STULZ

CLIMATE. CUSTOMIZED.

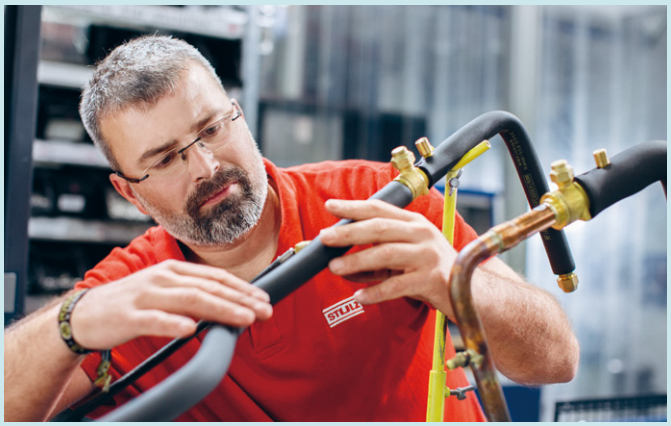
# CyberHandler 2

## The Indirect Evaporative Free Cooling Air Handling Unit

# STULZ air conditioning systems for mission-critical applications – around the globe

**For over 40 years** we have been one of the world's leading manufacturers of air conditioning solutions for mission-critical applications. For our customers, we develop and produce air conditioning systems and chillers, plan individual air conditioning solutions, implement the systems and keep them up and running with our own Service.

Our headquarters are in Hamburg. With 19 subsidiaries, 10 production sites, and sales and service partners in more than 140 countries, we make sure we are close to our customers wherever they are in the world.



**Technical peak performance from Germany**
It is the combination of decades of experience and a continuous innovative spirit that makes STULZ unique. From engineers to customer advisers, we work in closely intertwined teams, which jointly develop and continually optimize our air conditioning and chiller systems throughout all stages of development. So it should come as no surprise that our systems are extremely reliable and durable, and set the benchmark for energy efficiency around the globe.

**Service 24/7, 365 days a year**
In Germany, 140 highly qualified service engineers at 10 sites guarantee fast, expert solutions to your problems – around the clock. For 40 years, our customers have placed their trust in STULZ Service's technical expertise, comprehensive resources and seamless availability.

