TRANE TECHNOLOGIES

REFERENCE DESIGN #507

ADVANCED COOLING INFRASTRUCTURE FOR THE 250 MW AI FACTORY

Modular design for streamlined, accelerated deployment

Water-Cooled Chiller Efficiency in Deployable Modular Cooling Plants

TRANE + stellarenergy Expect More liquidstack

INTRODUCTION

Artificial intelligence is driving massive growth in data center demand — and advanced cooling is critical to keep innovation running. Trane leads the way with proven thermal management solutions for AI factories and data centers of all sizes.

This reference design provides:

- ✓ A 250 MW cooling blueprint for AI factory applications
- ✓ Integrated air- and liquid-cooling configurations for NVIDIA racks
- ✓ Guidance on modular cooling plants, CDUs, fan coil walls, chillers, dry coolers, pumps, and facility piping
- ✓ A foundation for mechanical design that complements electrical and controls systems

The NVIDIA DSX AI Factory Platform unifies AI factory design and operations across compute, networking, power, cooling, facilities, and software. In support of that approach, LiquidStack's GigaModular™ CDU has qualified as NVIDIA DSX Ready CDU, meeting the applicable NVIDIA DSX reference design requirements for this reference design.

3 Companies coming together!!!

Leveraging individual strengths for a better holistic solution

Data centers power the digital world—and the demands have never been greater. Trane Technologies helps customers meet that moment with integrated solutions designed to improve efficiency, support uptime, scale with growth and accelerate speed to compute.

TRANE TECHNOLOGIES

TRANE + stellarenergy Expect More liquidstack

By bringing together the proven climate expertise of Trane, advanced liquid cooling innovation from LiquidStack, and modular manufacturing from Stellar Energy, Trane Technologies helps data center developers, designers and operators reduce complexity and act with greater confidence. The result is a more resilient, more efficient and more future-ready approach to mission-critical infrastructure.

We help customers optimize thermal performance, reduce energy and water use, support higher-density environments and move faster toward sustainability—without compromising reliability.

DESIGN OVERVIEW

Temperature and Flow Rates

The following table summarizes the water-cooled chiller temperature and flow rate requirements for this reference design. Based on a 16-rack-per-Scalable-Unit AI factory with the Vera Rubin MaxLPS Architecture in Chicago, IL, these values can be adjusted for specific applications

Technical Loop Supply Temperature: 41°C (105.8°F)

Technical Loop Return Temperature: 51°C (123.8°F)

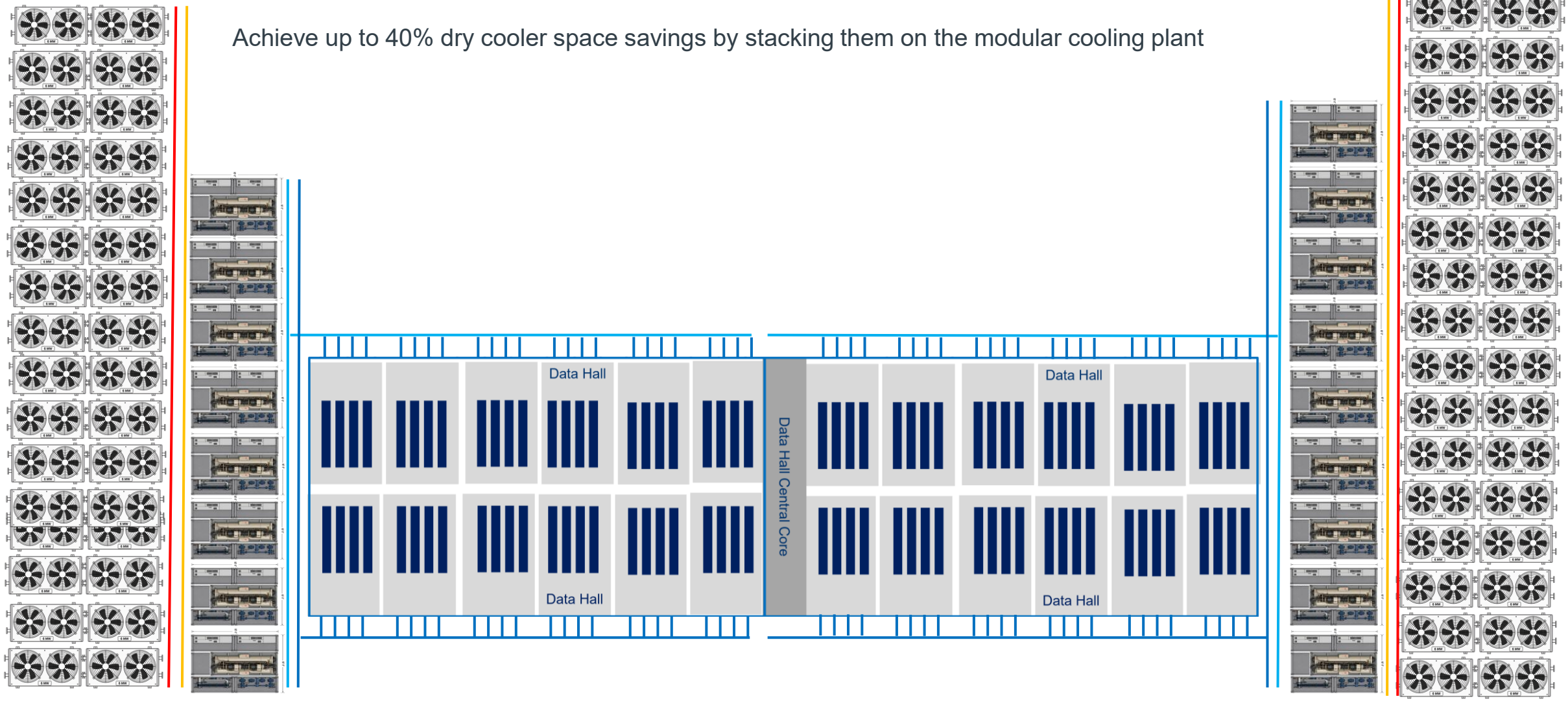
Fan Coil Wall Supply Air Temperature: 27°C (80.6°F)

