International Society of Automation
Delhi Section

Setting the Standard for Automation™

Smart Control System Cabinets

Integrate & Deploy with Zero Downtime solutions by Rittal

ISA-D: “Fertilizer , Food and Pharma Symposium-2023"

Rittal – The System.

Faster – better – everywhere.

Innovation leads to Transformation

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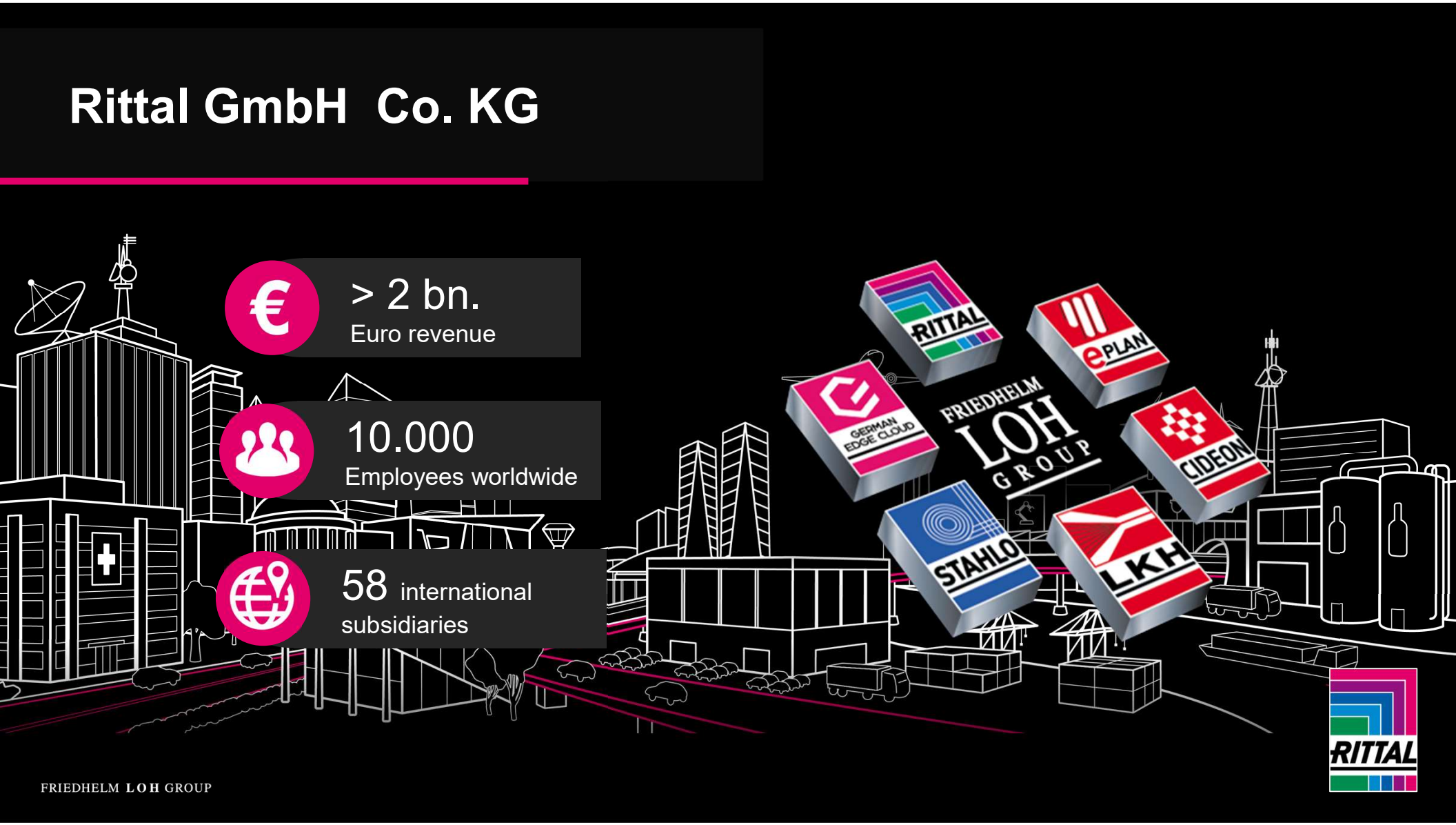
Rittal GmbH Co. KG



Robust Infrastructure

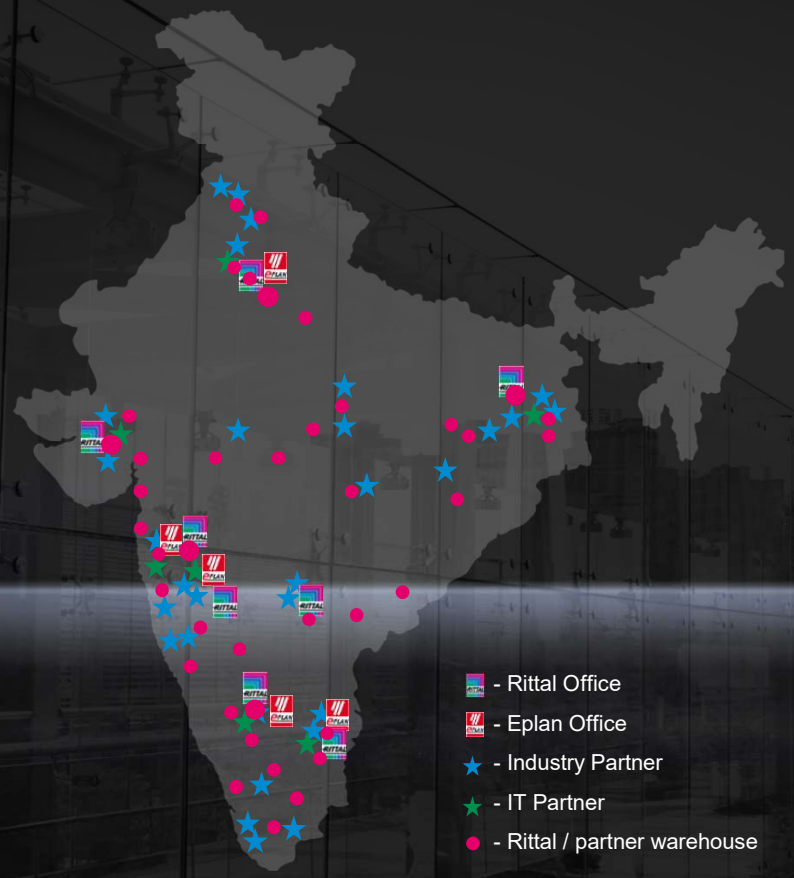
10
Offices across India

5
Modification centers

16
Service partners

1100+
Employees

140+
On-ground representatives



8000+
Customers

5
Warehouses

107+
Channel partners

70+
Partner warehouses

48 hrs
Delivery guaranteed*
*For select cities

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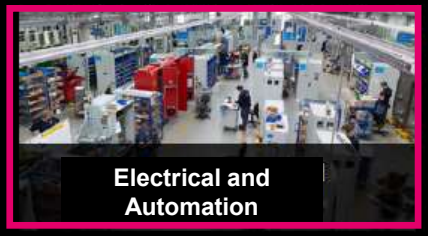
Vertical Market Management