# Flexible & Efficient

## 11 sizes from 30 kW to 520 kW to fit your needs with maximum efficiency

Typical pPUE between 1.02&1.10

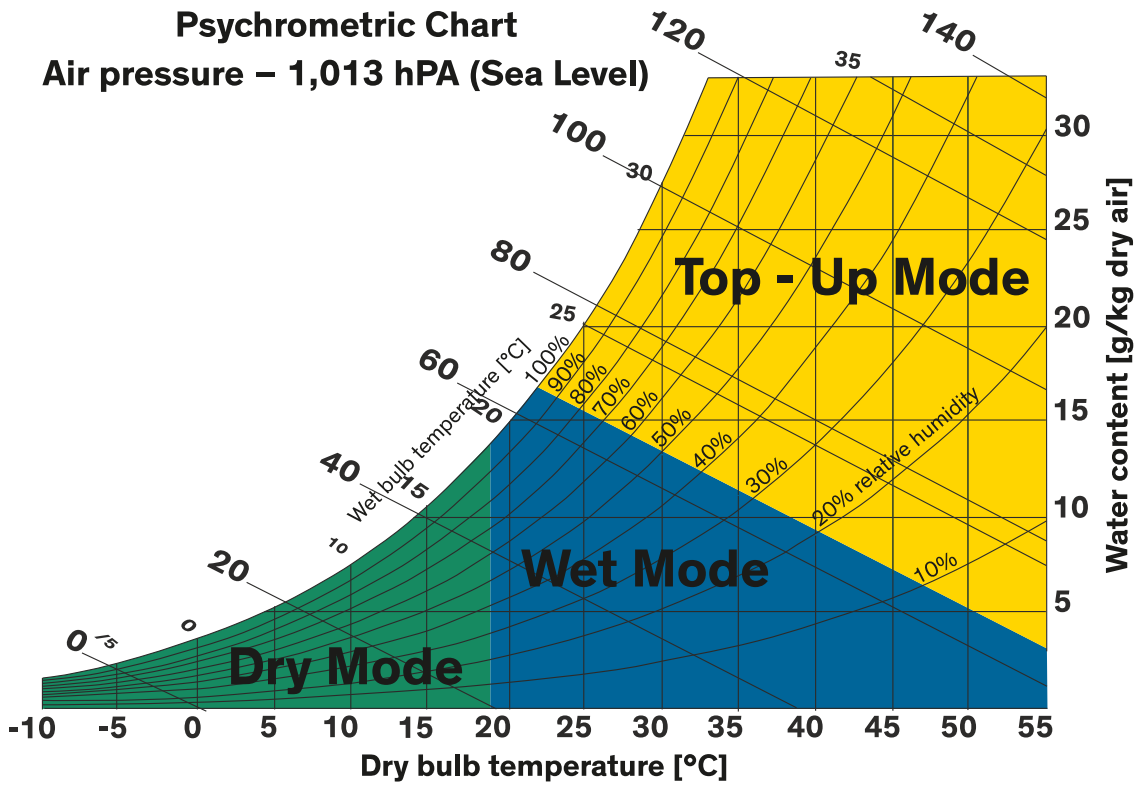
The STULZ CyberHandler 2 is a complete air conditioning solution especially designed for data centers.

With its outdoor housing, it can easily be installed next to a building or on a roof, freeing up precious floor space in the data center. 11 different sizes and various output ratings from 30 kW to 520 kW lay foundations upon which we can satisfy customers´ specific wishes.

Within each system, numerous options allow project-based configuration and adaptation to suit local conditions. A very efficient combination of Free Cooling and evaporative cooling in an optimized design mean that 100 % mechanical cooling is no longer necessary in most regions. pPUE values as low as 1.02 can be achieved.

Data centers are mission-critical systems requiring maximum operational reliability. For the CyberHandler 2 we employ a mix of components that we use in our STULZ precision air conditioning solutions for data centers, and each unit is equipped with its own STULZ controller, specially developed for controlling mission-critical chilling systems.

# Operating Modes & Benefits




## 3 operating modes based on ambient air temperatures:

- **"DRY MODE" (Free Cooling only)**
  Adiabatics OFF
  Mechanical Cooling OFF

At low outside temperatures, hot air from the data center is cooled down by the cold outside air via the plate heat exchanger.

- **"WET MODE" (Adiabatic):**
  Adiabatics ON
  Mechanical Cooling OFF

When the outside temperature is moderate, the outside air is pre-cooled by the adiabatic system before passing through the heat exchanger, where it cools down the air from data center

- **"TOP-UP MODE" (Mixed Mode):**
  Adiabatics ON
  Mechanical Cooling ON

At very high outside temperatures, a compressor refrigeration system is used in addition to the adiabatic system to provide top-up cooling.