	Medium Temperature (Airside)	High Temperature (Liquid Direct to Chip)
Block 1 (2 Data Halls + Core)	19.87 MW (5,650T)	145.5 MW (41,372T)
Block 2 (2 Data Halls)	11.37 MW (3,233T)	132.5 MW (37,676 T)
Load Requirement/Modular Cooling Plant	8 MW (2300T)	18.3 MW (5200T)
Evaporator Flow Rate/Chiller	11,648 LPM (3,077 GPM)	29,670 LPM (7,838 GPM)
Facility Loop Temperature (Return)	32°C (89.6°F)	34.5°C (94°F)
Facility Loop Temperature (Supply)	22°C (71.6°F)	25.5°C* (78°F)
Condenser Flow Rate/Chiller	13,722 LPM (3,625 GPM)	30,233 LPM (7,987 GPM)
Heat Rejection Loop Temperature (High)	55°C (131°F)	55°C (131°F)
Heat Rejection Loop Temperature (Low)	45°C (113°F)	45°C (113°F)
Heat Rejection Loop Fluid	Water**	Water**
Max Ambient (Chicago, Il)	40°C (104°F)	

**A 25.5°C chiller plant supply stream is blended with 47°C primary return water to achieve a 37°C primary supply temperature at the CDU.*
***Our recommendation is to utilize freeze protection.*

Replacing Central Utility Buildings with Modular Cooling

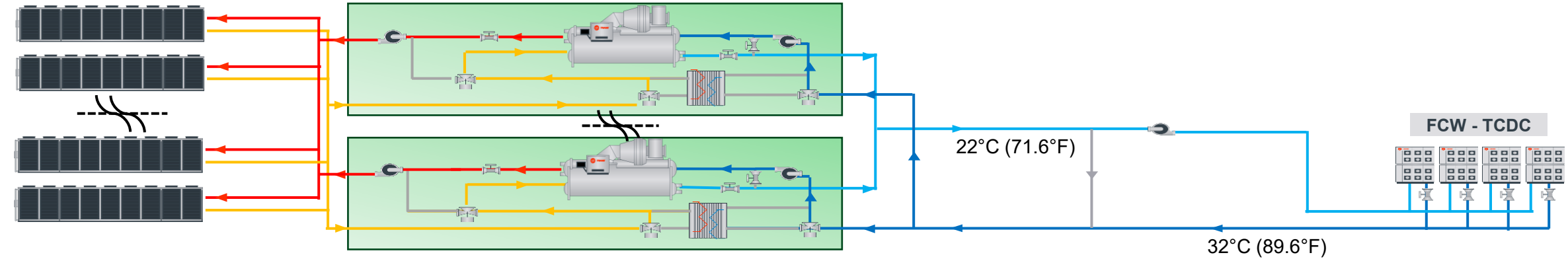
Achieve up to 40% dry cooler space savings by stacking them on the modular cooling plant



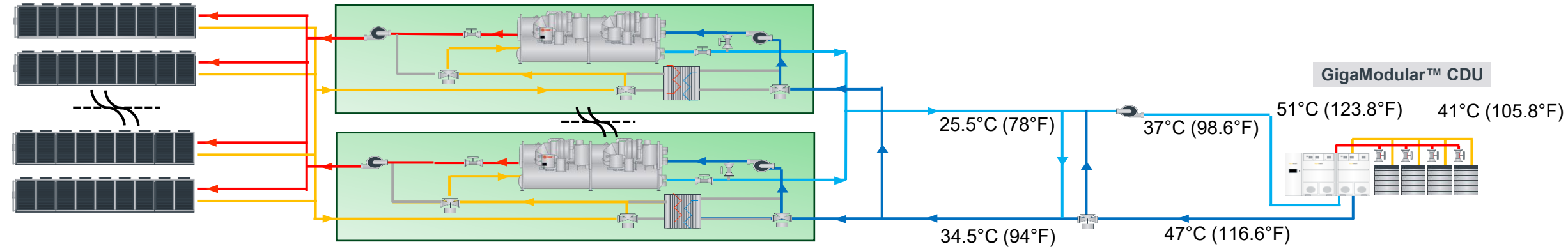
DESIGN OVERVIEW

Reference Diagram

- ✓ 250 MW mechanical cooling blueprint for AI factories
- ✓ Integrates air- and liquid-cooling systems
- ✓ Pre-engineered modular design for faster commissioning and deployment