Current Trends in Industry

Trends

- Digitalization and Industry 4.0
- Sustainable manufacturing
- Digital twins
- Robotics and automation
- 3D printing
- Artificial intelligence (AI)
- Servitization
- Reshoring
- Extended reality
- Advanced materials

Impacts

Industry 4.0 enables manufacturers to conduct real-time data collection and analysis for vast amounts of data, providing them valuable insights into their operations.

Manufacturing processes often require large amounts of energy and water and can often produce harmful waste and other by-products

A digital twin—a virtual replica of a physical object or system, equipped with sensors and connected to the internet—can collect data and provide real-time performance insights

Rittal and Eplan

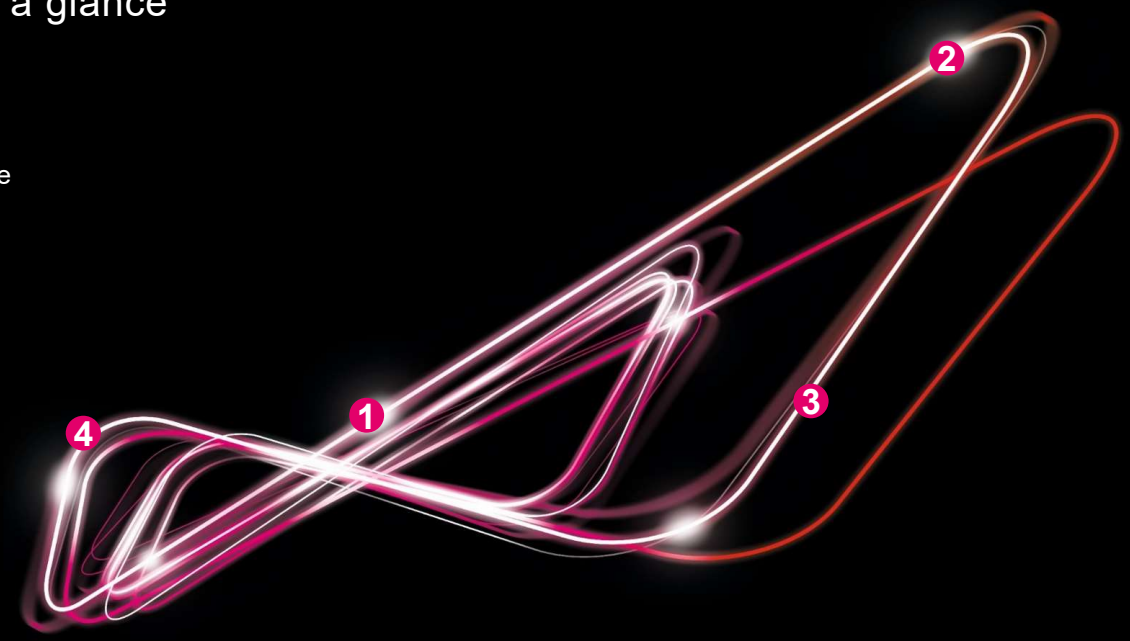
The benefits for you at a glance

1. Engineering

- Error-free and flexible processes with the digital twin throughout the entire value chain
- High-quality 3D data in the EPLAN Data Portal
- 3D-assisted design with EPLAN Pro Panel

2. Sourcing

- Error-free product configuration with the Rittal Configuration System
- Interfaces to EPLAN engineering tools
- Easy ordering and fast delivery of Rittal series products



4. Operations

- Minimised downtimes and efficient production with Rittal Global Service
- Predictive maintenance thanks to IoT linking of Rittal cooling units
- Access to project data from any location with the cloud-based solution EPLAN eVIEW

3. Manufacturing

- Fully automated Rittal equipment for precise machining, assembly and wire processing
- Easy wiring with EPLAN Smart Wiring
- Linking of all workstations via the digital twin

MORE PRODUCTIVE – thanks to digitalisation and prototyping

FASTER – thanks to configuration aids and online shop

MORE RELIABLE – thanks to smart, global service

BETTER – thanks to Industry 4.0 and automation

Ecosystem of Industrial Automation

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Component Manufacturer

Delivery of components

Panel Builder

EPLAN
Data Portal

3b **Engineering**
(3D/virtueller Zwilling)

4 **Sourcing**

5 **Manufacturing**

V2 EPLAN Project

EPLAN Project

1a **Specification**

1b **Planning**

2 **Basis Engineering**

3a **Detail Engineering**
Schematics

Delivery of the control panel

Operator

V1 EPLAN Project

Products, turn key solutions

OEM, System Integrator

V3

7 **Operation**

6 **Commissioning**

Things/Supply Chain **Specification** **x** **Value Chain**

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Codes & Standards for Enclosures

Secure enclosures
Housing requirements

- **Protection of persons**
  - who are in the vicinity of switchgear (non-professional persons)
  - who operate switchgear (instructed persons)
  - who work in or on the switchgear (qualified electricians)

- **Protection against environmental conditions and faults**
  - Dirt particles and dust
  - Humidity
  - Mechanical damages
  - Temperature
  - Corrosion
  - EMC influences
  - Electrical faults

Secure enclosures
Regulations and standards for housings

- Protection of persons
  - who are in the vicinity of switchgear (non-professional persons) — IEC 61439, IEC 61641
  - who operate switchgear (instructed persons) — IEC 60204
  - who work in or on the switchgear (qualified electricians)
- Protection against environmental influences and faults
  - Dirt particles or dust — IEC 60529
  - Humidity — IEC 60529
  - Mechanical damages — IEC 62262
  - Temperature — IEC 61439/IEC 60068-2
  - Corrosion — IEC 60068 -2
  - EMC influences — IEC 61439
  - Electrical faults — IEC 61439

