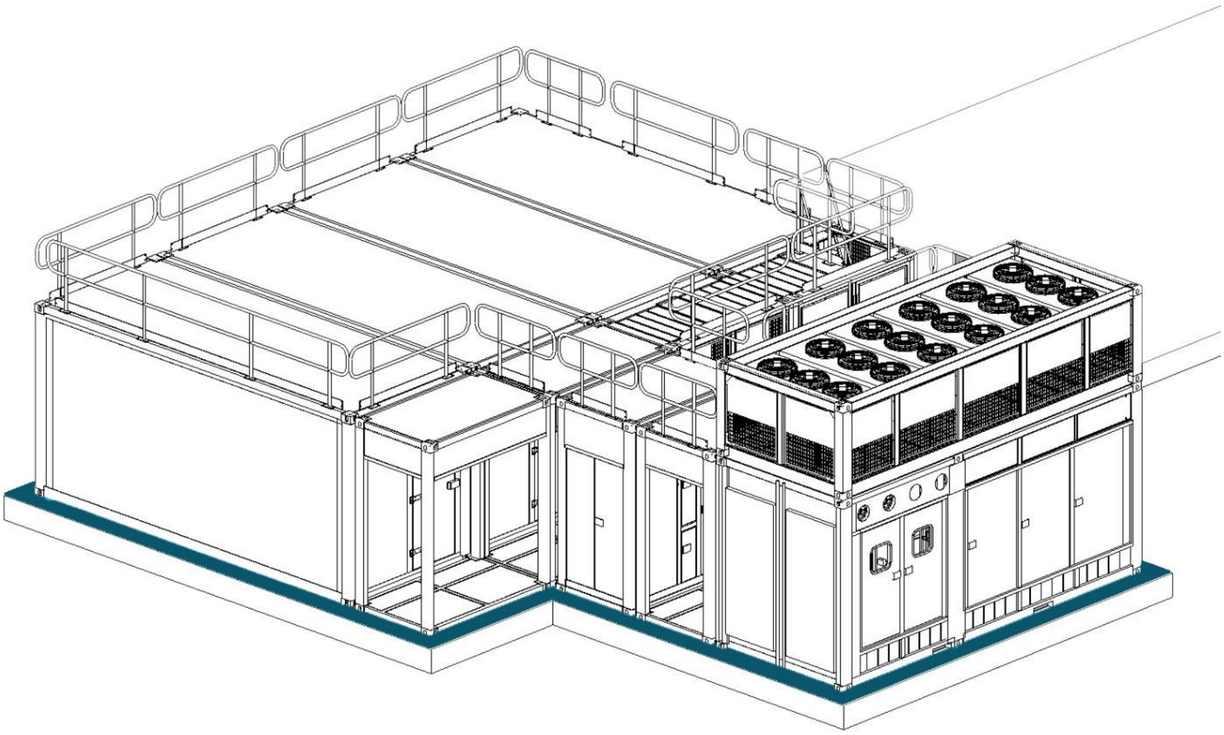

White Paper

protected critical infrastructure

&

secure modular server rooms

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1 The Rhein-Tec B.V. — Engineering Resilience. Anywhere.

When failure is not an option, Rhein-Tec delivers certainty. Operating from the Netherlands, Switzerland and Germany, Rhein-Tec B.V. develops, builds and operates highly resistant facilities designed to perform under the harshest conditions—anywhere in the world.

Our expertise lies at the intersection of special machine construction, advanced architecture and mission-critical infrastructure. From cutting-edge research environments and medical facilities to critical infrastructure and defence applications, Rhein-Tec creates integrated solutions where technology, structure and operation form one resilient system.

Every Rhein-Tec facility is engineered for extreme durability, precision and adaptability. Modular concepts, custom-built machinery and intelligent architectural design allow our installations to remain operational in challenging climates, remote locations and high-risk environments—without compromising performance or safety.

Sustainability is embedded at the core of our engineering philosophy. Guided by cradle-to-cradle principles, we design facilities with circular material flows, energy efficiency and long-term value in mind. Our solutions reduce environmental impact while extending operational lifecycles—proof that resilience and responsibility go hand in hand.