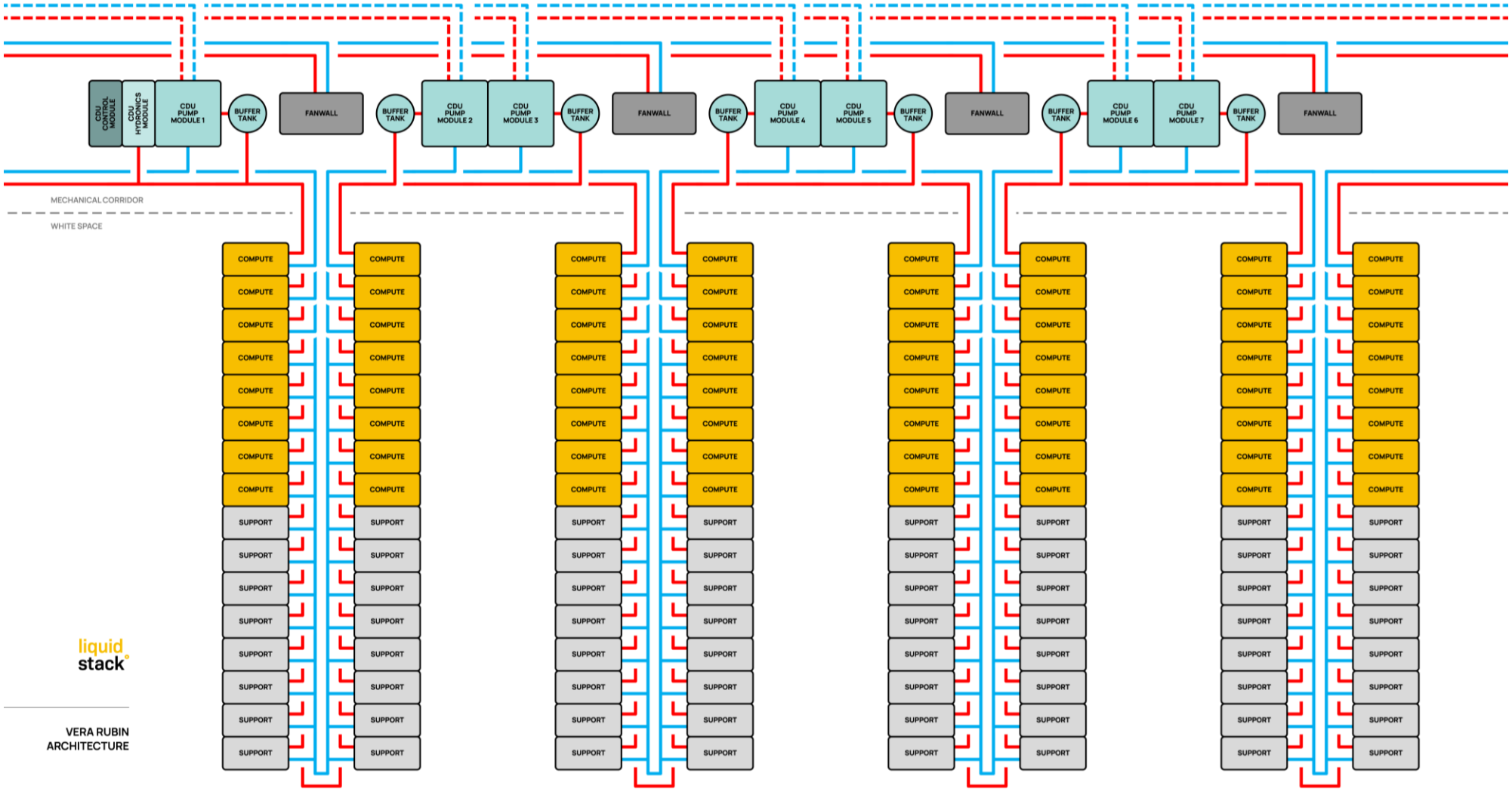


Dry Fluid Coolers



DEPLOYMENT OF INTEGRATED AIR AND LIQUID COOLING

6 Deployments per data hall



DESIGN OVERVIEW

Customer Outcomes

Reduced Time to Full Performance

- Mitigate onsite trade shortages
- Simplify piping, electrical, and chilled-water connections to reduce onsite labor
- Standardize designs across sites
- Compress schedules through modularization and UL listed MCP
- Reduce commissioning, design complexity, and construction scope with factory-tested controls and a factory-installed waterside economizer

Reduce power use

- Reduce chiller power with a dedicated high-temperature loop
- Lower annualized power through elevated return water temperatures and an integrated economizer in the MCP
- Enhance chiller lift and pump energy with advanced controls to maintain best-in-class PUE
- Improve free cooling performance with an integrated waterside economizer

Balanced total cost of ownership (TCO), redundancy and resiliency

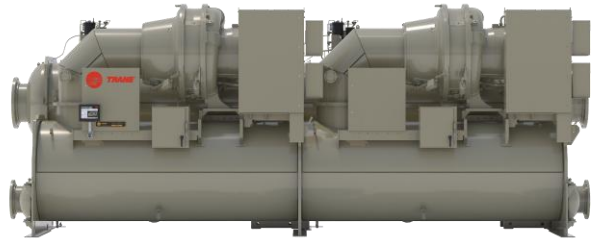
- A redundant modular cooling plant ensure full backup for all critical mechanical loop components
- Help reduce footprint with stacked dry coolers over MCP
- Help reduce redundant components with a modular cooling distribution unit for larger liquid-cooling deployments
- LiquidStack's GigaModular CDU, qualified as DSX Ready CDU for this reference design, helps customers evaluate liquid-cooling infrastructure with greater confidence.