Secure enclosures
Test overview

- Protection against the penetration of solid bodies, dust and water
- Size accuracy
- Corrosion resistance
- Paint coat thickness
- Notched impact strength
- Static material strength (load capacity etc.)
- Dynamic material strength, vibration resistance
- Proof of resistance to pressure in the event of electrical short circuits
- Proof of the protection of persons in the event of electrical faults
- Protection against mechanical damages from the outside
- Ensure a consistent quality of production

Rittal system solutions

Enclosure – Facts & Features

- High load-bearing capacity of the 16-fold up to 1,400 kg
- Versions available: sheet steel, stainless steel, EMC, Ex
- Worldwide approvals (e.g UL, CSA, TÜV, DNV-GL etc.)
- Protection category up to IP 66 & NEMA 4/4x
- Convenient features:
  - automatic potential equalisation for gland plates, roof, side and rear panels
  - Interior installation on 2 mounting levels
  - Straightforward hole count in the profile
  - Tool-less mountable mounting plate brackets

Rittal system solutions

Enclosure – Customer Benefits – Inter-changeability

Rittal system solutions

Enclosure – Customer Benefits – Flexibility

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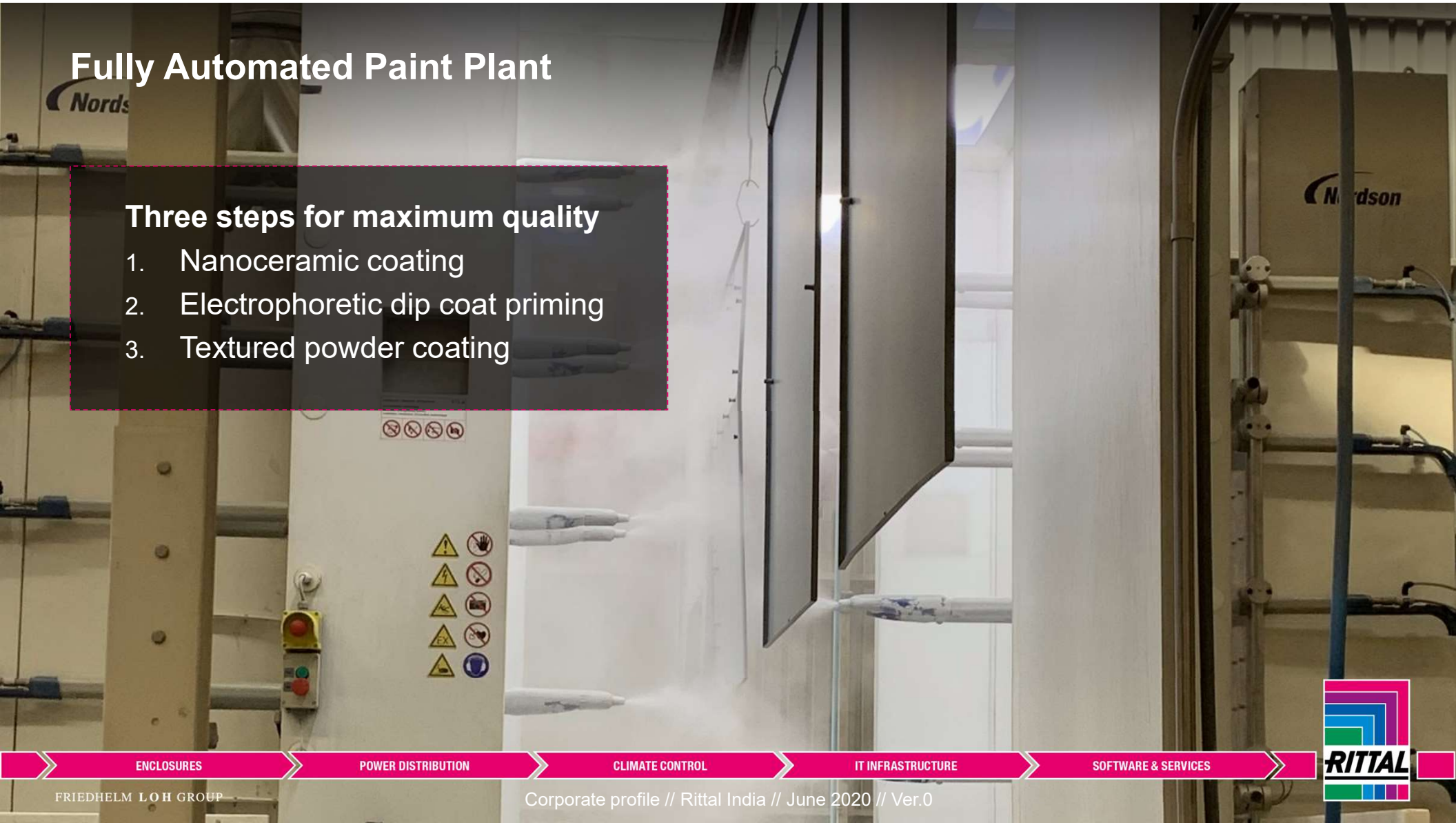
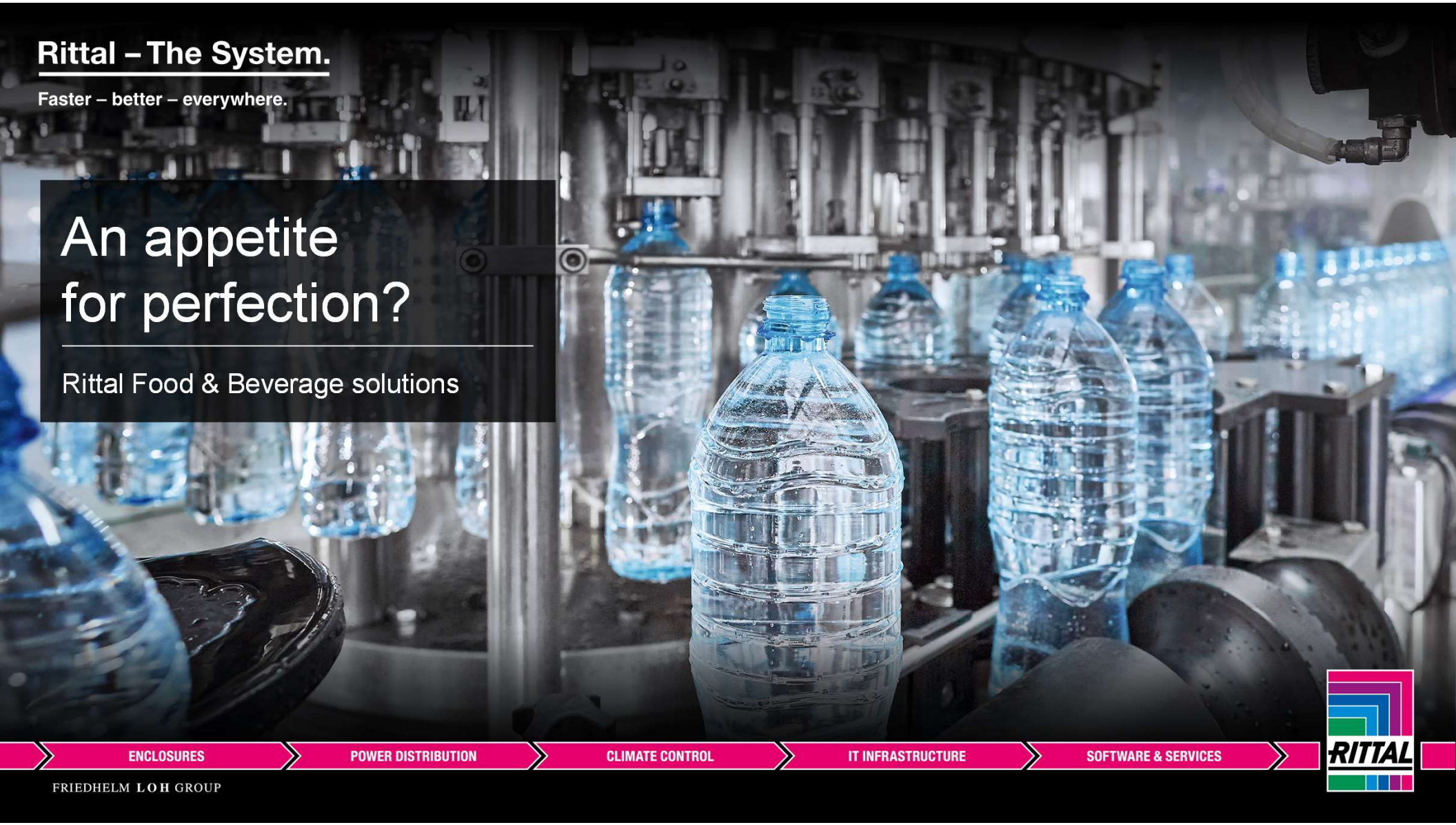
Fully Automated Paint Plant