Rhein-Tec B.V.
Highly resistant facilities for a world that demands reliability.
Engineered to endure. Designed for the future.

1.1 Protected infrastructures

We generally understand critical infrastructure to mean energy and water supply, communication networks, health facilities, security agencies and transport, which form the basis for the functioning of our society.

However, for most companies, their own IT infrastructure is critical infrastructure.

Most companies today are no longer able to operate in the event of data loss.

Our modular data centres ensure the operation of core infrastructure.

2 critical infrastructures

We harden physically critical infrastructures against physical threats such as sabotage, burglary or natural disasters through technical, organisational and structural measures. The aim is to ensure the physical security of critical infrastructure operators in order to guarantee their operational readiness, as stipulated in the new Critical Infrastructure Framework Act.

Measures for the physical protection of critical infrastructures

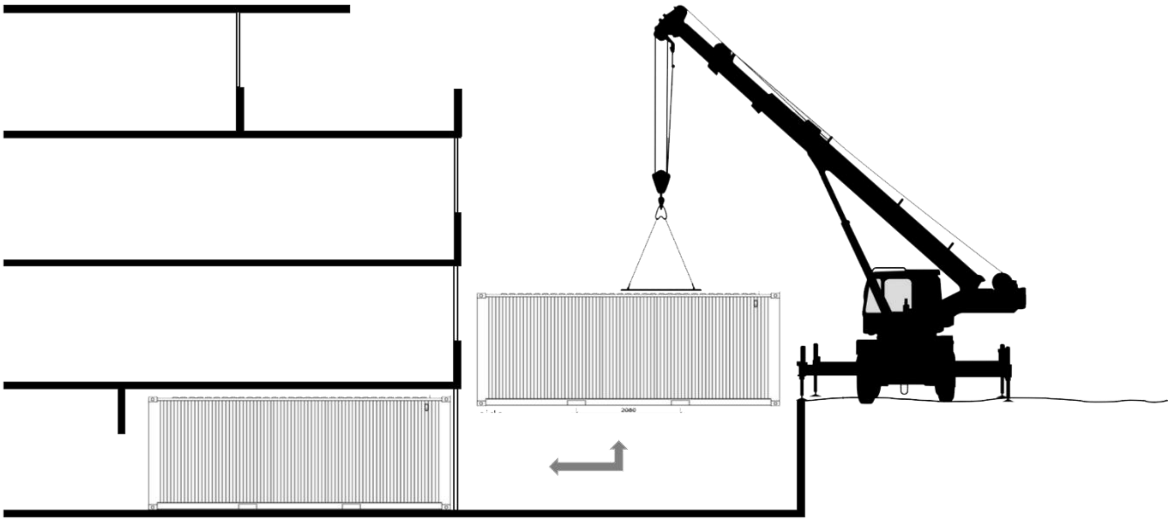
- Access controls: Physical and electronic access systems that regulate access to critical areas.
- Surveillance: Video surveillance and alarm systems provide additional security for buildings and facilities.
- Redundancy: Redundant supply systems ensure that a system failure can be compensated for by a replacement system.
- Security solutions: Modern, networked locking systems and compliance with standards such as DIN EN 13637 for escape doors are examples of advanced security measures.
- Holistic concept: Physical security complements IT security and is combined with organisational measures to form a robust overall concept that is integrated into the security strategy.

3 Modular resilient technology and server rooms

Our modular technology shelters are delivered plug-and-play, and the IT infrastructure is usually installed at our factory by our customers' IT companies or our partners. Pre-installation at the IT provider's premises is also possible in advance.

This saves time during commissioning, as the construction of the infrastructure is now independent of the building's construction status. The shelter can be integrated into a building at any time.

The fully integrated design makes it easy to scale as required. Depending on requirements, additional shelters can be easily added.



4 structure and components

4.1 structure of the shell & cells structure

Depending on requirements, the cell is manufactured using a half-shell construction method, as is also used in aircraft construction.

This enables a stable, robust yet lightweight construction.

The entire cell consists of an inner shell and an outer shell, with the load-bearing aluminium structure running between the two shells. Cavities are filled with fire-resistant insulating foam.

Different materials can be used for the outer and inner shells, depending on the protection and resistance requirements.