## The benefits of Indirect Evaporative Cooling:

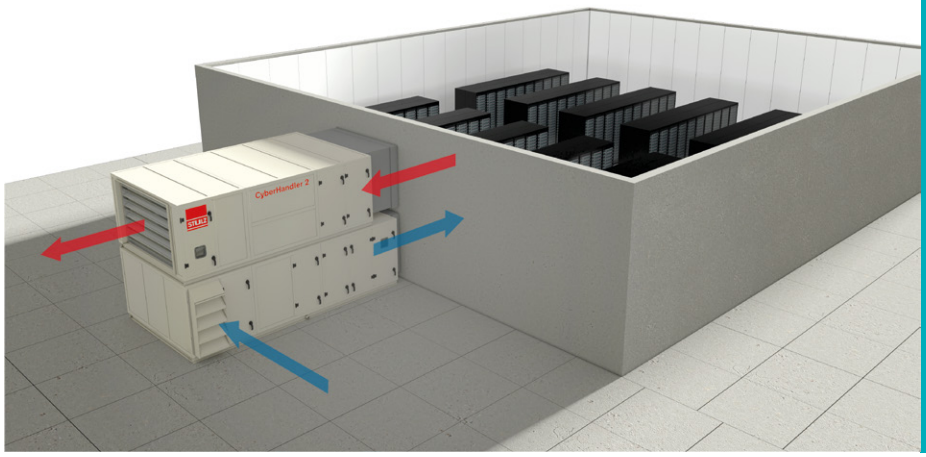
- No contamination from the outside
- Evaporative cooling extends Indirect Free Cooling operation all year round
- Unbeatable energy efficiency levels with pPUEs in the range of 1.02 – 1.10
- Lower total cost of ownership (TCO): reduced CAPEX, OPEX, maintenance, infrastructure costs, etc.
- The unit is installed outdoors, freeing up maximum white space in the data center
- Simplified installation: easier management of wiring, pipes and water, not needed inside the data center
- Downsizing the electrical infrastructure allows savings in CAPEX of 6-8 %
- Faster return on investment

# Installation Configurations

Our high-performance air handling units are positioned directly on or next to the building. All the necessary chilling components are integrated in the units´ housing, saving floor space in the data center and facilitating maintenance, as the service engineers no longer need to enter the data center.

## Wall

### Installation next to the building



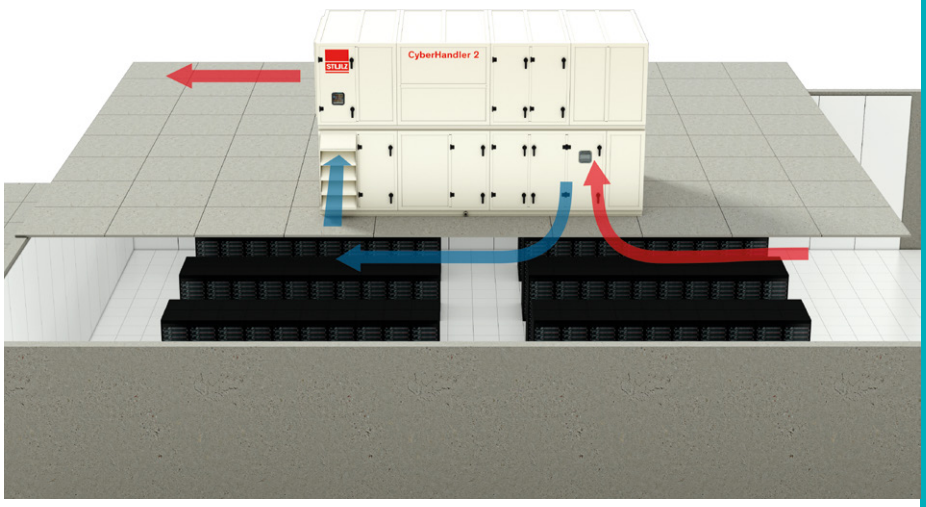

Supply and exhaust air is conveyed horizontally through the air conditioning unit.

The supply air duct can easily be joined to an existing raised floor, while the exhaust air travels conveniently out of the data center straight into the unit.

This kind of installation is especially suitable for data center projects without space restrictions and no need for the units to be visible.

## Roof

### Installation on the building




The air is conducted through the ceiling of the rooms into the CyberHandler 2. No additional air ducts are needed outdoors for connection.

By cleverly locating them on the roof, plus a few minor structural measures, the units can easily be made invisible, which has a dual benefit.

Firstly, units installed on the roof have fewer points of contact with the environment and will always generate less noise pollution.