Three steps for maximum quality

1. Nanoceramic coating
2. Electrophoretic dip coat priming
3. Textured powder coating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An appetite for perfection?
Rittal Food & Beverage solutions
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Differences in the industry

Food

Dairy

Beverage

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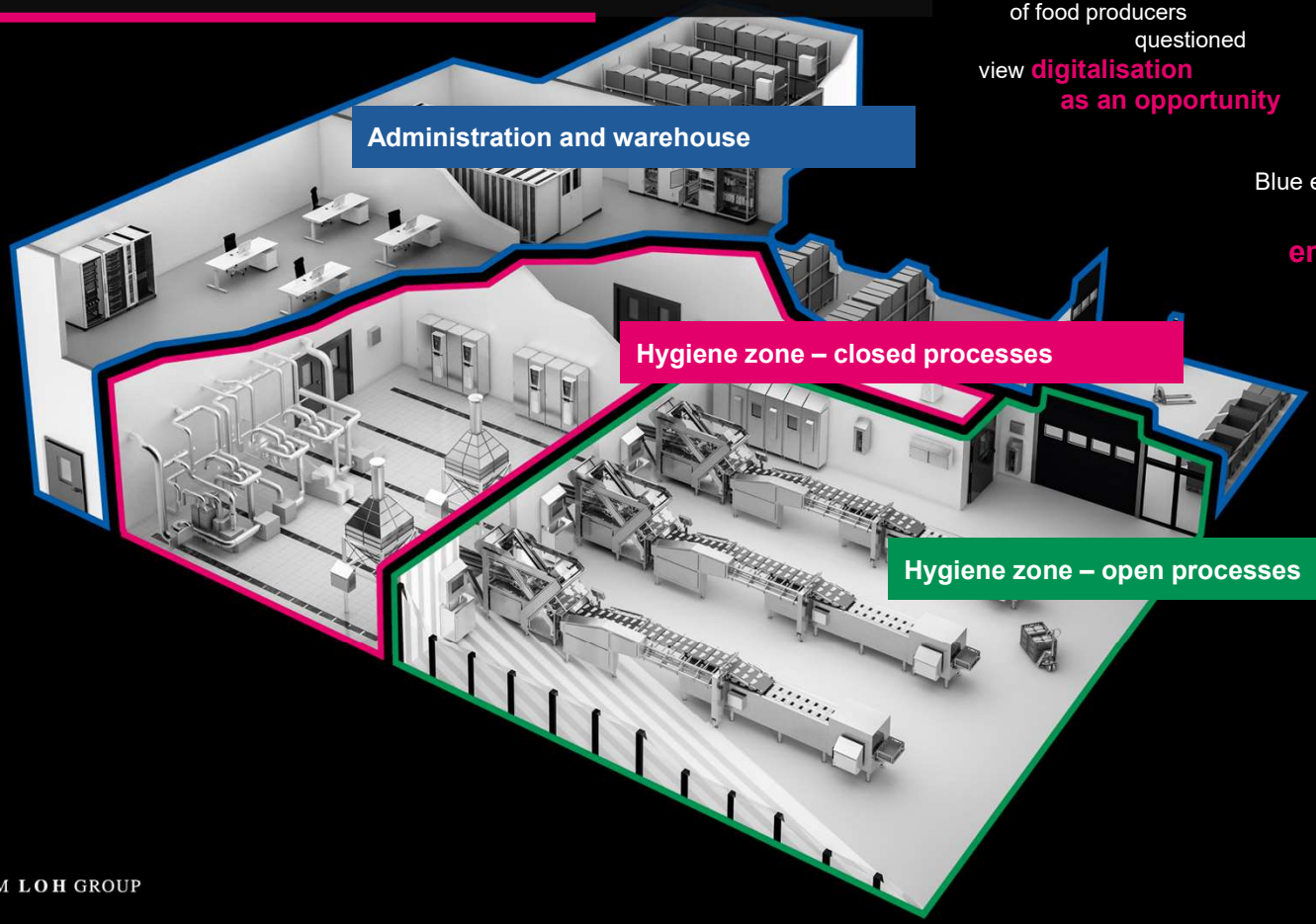
Three areas of expertise



84 %

of food producers questioned view **digitalisation as an opportunity**

Blue e+ cooling units could **cut carbon emissions** in Europe by

3 million

tonnes.