- GRP for robust structures that are either mobile or installed on roofs.
- As standard, we use COR-TEN A steel in accordance with EN 10025-5: S355J2W for the ISO standard sizes ISO 10, ISO 20 and ISO 40.
- Aluminium in accordance with DIN 81249-1 – seawater-resistant aluminium for robust, lightweight infrastructures that must be protected against thermal and physical influences or are used in the offshore sector.
- Aluminium 2139-T8 and 2195-T8P4 are used in shelters that are intended to be mobile or semi-stationary and provide ballistic protection or high resistance to mechanical impact.

- Armox® 440T For highly protected facilities, we use Armox® armour steel. Armox® 440T combines high penetration protection with excellent protection against pressure waves.

The weight of a cell varies depending on requirements, size, protection and safety, ranging from 150 kilograms to 30 tonnes.

Standard sizes

Designation	**Dimensions Length Width Height**	**Materials**	**Resistance classes**
Euro Iso PAL	1200 x 800 x 1400	Aluminium 3 mm / Stainless steel V2A 1,5 mm	RC3 – RC4 F30 bis F60 DIN 4102-2
IA-APA_APA LD2	1562 x 1534 x 1636	GPR or. Aluminium	RC2 – RC4 F0 bis F60 DIN 4102-2
IA-AKE_AVE LD3	2007 x 1534 x 1626	GPR or. Aluminium	RC2 – RC4 F0 bis F60 DIN 4102-2
IA-AAP LD9	3125 x 2235 x 1626	GPR or. Aluminium	RC2 – RC4 F0 bis F60 DIN 4102-2
IA-AAP LD9	3164 x 1534 x 1626	GPR or. Aluminium	RC2 – RC4 F0 bis F60 DIN 4102-2
IA-AAP LD9	3160 x 2340 x 2240	GPR or. Aluminium	RC2 – RC4 F0 bis F60 DIN 4102-2
ACE I	2900 x 2050 x 1825	Aluminium or Armox® 440T	RC3 – RC6 EP-55 STANAG 4569 L1 – L3 F30 – F120
ACE II	4259 x 2200 x 2075	Aluminium or Armox® 440T	RC3 – RC6 EP-55 STANAG 4569 L0 – L3 F30 – F120
ACE III	5000 x 2200 x 2075	Aluminium or Armox® 440T	RC3 – RC6 EP-55 STANAG 4569 L0 – L3 F30 – F120
ISO 10	2991 x 2438 x 2691	COR-TEN A steel or Armox® 440T	RC3 – RC6 EP-55 STANAG 4569 L0 – L3 F30 – F120
ISO 20	6058 x 2438 x 2591	COR-TEN A steel or Armox® 440T	RC3 – RC6 EP-55 STANAG 4569 L0 – L3 F30 – F120
ISO 40	12192 x 2438 x 2591	COR-TEN A steel or Armox® 440T	RC3 – RC6 EP-55 STANAG 4569 L0 – L3 F30 – F120

4.2 structure of the inner cell

The interior of each cell is made of fireproof materials.

Ventilation ducts and lighting units are integrated into the interior cell as standard.Depending on the client's application, either sturdy C-rails or airliner rails ensure a firm and stable connection between the cell and the built-in components.

From size ISO20 upwards, a double floor can also be used depending on the application.

4.3 technical standard components

Even our smallest data centres are designed with redundancy for most components as standard..

2 air conditioning systems

2 power distribution boards

2 UPS

5 standard protection systems

5.1 passive fire protection

- Standard door
  Fire door T90-1 H16 RC4
  For container solutions from ACE I
  Sliding rail overhead door closer
  Circumferential fire protection rebate seal
  Fire resistant 90 min
  Smoke gas tight

  The T90 fire door is a door that can withstand the flames and heat of a fire for 90 minutes before losing its function. This is one of the highest fire resistance classes and is designed to prevent a fire from spreading over a longer period of time. T90 doors are installed with a smoke protection function.
  Function: The door prevents the spread of fire and heat for at least 90 minutes.
  Areas of application: They are used in areas where special fire protection is required, such as long corridors, stairwells or garages.
  Classification: The number '90' stands for the number of minutes the door can withstand a fire.
  Additional functions: The smoke protection doors are tested and approved, which is achieved by means of special seals.