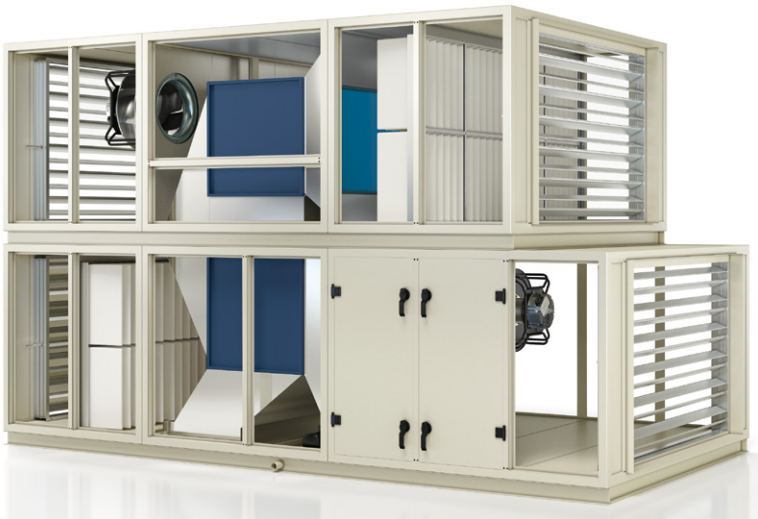
Secondly, data centers are high-security areas, and roof installation makes sabotage more difficult.

This kind of installation is especially suitable for data centers in residential and mixed-use areas.

# Cooling Configurations

The requirements for a cooling system vary hugely depending on the location and climate zone. With four basic configurations and many options available, we can offer the right solution for every project requirement in virtually every climate zone.

## Indirect Evaporative Free Cooling



The largest mechanical component in the CyberHandler 2 is the air/air heat exchanger. The hot air from the data center is cooled with outside air in the heat exchanger without mixing the two air flows. In addition, adiabatic cooling takes place in the heat exchanger by nozzles spraying water directly on the heat exchanger.
In this way, the air is pre-cooled and the heat exchanger is enhanced, extending the Free Cooling period. In temperate/hot climates, in particular, this covers all cooling needs, and additional mechanical compressor cooling is unnecessary.

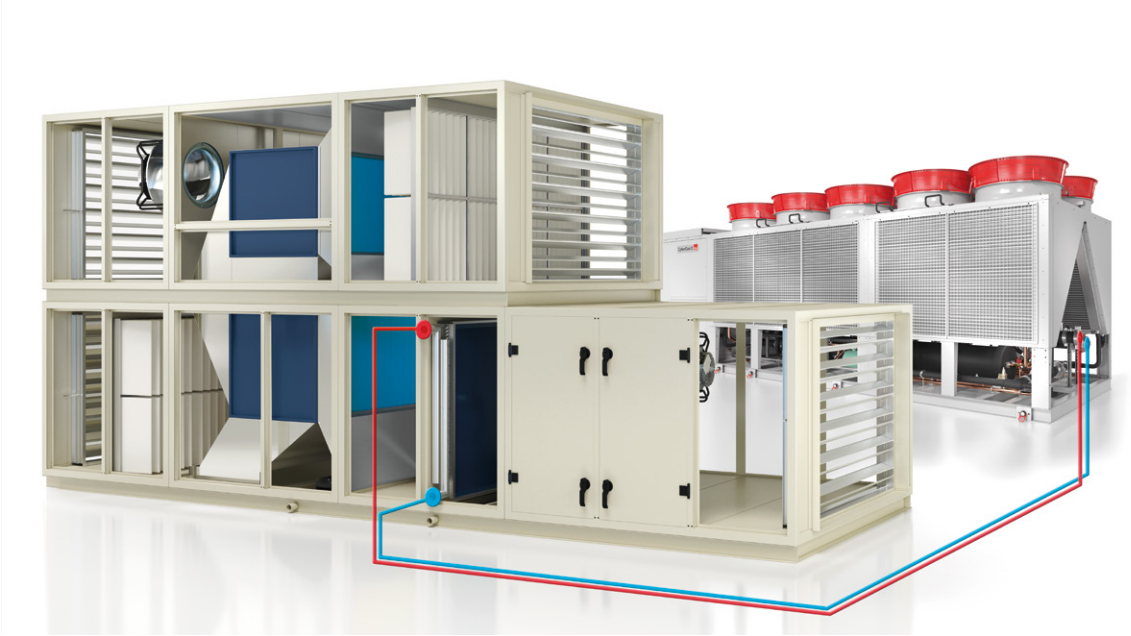
## Indirect Evaporative Free Cooling with Top-Up integrated DX cooling system