SYSTEM SUSTAINABILITY

Incorporating modular cooling plants within a thermal management system offers the higher efficiency of water-cooled chillers inside a fully packaged solution with the ability to be commissioned and scaled quickly. Paired with dry coolers, Modular cooling plants use no water and help reduce the footprint of large-scale AI data centers, supporting more sustainable infrastructure strategies alongside LiquidStack's approach to efficient, environmentally conscious data center cooling.

- Integrated free cooling for lower annualized Power Usage Effectiveness (PUE)
- Dry coolers eliminate water use — Water Usage Effectiveness (WUE) = 0
- R-1233zd refrigerant (GWP 1) reduces carbon impact

Stellar Energy Modular Cooling Plant



Trane CenTraVac CDHH Water-Cooled Chiller

LiquidStack GigaModular CDU

Stellar Modular Cooling Plants

Configurable Platform Drives Speed to Deployment

- Rapid specification, design, manufacturing, and deployment
- Enables procurement scale and velocity

Flexible Equipment Options for Critical System Components

- Gives customers faster access to solutions by leveraging multiple qualified options for chillers, pumps, heat exchangers, and hydronics, helping reduce supply constraints and support project timelines

Universal Enclosure Envelope

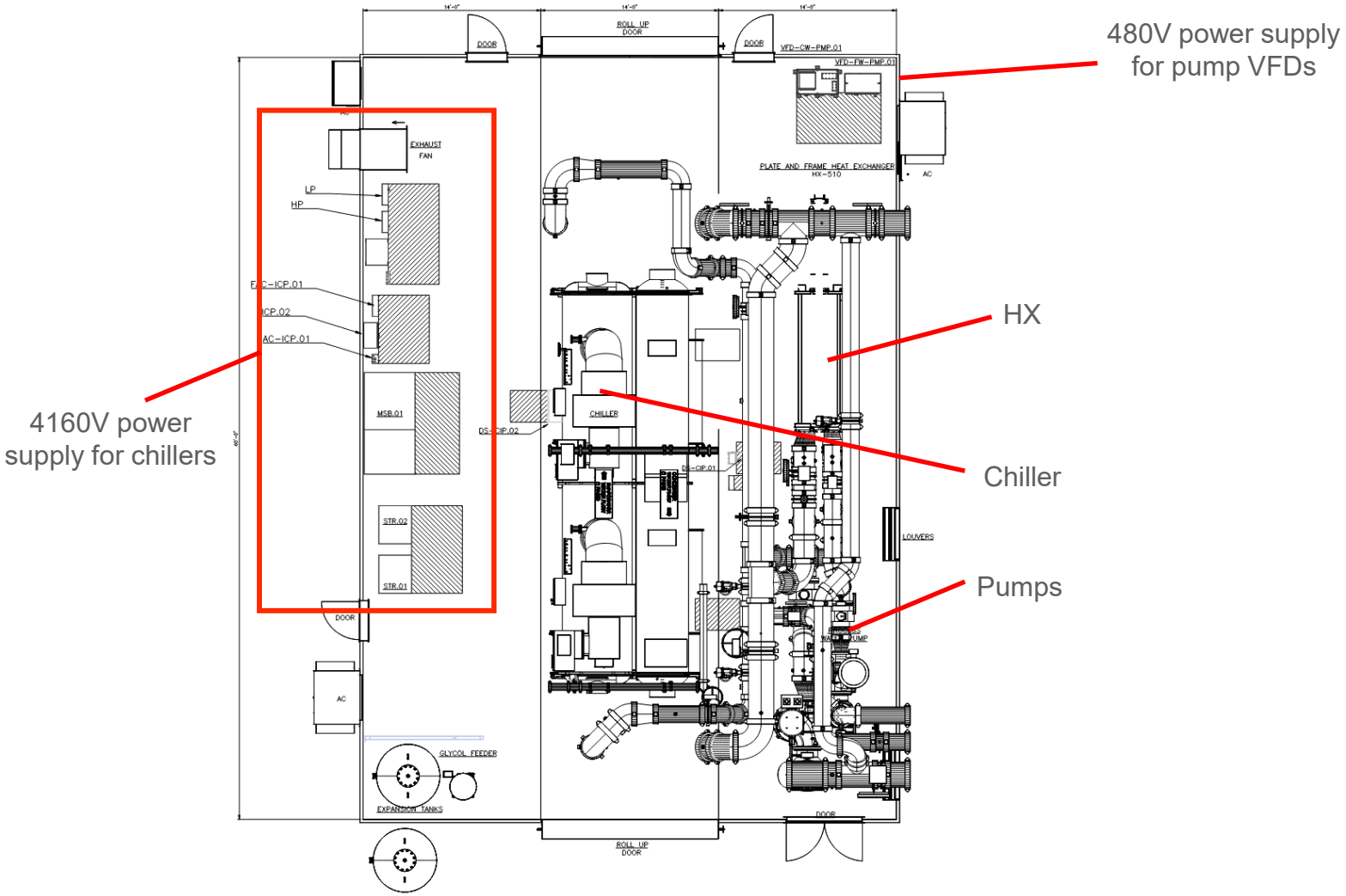
- Removable walls and roofing for ease of service and flexible plant configuration
- Designed for "anywhere in North America" to enable reuse

Performance and Capacity Flexibility

- Designed around nominal capacities and configurable to meet specific customer process needs
- Stellar offers optimized heat rejection solutions to further expand the value proposition.