- Insulating layer
  To insulate our shelters and protect them from external influences such as fire, we use fireproof insulation from marine technology. Between the inner and outer shells there is a fireproof insulating layer consisting of mineral wool and aluminium.

- Cavity
  Cavities between building columns or steel girders are filled with fireproof foam.
  180 minutes according to EN 1366-4

- Fireproof cables and pipe penetrations
  All cable or pipe penetrations for electrical wiring, network cables, fibre optic cables, as well as pipe penetrations for air conditioning systems and bilge pumps, are secured with fireproof mats and double fire barriers.

5.2 protection against shocks and vibrations

All technical components such as 19" racks, power generators, energy systems and air conditioning units are mounted on highly elastic vibration dampers as standard.

The vibration dampers decouple the technical installations from the shelter.

5.3 protection against forced entry and sabotage

- Standard security door type T90-1 H16 RC4
  Resistance class RC4
  Panic release for doors and emergency exits
  Electronic access control
- preparation for alarm system
- preparation camera surveillance
- High burglary protection as standard up to RC4 through hardening of the outer and inner shell to Stanag level 3
- Preparation of electronic locking system

Resistance class RC4 (Resistant Class 4) means that a component such as a door or window can withstand an experienced perpetrator using heavy tools such as saws, hammers, crowbars and cordless drills for at least 10 minutes. This protection class is designed for areas with high security requirements such as banks, data centres or military facilities.

Features of RC4 products

- Resistance to tools: Unlike lower classes, RC4 can withstand attacks with heavy impact and sawing tools as well as cordless drills.
- Resistance duration: The component must withstand the attack for at least 10 minutes.
- Areas of application: This class is used in buildings with high security requirements, including banks, data centres, military facilities and command centres.

6 Optional protective components

Various passive and active technical components can be installed as an option to increase physical security.

6.1 active fire-fighting system

The integrated early fire detection and extinguishing system with Novec 1230 is an automatic system that extinguishes fires in seconds by releasing the Novec 1230 extinguishing agent as a gas. The extinguishing agent removes heat from the flame, effectively extinguishing the fire without leaving any residue. These systems are ideal for protecting critical areas such as server rooms, archives or museums, as they are electrically non-conductive, non-corrosive and safe for people in most cases.

The systems are available for all sizes of our data centres.

How it works

- Early detection: the integrated fire alarm system detects a fire at an early stage.
- Automatic activation: The system automatically triggers the release of gas.
- Extinguishing agent: Novec 1230 is a liquid that is converted into gas under pressure and distributed as a gaseous extinguishing agent in the protected area.
- Extinguishing effect: The gas removes heat from the flame, stopping combustion. It does not significantly displace oxygen and leaves no residue.

Advantages of Novec 1230

- Fast: Extinguishing systems stop fires in seconds before damage can occur.
- Residue-free: After extinguishing, no residue remains that would require expensive follow-up work.
- Safe: The extinguishing agent is non-corrosive, non-conductive and has low toxicity.for protecting server rooms, data centres and other electrical and electronic equipment..

6.2 Firefighting in the external environment using a water fog system

This ensures that the outer environment of the container is protected, for example in the event of a forest fire if the container is located outdoors, or a hall fire if the system is operated indoors.

How it works:

A system of fine spray nozzles is attached to the upper outer edge of the container, which is capable of producing a mist of fine water droplets around the container for a radius of approximately 10 metres.

- With a maximum of 2000 litres per minute, the outer environment is cooled
- the fire is kept at a distance
- smoke and other toxic gases are suppressed, which makes the fire brigade's work easier
- the outer wall of the data centre is cooled

the system can either be connected to the building's own riser pipe or equipped with an external water tank

6.3 protection against shocks and vibrations

If stronger vibrations than those caused by earthquakes or normal transport activities are to be expected, special racks with a gimbal suspension and oil shock absorbers can be installed. These are mainly used in military facilities.

The bearings absorb a large part of the kinetic energy, so that even stresses on the outer skin can be easily withstood.