In very hot climates, DX cooling is added to the existing system. The complete DX system with compressor, evaporator and condenser is also housed inside the unit. With this enhancement, 30 % of the required cooling can be generated mechanically. In this way, the system can be used in practically any climate zone.

**Redundant cooling configuration for even greater independence**

Extreme climatic conditions with strongly fluctuating temperatures and periods of intense heat are now occurring more often in various regions. In isolated cases, when the adiabatic cooling is not enough to guarantee sufficient cooling, the system must be combined with a 100% weather-independent solution. Chilled water systems with chillers and DX heat exchanger systems have proven to be an excellent enhancement here.

## Indirect Evaporative Free Cooling with CW Coil Top-Up/Redundant cooling



A CW chiller is added to the adiabatic cooling system, and provides additional cooling in an infinite range. If necessary, the chiller can generate all the cold needed.

## Indirect Evaporative Free Cooling with redundant DX cooling system

In this configuration, a DX outdoor unit is connected to the CyberHandler 2, and takes on 100% of cooling if required.

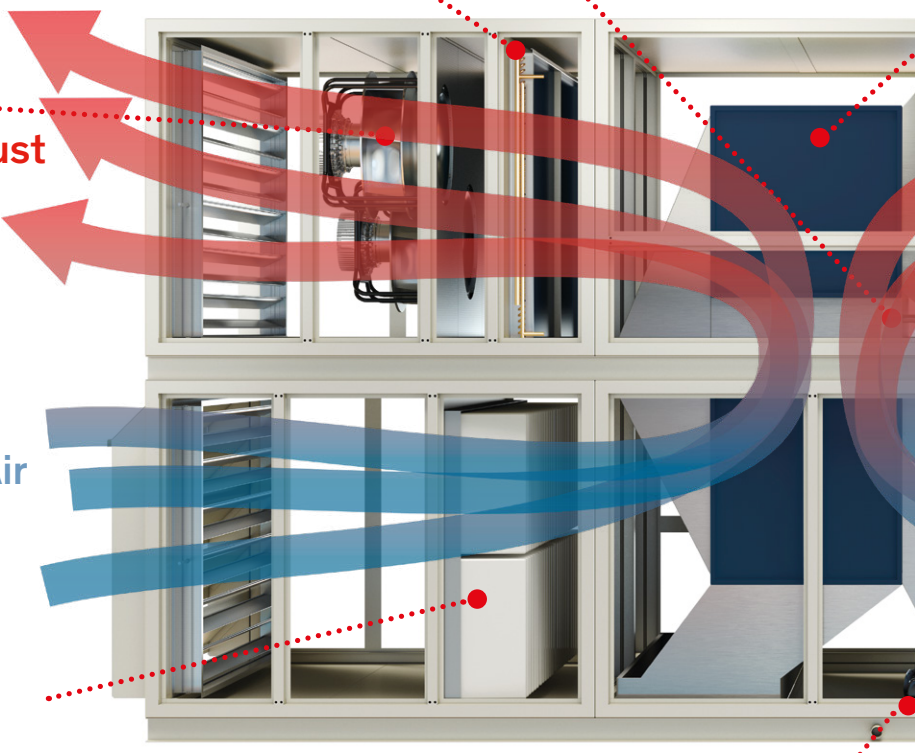
# Components Overview

## Mechanical cooling options

- Chilled water coil (external chiller)
- DX coil (external condenser)
- Integrated DX cooling system (top-up)