In **2018**, there were

186

food items **recalled** from circulation in Germany alone

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Why do we need Enclosures in the Production?

For the electrical components in the interior:

- Protection against dust and water
- Support and structuring of the interior structure
- Protection against overheating
- Protection against electromagnetic interference (EMC)
- Protection against mechanical influences, vandalism and earthquakes

For the environment:

- Shielding of electromagnetic emissions
- Protection against contact with dangerous voltages
- fire protection (special solutions for smoke extraction systems)

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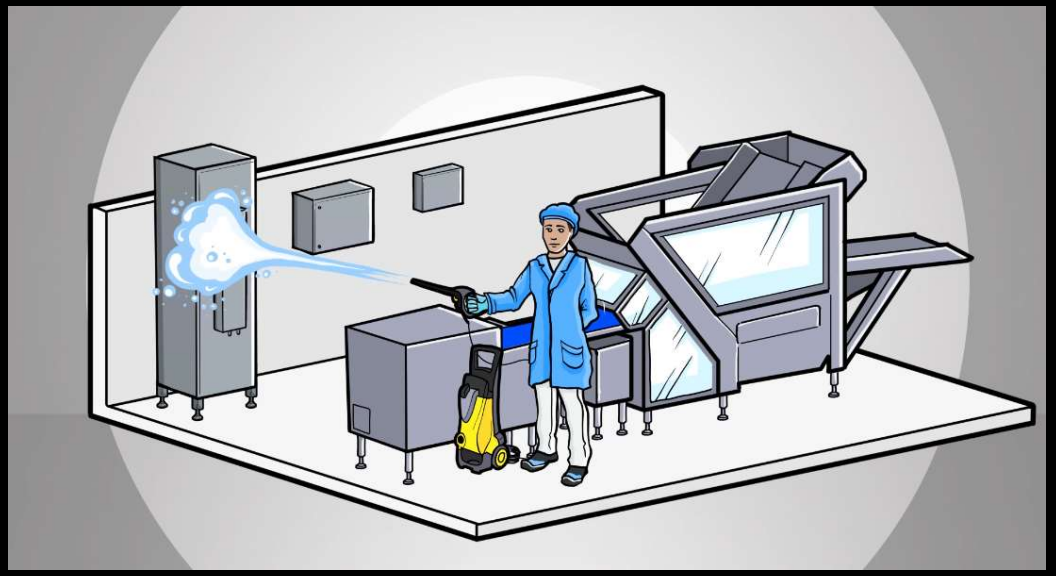
Challenges in the food industry

- Daily cleaning
- High-pressure cleaning
- Aggressive cleaning agents
- Wide temperature fluctuations
- Frequent maintenance
- High level of leak-tightness
- Ensuring hygiene

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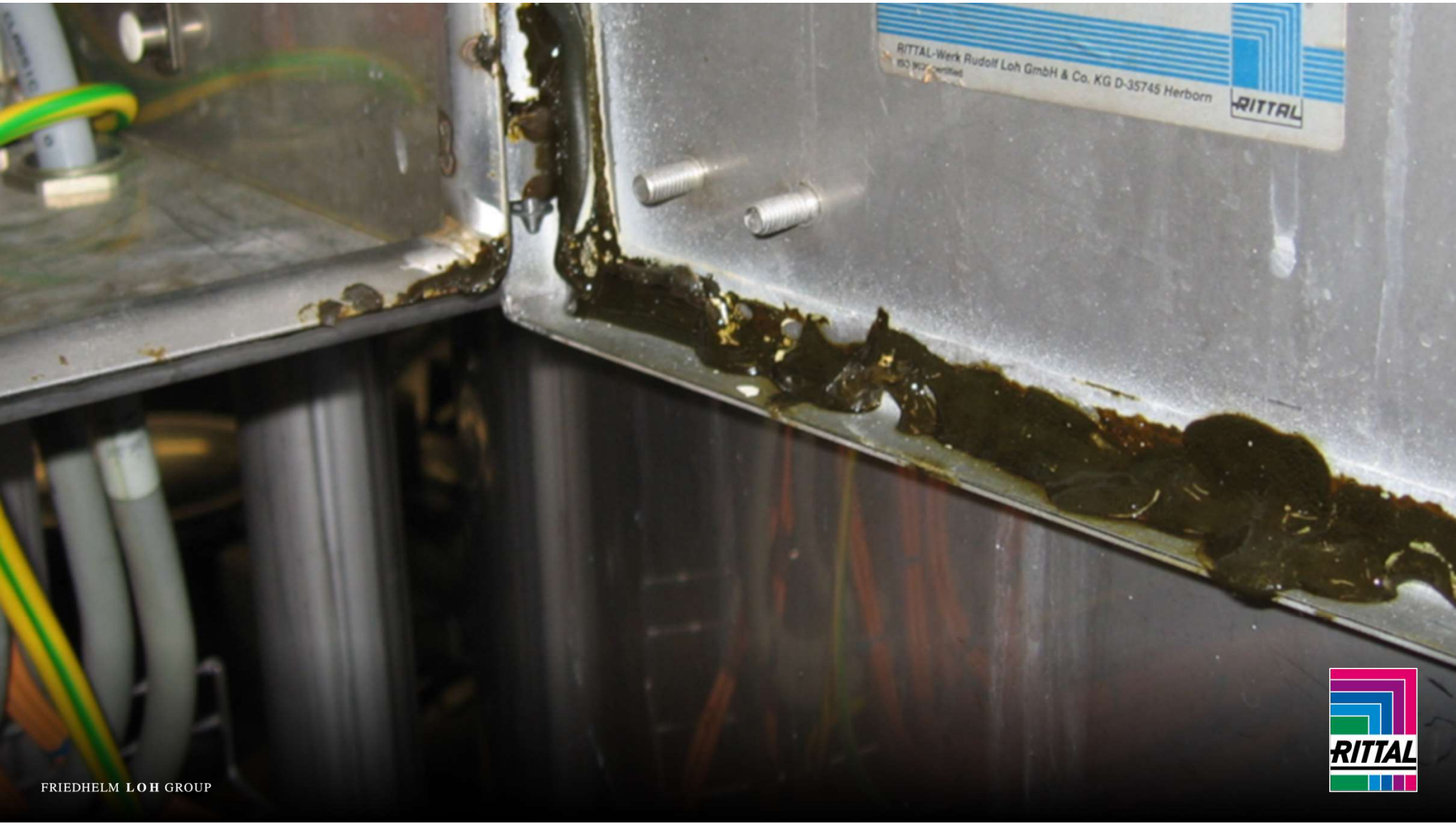