6.4 protection against forced entry and sabotage

Security doors and higher RC6 doors are constructed from a sturdy, multi-walled steel shell filled with special materials such as concrete, steel balls or insulating materials to make break-in attempts more difficult. The door is secured by a robust electronic combination lock.

- The security door consists of several components: a multi-walled door leaf with special filling, a locking system with bolts, a frame for secure anchoring and, depending on requirements, special elements such as a panic function, ventilation or prepared connections for an alarm system.

    - Multi-walled construction:

      Consists of several steel plates connected by special filling materials and spacers to provide resistance to mechanical and thermal attacks.

    - Filling:
      made of special concrete to increase security.

    - Locking system:

      Bolt and bolt mechanism: Sturdy round or bolt bolts that slide into the door frame and secure the door at several points.

    - Security:
      Can be horizontal, vertical and on the hinge side to make breaking open more difficult.

    - Lock
      Electronic lock,

      Optional multiple locking systems: The combination of key and ID card or biometrics further increases security.

    - Frame (door frame)

      Fixed welded: The frame is firmly welded into the construction.

- Video surveillance

  As a rule, the Schalter is integrated into the customer's existing video surveillance system and is prepared for this as standard.

  On request, the Schalter can also be equipped with its own video surveillance system.

6.5 Ballistic protection

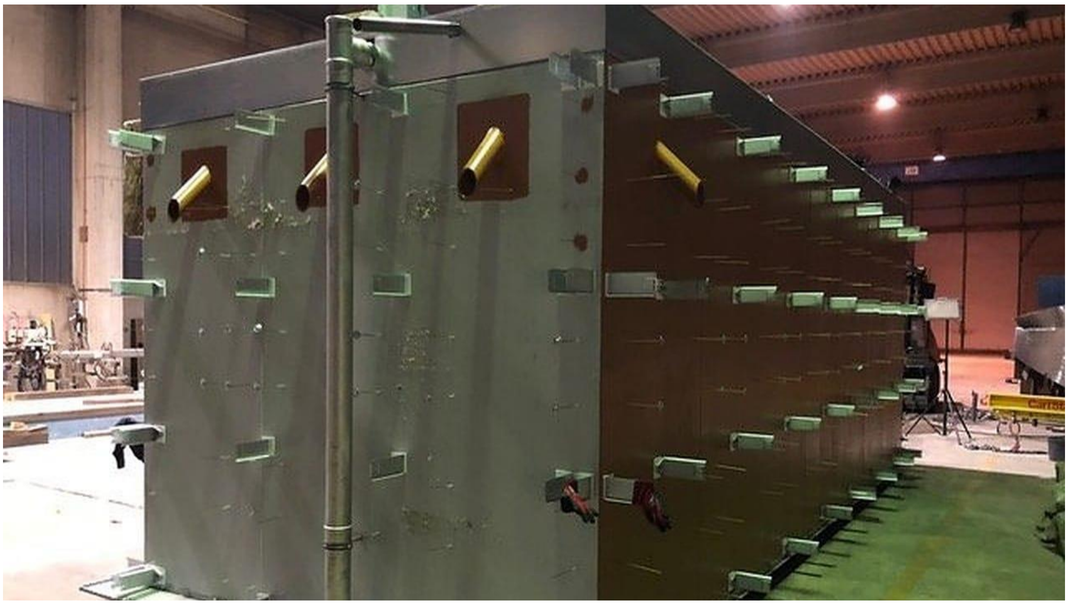
We plan, build and operate highly secure infrastructure shelters for highly protected critical infrastructures.

With NATO STANAG levels 1 to 6

The shelters are manufactured from Armox steel by the Swedish manufacturer SSAB.