## Water spray nozzles

- Full cone stainless steel nozzles
- Guarantees a full “shower” on the plate heat exchanger
- Non-clogging design
- Allows the use of demineralized water




## Fans

- Plug fan technology
- State-of-the-art, highly efficient EC motors
- Reduce the noise level

## Filters

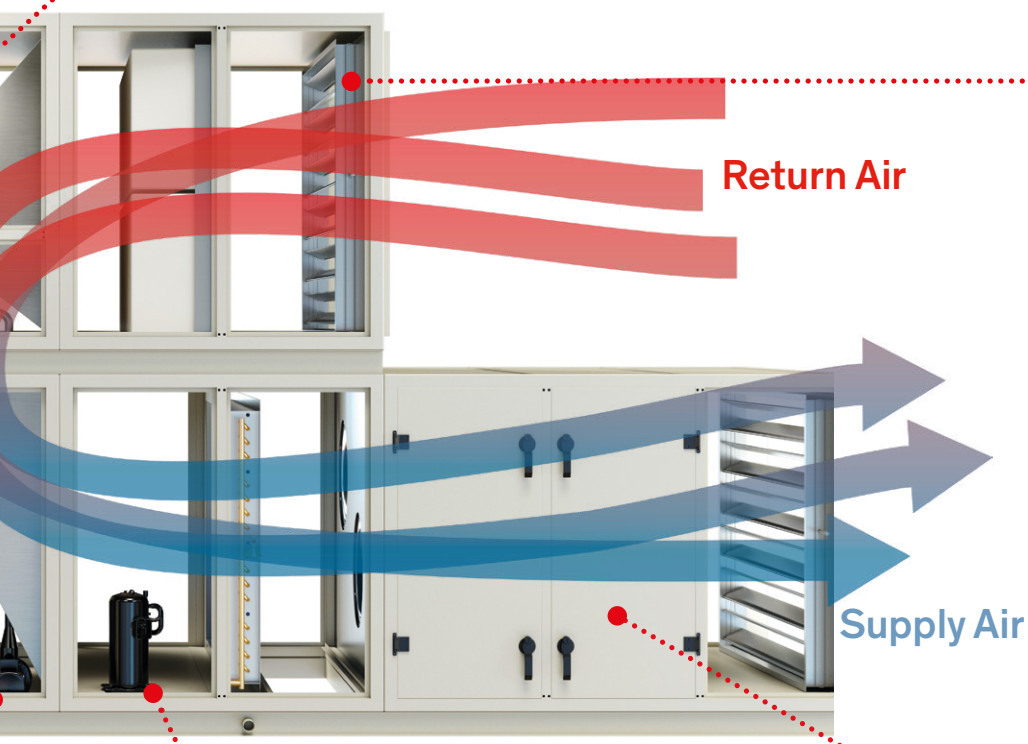
- Eurovent certified
- Meet the standard EN779:2012
- Low pressure drop design
- Available in different classes (G4, M5, F7 and F9)

## Water Pump

- High efficiency stainless steel circulation pump
- Allows the use of demineralized water
- Low pressure system
- Redundant pump as an option

## Air-to-air plate heat exchangers

- 100 % aluminum, epoxy painted, extra sealed
- 100 % indirect heat recovery
- Eurovent certified
- Excellent efficiency to pressure drop ratio
- Double PHX for higher cooling recovery



## Dampers

- 100 % aluminum and plastics (no corrosion issues)
- Low pressure drop design
- Different leakage classes available
- Special fire and smoke dampers (optional)

## Microprocessor Controller

- State-of-the-art intelligent control for IT cooling systems
- Designed specifically for precision control of mission-critical environments
- Hardware and sofware developed in-house