Modular Cooling Plant Details

Standard, configurable platform for 15–18 MW capacities, delivered as UL-listed equipment in six skids.



Modes of Operation

Mode 1: Free Cooling

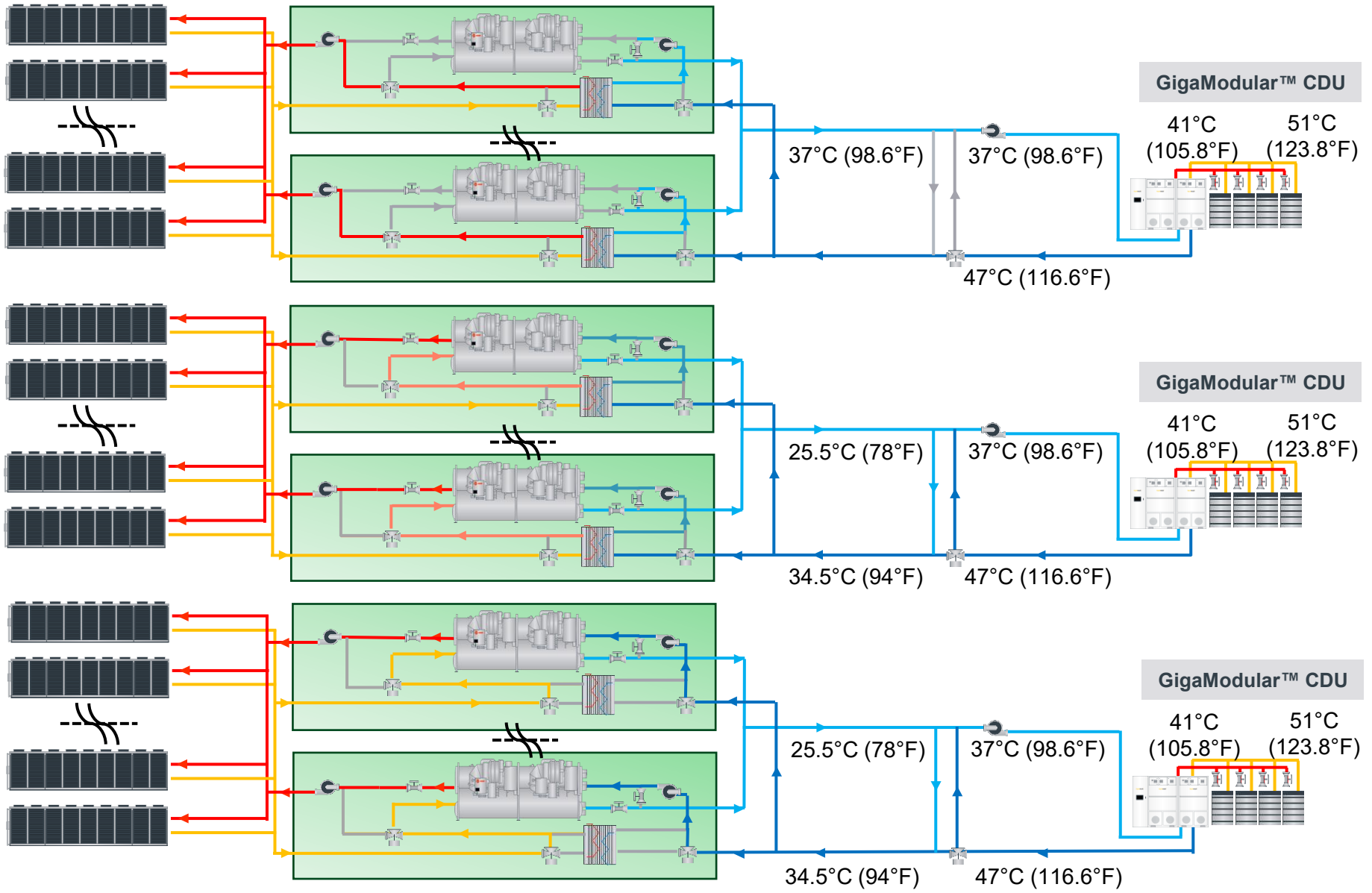
Active below 30.8°C (87.4°F) ambient—calculated as 37°C CDU supply less WSE (1.2°C) and dry cooler (5°C) approaches. **Met 98.1% of annual hours in Chicago, IL.**

Mode 2: Hybrid Cooling

Outdoor temperature is below return temperature 34.5°C but exceeds the 30.8°C limit for full cooling capacity.

Mode 3: Mechanical Cooling

Outdoor temperature exceeds the fluid return temperature (34.5°C)—free cooling is bypassed.