	Kinetische Energie	Artillerie (HE = High Explosives)	Splitterschutz / Minenexplosion
Level 1	7,62 × 51 mm NATO Ball (Ball M80) aus 30 Metern mit 833 m/s	155 mm HE aus 100 m	Handgranaten, nicht explodierte Streumunition und
	5,56 × 45 mm NATO Ball (SS109) aus 30 Metern mit 910 m/s	Winkel: Seite 360°; Höhe: 0–18°	andere kleine Sprengkörper (Antipersonenminen o. ä.):
	5,56 × 45mm NATO Ball (M193) aus 30 Metern mit 930 m/s		Explosion unter Fahrzeug
Level 2	7,62 × 39 mm API BZ aus 30 Metern mit 695 m/s	155 mm HE aus 80 m	Explosivpanzerminen mit 6 kg TNT:
		Winkel: Seite 360°; Höhe: 0–22°	2a – Aktivierung durch Überfahren unter einzelnem Rad oder Kette
			2b – Minendetonation mittig unter Fahrzeug
Level 3	7,62 × 51 mm M993 AP (WC Kern) aus 30 Metern mit 930 m/s	155 mm HE aus 60 m	Explosivpanzerminen mit 8 kg TNT:
	Winkel: Seite 360°; Höhe 0–30°	Winkel: Seite 360°; Höhe: 0–30°	3a – Aktivierung durch Überfahren unter einzelnem Rad oder Kette
			3b – Minendetonation mittig unter Fahrzeug
Level 4	14,5 × 114 mm AP / B32 aus 200 Metern mit 911 m/s	155 mm HE aus 30 m	Explosivpanzerminen mit 10 kg TNT:
		Winkel: Seite 360°; Höhe: 0°	4a – Aktivierung durch Überfahren unter einzelnem Rad oder Kette
			4b – Minendetonation mittig unter Fahrzeug
Level 5	25 mm APDS-T (M791) oder TLB 073 aus 500 m mit 1258 m/s	155 mm HE aus 25 m	

	Winkel: frontal mittig: ±30° Seite, Höhe 0°	Winkel: Seite 360°; Höhe: 0–90°	
Level 6	30 mm APFSDS oder AP aus 500 m	155 mm HE aus 10 m	
	Winkel: frontal mittig: ±30° Seite, Höhe 0°	Winkel: Seite 360°; Höhe: 0–90°[2]	



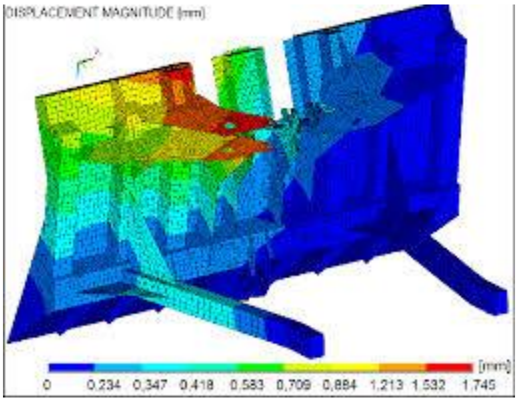
7 our services

We plan, build and operate secure server rooms and critical infrastructure at our customers' request.

In addition, we are happy to take on the entire project management for our customers, from the initial idea to handover to the company.

7.1 Engineering and project management

It all starts with an idea, which then develops into a concrete project. We take on project management, requirements analysis and engineering right from the start. Using modern planning systems and state-of-the-art design and simulation infrastructures, we calculate all the important parameters during the planning phase to ensure that the requirements are met.



The containers all have appropriate lighting to ensure handling under all circumstances

- Project management
- Requirements engineering
- Planning
- Structural and strength calculations
- System calculations for climate control and energy systems
- Planning of safety systems

7.2 Building

Our strength lies in our in-depth knowledge of plant and machinery construction. We combine the disciplines of mechanical engineering/metal construction, air conditioning technology, energy plant construction, safety engineering and information technology.

- Netherlands
  construction of facilities up to RC6 scaffolding of all systems with air conditioning energy systems and technical components

- Ukraine:
  heavy shell construction according to Stanag / heavy machine construction, final equipment of the systems takes place in the Netherlands

7.3 Conceptual support

We design the following for our customers as required:

- security concepts
- emergency plans
- provide support in the case of a crisis
- take over operations

8 Delimitation – what we do not do

Our company's activities are limited to the planning and physical construction of secure facilities. Although we have a very good understanding of IT, we leave the planning and construction of IT infrastructure to our partners.

We are your open partner when it comes to the planning and installation of information technology systems. You can commission your own IT company or we will be happy to involve professional IT companies whose performance and precision we are convinced of.

As a rule, we provide IT providers with assembly areas in our factory facilities in southern Germany, the Netherlands and Austria, where the IT components can be assembled and set up.

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