## Compressor technology

- The latest EC compressor scroll inverter technology
- Additional tandem scroll compressors for higher capacities
- Maximum efficiency at partial loads

# STULZ Microprocessor Controller

**The STULZ Microprocessor Controller provides precision monitoring and control of the mission critical environment.**

## Advantages

- Backlit LCD alphanumeric display for visual indication
- Operated via 6-key menus, in five different modes
- Capable of networking up to eight STULZ Microprocessor Controller with an independent LAN
- Unit functions for cooling, heating, humidifying and dehumidifying
- Three levels of restricted entry into the configuration
- Sensor inputs control inputs/outputs
- Additional I/O sensors and alarms
- Psychrometric control provided as a user configurable temperature and humidity (relative humidity) or dew point control
- Optional UPS backup module
- Independent EC Fan and cooling control (CW valve or DX)
- Cooling control sequence: return air temperature, humidity, supply air temperature, dew point
- Fan control sequence: BMS, local/static pressure, and temperature based (supply or return air)

### STULZ Microprocessor Controller ties everything together

- Designed specifically for precision control of mission critical environments
- Multiple I/O capabilities for all major components to optimize control for energy savings
- Supports universal BMS interface for remote monitoring (address readable) and remote control (address writable)
- Capable of network controllers in a workgroup (pLAN) to work as one (no BMS required)
- Pre-engineered controls for economizers and adiabatic cooling

### STULZ Microprocessor Controller communicates with BMS/BAS systems via the following protocols

- BACnet IP
- BACnet over Ethernet
- BACnet MS/TP
- HTTP
- SNMP V1, V2c
- Modbus IP
- Modbus RTU

**The CyberHandler 2 Select** is a powerful software tool specially designed to allow an easy and friendly experience during the selection of each Air Handling Unit. The user-friendly interface helps you optimize and customize the unit so it best fits the project requirements. The CyberHandler 2 Select can provide you with the following documentation:

- Technical specification sheets
- 2D drawings
- 3D images
- Quotations
- Life-cycle cost (LCC) calculations
- pPUE calculations (ASHRAE Weather Data Viewer version 5.0 is integrated)

# The complete solution

The CyberHandler 2 is more than a product. We offer a full range of services, providing you with a turnkey solution for your data center cooling:

- Software tools for calculating life-cycle cost/pPUE
- Reverse osmosis (RO) water treatment system
- Start-up
- Maintenance
- Warranty

# Testing facilities

In our Test Center, located near Madrid in Spain, we can perform a variety of tests on the Air Handling Units in a state-of-the-art test chamber. This enables our clients to witness the units operating under simulated extreme conditions, providing critical information such as performance data, energy consumption and water consumption.

## Test parameters

- Function tests for simulating the safety features
- Physical dimensions of the units
- IT load up to 520 kW
- Airflows up to 120,000 m3/h
- Outdoor ambient conditions:
  – Temperature range from +10 to +50
  – Humidity range from 30% RH to 90% RH

# Main features at a glance

- Cooling range from 30 kW to 520 kW
- 11 sizes
- Ready for roof and wall installation
- The best casing leak classification according to standard EN1886 (L1/L1)
- Designed for minimum pressure drops
- STULZ Microprocessor Controller designed especially for precision control of mission-critical environments
- Easy access for maintenance
- Several filter classes available: G4, M5, F7 and F9
- Designed to fit standard transportation
- Flexible modular installation
- 3 cooling systems in 1:
  - Indirect Free Cooling
  - Indirect Evaporative Free Cooling
  - Mechanical cooling (as top-up or redundancy)

# Customize it...

## Customize the CyberHandler 2 to your requirements with a wide range of options

- Dual power supply with automatic or manual switchover
- Ultrasonic humidifiers
- Fresh air damper for CO2 control
- Outdoor installation
- Damper (ambient side and DC room return)
- Silencers
- Factory Acceptance Test
- Control systems UPS backed
- Fire and smoke dampers (data center side)
- Different filter classes according to the EN779: M5, F7, F9
- RO water treatment system
- Anti-frost control
- Redundant adiabatic water pump
- Alternative power supply