GigaModular™ CDU Platform – NIVIDIA DSX Ready

Scalable Capacity with Centralized Controls for a Simplified Infrastructure

Modular building blocks scaled to suit a wide range of data hall layouts and deployment strategies

- Reduced infrastructure footprint compared to traditional CDUs enables more cooling capacity per square foot
- Up to 20% lower CapEx versus traditional row CDU deployments

Centralized system-level controls and instrumentation architecture

- Dual concurrently maintainable controllers
- Resilient 2-way ring network communications architecture
- Eliminates redundant onboard controls in each pump module
- Ensures stable and balanced group control

Service-forward design supports maintainability across the system

- Concurrently maintainable components
- Simplified service model: front and rear, or front and side, access allows for flexible module placement within the data hall or gray space
- Hot-swappable components (controllers, pumps, filtration)

LiquidStack's GigaModular CDU has qualified as NVIDIA DSX Ready CDU. It meets the applicable NVIDIA DSX reference design requirements for this reference design, helping AI factory builders select liquid-cooling infrastructure with greater confidence.

GigaModular™ CDU Platform – NIVIDIA DSX Ready

Built and Validated for the Future of AI Infrastructure

Supports evolving GPU platforms

- Designed for high-density AI environments
- Scales to meet next-generation GPU deployment requirements
- Designed to meet NVIDIA Vera Rubin specifications and beyond

Flexible placement options for any data hall

- Pump modules can be distributed (as shown on previous TCS Loop Design slide), grouped, or skidded
- Suitable for white space, mechanical corridors, or gray space

Flexible, scalable hydronic architecture

- Optional hydronic modules include an expansion tank and make-up reservoir
- Replicable modular deployment model
- Scales beyond standard header configurations through site-level hydronic design

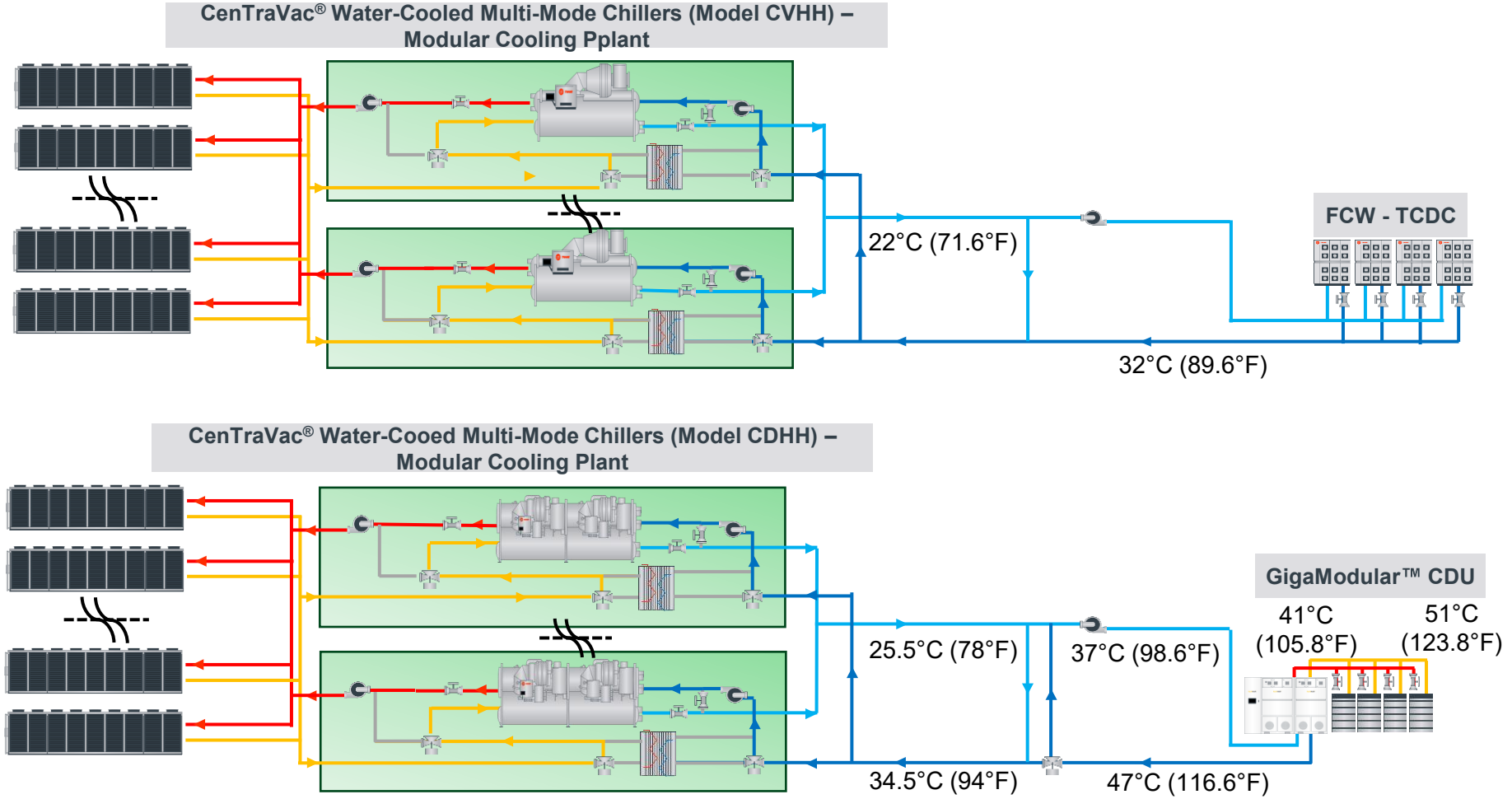
Qualified as NVIDIA DSX Ready CDU for this reference design, LiquidStack's GigaModular CDU supports liquid-cooled AI factory infrastructure aligned to applicable NVIDIA DSX reference design requirements.