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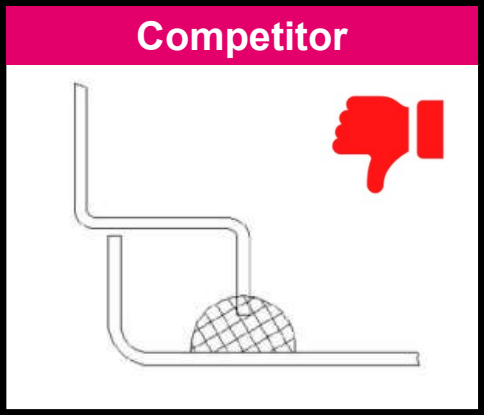
Materials and surfaces

- Corrosion resistant
- Suitable for cleaning and disinfection
- Smooth – no cracks or gaps
- It must be possible for liquids to drain away

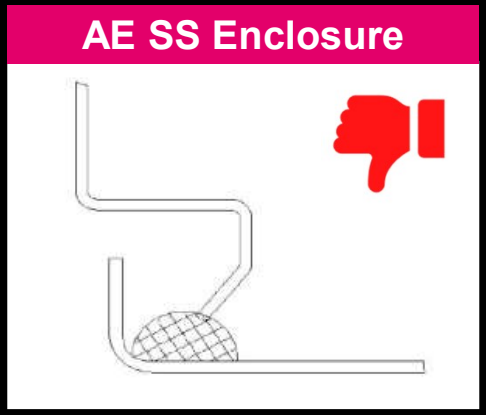
Sealing

- Sealed, welded without any gaps or bonded
- Screws and other such fastenings are to be avoided in the food industry or must have a hygienic design

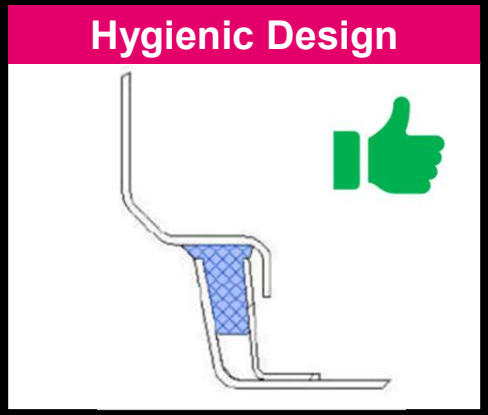
Competitor



AE SS Enclosure

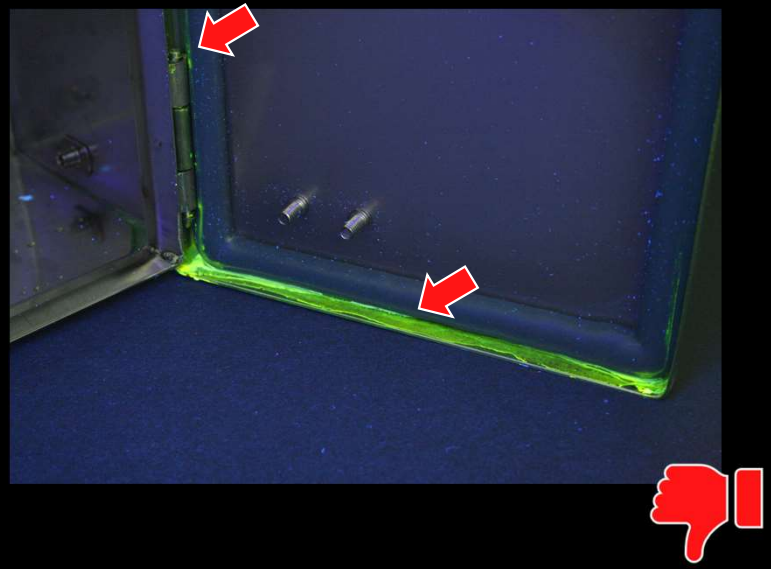


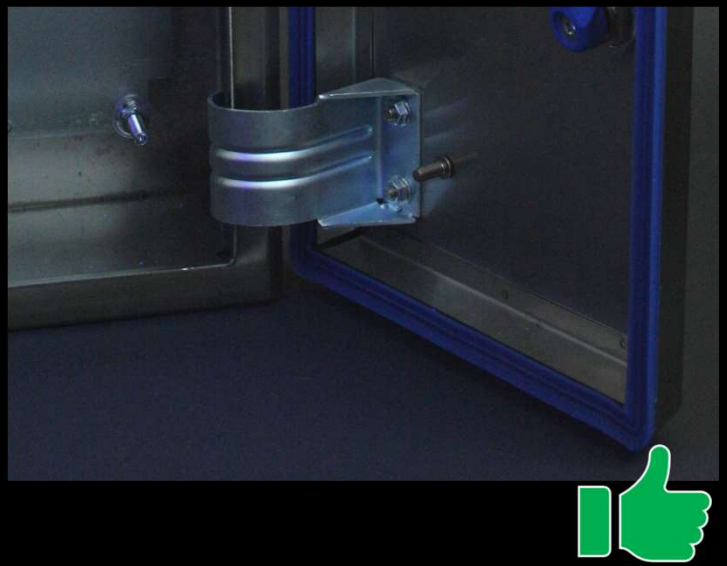
Hygienic Design



Dead spaces

- Spaces that can’t be seen or cleaned
- These must be avoided





Angles and corners

- Minimum radius of 3 mm in order that they can be cleaned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Hygienic Design

- Regulations and organisations

Standards of Hygienic Design is based on….