# Technical Data & Nomenclature

| Sizes | | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|
| **Technical Data** | | | | | |
| Nominal net cooling capacity | kW | 32 | 43 | 52 | 69 |
| Nominal data center airflow | m3/h | 5,350 | 8,500 | 10,200 | 13,600 |
| Max. net cooling capacity | kW | 63 | 106 | 123 | 174 |
| Max. data center airflow | m3/h | 13,400 | 22,575 | 26,200 | 37,050 |
| pPUE (annual) | | 1.036 | 1.036 | 1.033 | 1.032 |
| EER | | 19.07 | 16.54 | 18.32 | 19.54 |

| Sizes | | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|
| **Dimensions and Weight** | | | | | |
| Width | mm | 1,400 | 1,775 | 2,010 | 2,620 |
| Height | mm | 2,400 | 3,010 | 3,010 | 3,010 |
| Depth | mm | 3,750 | 4,080 | 4,080 | 4,080 |
| Weight | Kg | 2,300 | 3,400 | 3,650 | 4,470 |

**Example:** CH2 - S1 - ADB - SH/RH

### Product Range

| | |
|---|---|
| CH2 | CyberHandler2 |

### Size

| | |
|---|---|
| S1 - S11 | From S1 to S11 |

### Cooling Configuration

| | |
|---|---|
| ADB | ADB: Adiabatic only |
| CWT | CWT: Chilled Water Top-Up Coil |
| CWR | CWR: Chilled Water Redundant Coil |
| DXT | DXT: DX Top-Up integrated system |
| DXR | DXR: DX Redundant system with outdoor condensing unit |

### Installation Configurations

| | |
|---|---|
| SH/RH | SH/RH: Supply Horizontal/Return Horizontal (Wall) |
| SB/RH | SB/RH: Supply Bottom/Return Horizontal (Roof) |
| SB/RB | SB/RB: Supply Bottom/Return Bottom (Roof) |

| S5 | S6 | S7 | S8 | S9 | S10 | S11 |
|---|---|---|---|---|---|---|
| 78 | 103 | 116 | 135 | 150 | 172 | 206 |
| 15,350 | 20,200 | 22,800 | 26,000 | 29,400 | 33,850 | 40,450 |
| 196 | 270 | 276 | 352 | 367 | 428 | 531 |
| 41,750 | 57,500 | 58,750 | 74,950 | 78,115 | 91,100 | 113,050 |
| 1.034 | 1.032 | 1.031 | 1.03 | 1.031 | 1.033 | 1.033 |
| 17.57 | 17.22 | 17.63 | 19.45 | 19.95 | 17.71 | 18.13 |

| S5 | S6 | S7 | S8 | S9 | S10 | S11 |
|---|---|---|---|---|---|---|
| 2,020 | 2,630 | 2,935 | 2,935 | 3,250 | 3,250 | 3,860 |
| 4,230 | 4,230 | 4,840 | 4,840 | 4,840 | 5,450 | 5,450 |
| 4,560 | 4,560 | 4,560 | 4,850 | 4,850 | 5,210 | 5,210 |
| 5,050 | 5,970 | 6,420 | 7,120 | 7,550 | 8,580 | 9,690 |

Capacities are based on the following conditions:
- Supply air 25°C DB with $\Delta T = 15$ K and 50 Pa ESP
- Ambient air 35.8°C DB / 22.3°C WB

Dimensions and weights are estimates and will depend on the selected cooling/installation configuration.
Annual pPUE calculation based on London Heathrow Airport weather data in nominal conditions.

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With specialist, competent partners in ten German branches and in subsidiaries and exclusive sales and service agents around the world.
Our ten production sites are situated in Europe, North America and Asia.

For further information, please visit our website at **www.stulz.com**

You can find out more on our product page.