SYSTEM BENEFITS

Scalable and Simplified for Greater Efficiency

Dual-temperature chiller plant, dedicated medium and high temperature chillers

- Best used when load ratios and temperature requirements are well defined and stable
- Separate loops decrease unnecessary lift, allowing chillers to be selected and enhanced specifically for each temperature band
- Helps avoid the energy waste of single-temperature mixing strategies

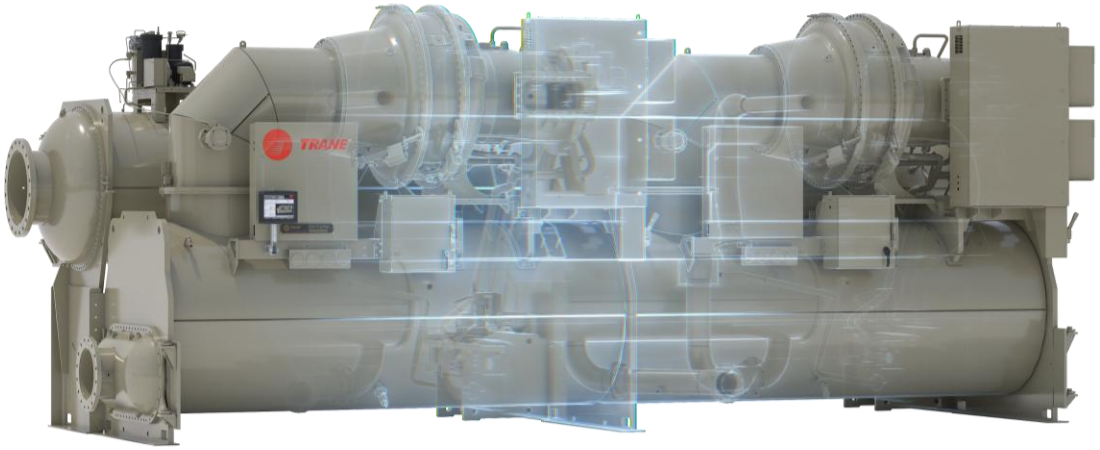


SYSTEM BENEFITS

Enhances Token per Watt

Results of dedicated loops with higher temperature water-cooled chiller for liquid cooling on 309 MW AI Factory:

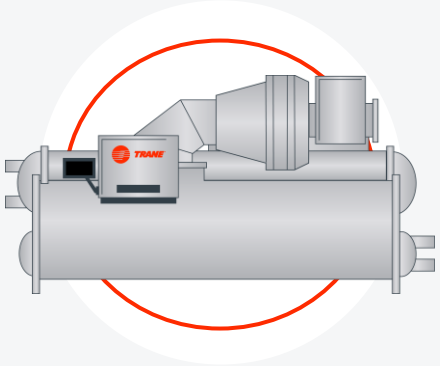
- Baseline: A single-loop design feeding both the Fan Coil Units (FCW) and Coolant Distribution Units (CDUs) at a constant 22°C (71.6°F)
- Dedicated Loops: The cooling load is split to maximize efficiency. Approximately 90% of the load is directed to a warmer 25.5°C (78°F) loop to achieve much higher operating efficiency, while the remaining 10% is maintained at the standard 22°C (71.6°F) FCW temperature

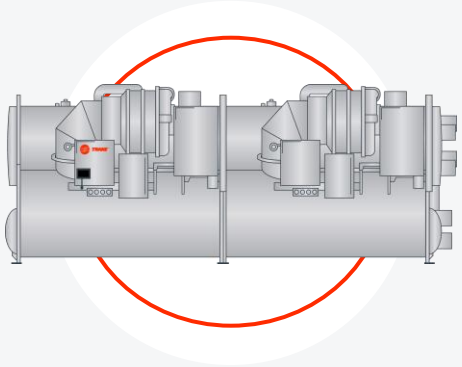


up to **16%** Chiller power improvement

up to **8 MW** Available to reallocate

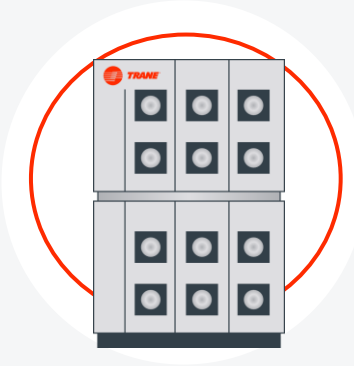
KEY SYSTEM COMPONENTS





Water-Cooled Chillers

Trane CenTraVac® chillers are engineered for data centers, operating efficiently at higher water temperatures to deliver reliable cooling and improved overall plant performance.



Fan Coil Walls

Trane Fan Coil Walls provide higher capacity, efficient air cooling in the data hall, using medium chilled-water temperatures to deliver added capacity where air cooling is needed most.