DIN EN ISO 14159

- Safety of machinery – Hygiene requirements for the design of machinery

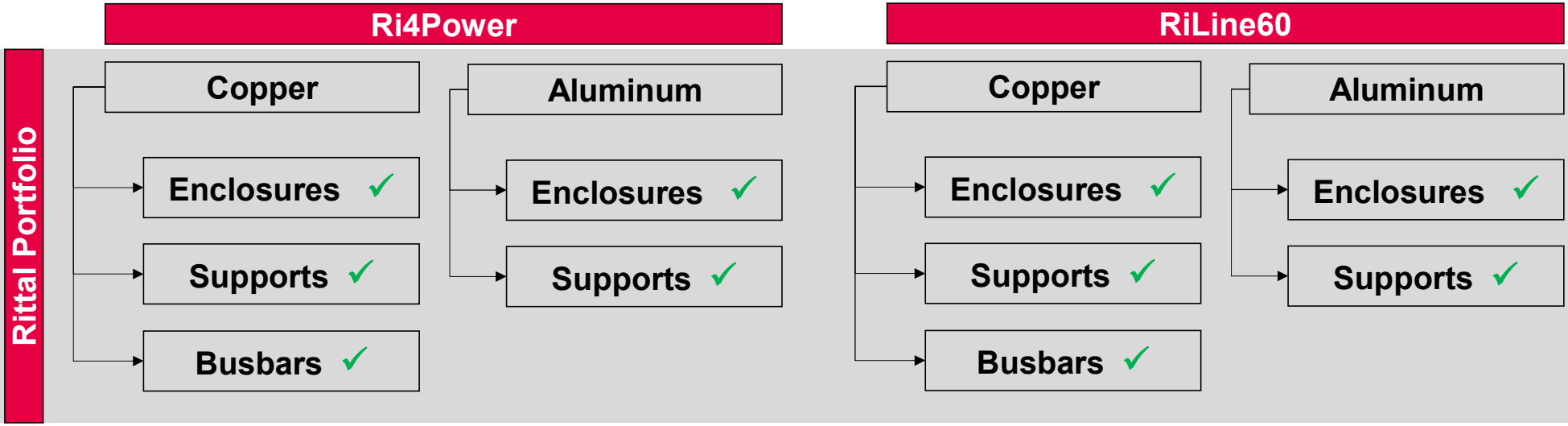
DIN EN 1672-2

- Food machinery – General principles – Part 2: Hygiene requirements

Machinery Directive 2006 / 42 / EC

- Annex 1, section 2.1: Foodstuffs machinery and machinery for cosmetics or pharmaceutical product

Product Portfolio
SBU B – E&P



Forms	Form 3 -4	Form 1 -2
Switchgear	Siemens / Schneider / ABB / GE / Terrasaki; ABB / Schneider	Siemens / Schneider / ABB / GE / Terrasaki
Max Ratings	6300 A & 10,000A (ERDA TR)	1600 A
Certifications	IEC 61439, IEC 61641	

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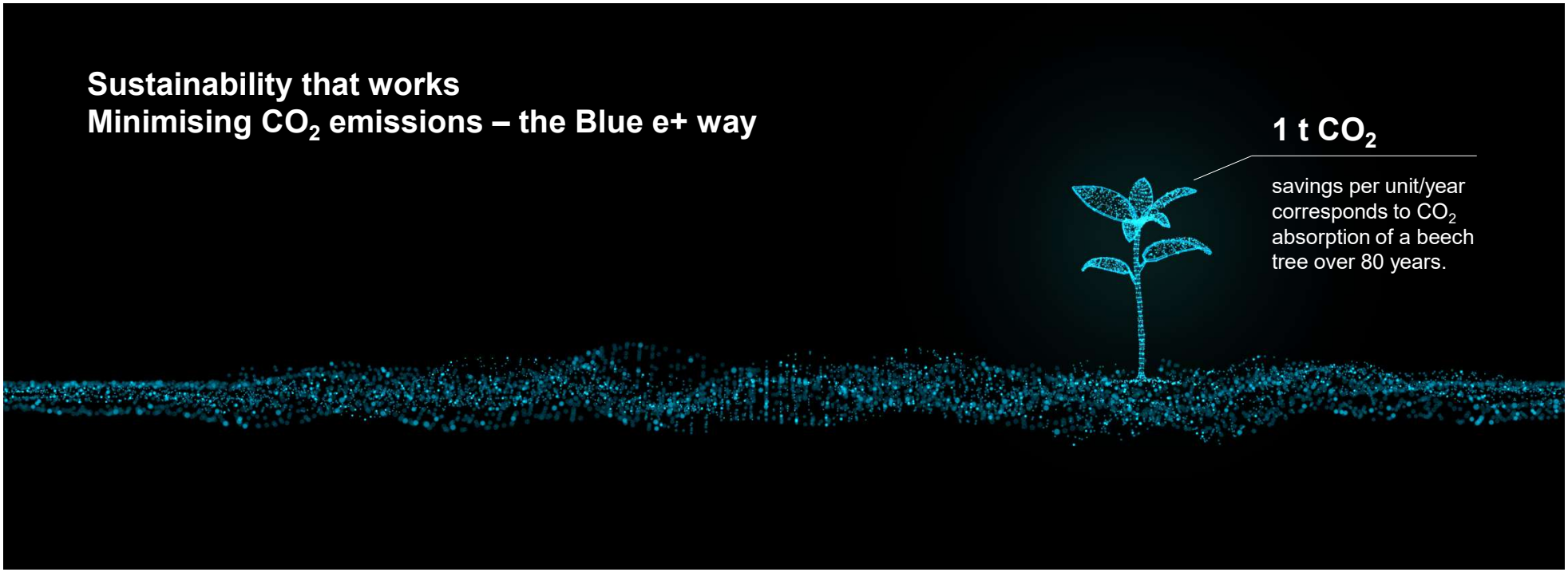
Sustainability that works
Minimising CO_2 emissions – the Blue e+ way



1 t CO_2

savings per unit/year corresponds to CO_2 absorption of a beech tree over 80 years.

History of the Blue e+ cooling units

Extension 1:
Output class 1600 W
Sheet steel

2017

Extension 2:
Output class 1600 – 5800 W
Stainless steel

2018

VX25 Blue e+ integration solution
Blue e+ roof-mounted cooling unit
Output class 1300 W

2018

Variant:
Output class 1500 W
Outdoor

2020

Extension configuration:
Output class 2000 – 5000 W
Outdoor

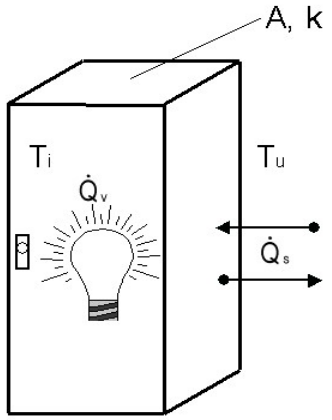
2022

Market launch of Blue e+ S
Output class 300 – 1000 W
Sheet steel

2022

Project planning and designing: Parameters

- Maximum ambient temperature (T_a)
- Maximum enclosure internal temperature (T_i)
- Effective enclosure surface area (VDE) (A)
- Heat transfer coefficient (k)
- Heat loss (Q_V)
- Installation type
- Protection category (IPxx)



A Effective enclosure surface area [m²] (VDE 0660, part 500)

Enclosure size (surface)
Depending on the enclosure installation type, the effective sufrace area can vary.

Project planning and designing: Parameters

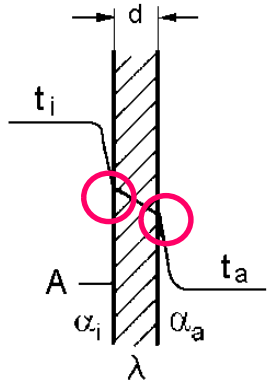
k Heat transfer coefficient

$$k = \frac{1}{\frac{1}{\alpha_i} + \frac{d}{\lambda} + \frac{1}{\alpha_a}}$$

d = Material thickness of the enclosure panels
λ = Specific thermal conductivity
α_i = Heat transmission coefficient on the inside of the enclosure
α_i = Heat transmission coefficient on the outside of the enclosure

Sheet steel:	5.5
Plastic:	3.5
Aluminium enclosure, Double-walled	5.0
Alu-zinc enclosure Double-walled	2,5

$$\frac{W}{m^2 K}$$



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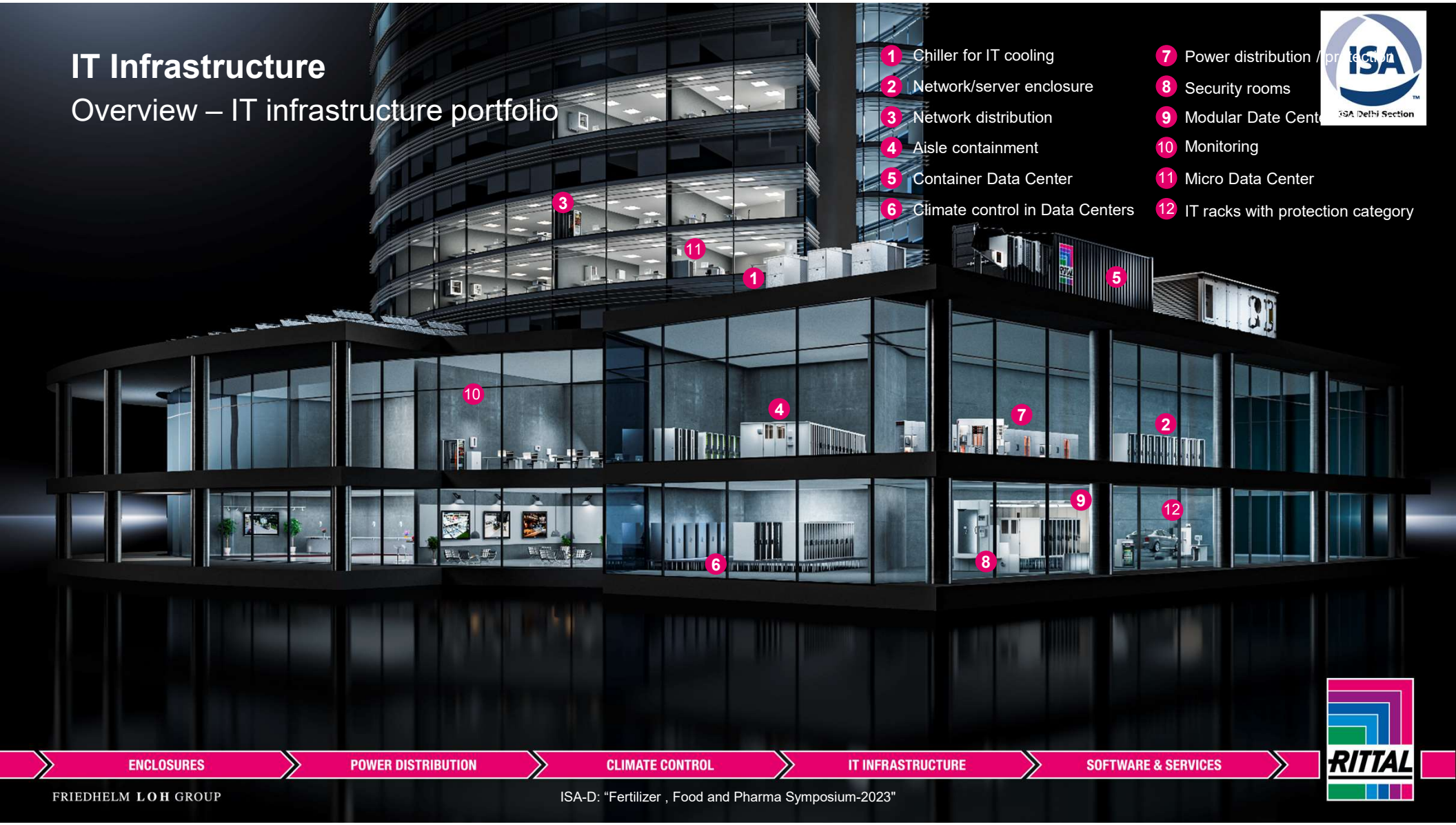
Project planning and designing: Parameters

QV	Heat loss installed in the enclosure [W]
QS	Heat radiation via enclosure surface [W] $Q_S = k*A*\Delta T$
QK	Required cooling output [W]
ΔT	Temperature difference between internal and external temperature [K] $\Delta T = (Ti - Ta)$
QE	Required cooling output [W] $Q_E = Q_V - Q_S$
V	Required volumetric flow of a fan-and-filter unit [m³/h] Approximate calculation $V = 3.1* Q_V / \Delta T$

IT Infrastructure

Overview – IT infrastructure portfolio



1. Chiller for IT cooling
2. Network/server enclosure
3. Network distribution
4. Aisle containment
5. Container Data Center
6. Climate control in Data Centers
7. Power distribution / protection
8. Security rooms
9. Modular Date Cent
10. Monitoring
11. Micro Data Center
12. IT racks with protection category

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Thank you.

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