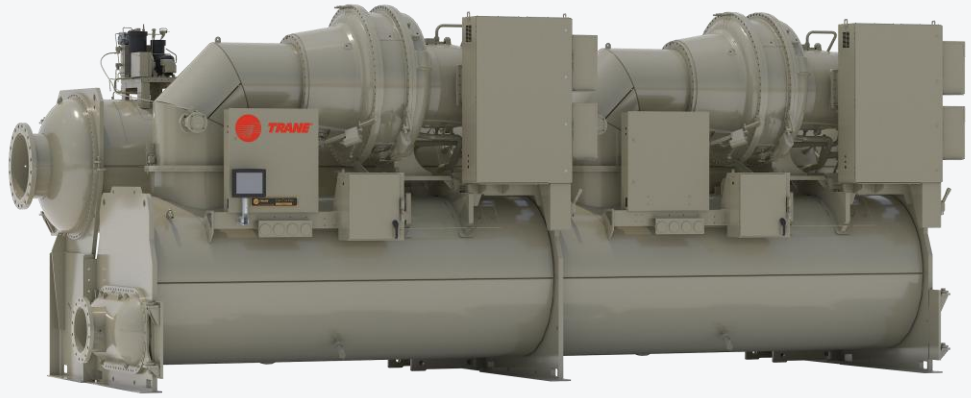
Coolant Distribution Units (CDUs)

Trane CDUs support the liquid-cooled portion of the data hall, separating facility and technical loops with a liquid-to-liquid heat exchanger for efficient, high-temperature cooling compatible with AI servers.

KEY SYSTEM COMPONENTS

CenTraVac® Water-Cooled Chillers Model CDHH

Design Characteristic	Requirements
Capacity Range	Up to 6,000 tons (21 MW)
Leaving Condenser Temp	Up to 68.3°C (155°F)
Facility Water Temperature Range	Up to 37.8°C (100°F)
Compressor	Two 2-stage Centrifugal Compressor
Heat Rejection Options	Dry Cooler/High Lift Application 6-pipe Heat Recovery Options
Refrigerant	Low GWP: R-1233zd
Restart After Power Loss	43-76 Seconds with UPS Depending Upon Starter/Drive
Power Feed Requirement	2300V to 12 kV Starter and Drive Options



KEY SYSTEM COMPONENTS

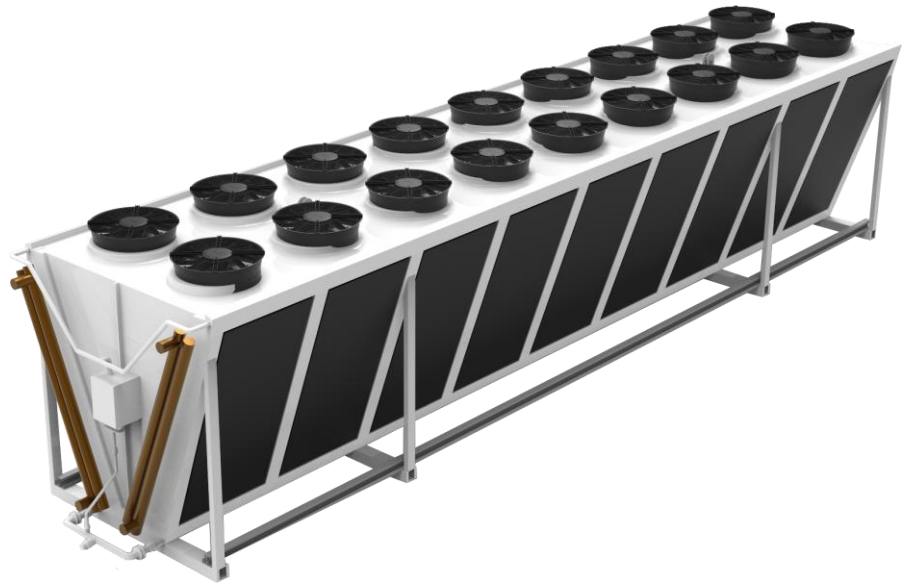
CenTraVac® Water-Cooled Chillers Model CVHH

Design Characteristic	Requirements
Capacity Range	Up to 3,000 tons (11 MW)
Leaving Condenser Temp	Up to 68.3°C (155°F)
Facility Water Temperature Range	Up to 37.8°C (100°F)
Compressor	2-stage Centrifugal Compressor
Heat Rejection Options	Dry Cooler/High Lift Application 6-pipe Heat Recovery Options
Refrigerant	Low GWP: R-1233zd
Restart After Power Loss	43-76 Seconds Depending Upon Starter/Drive
Power Feed Requirement	2300V to 12 kV Starter and Drive Options

KEY SYSTEM COMPONENTS

Dry Cooler

Design Characteristic	Requirements
Capacity Range	2,000 tons (6 MW+)
Max Ambient Dry Bulb	62.8+°C (145+°F)
Fans	Variable Speed VFD or ECM Driven Fans
Power Feed Requirement	380-480, 3 ph, 50/60 Hz



There are many dry coolers solutions in the market. This design is based on a general dry cooler configuration. Specifications may change depending on the dry cooler used in application.

KEY SYSTEM COMPONENTS

Fan Coil Wall, Model TCDC

Design Characteristic	Requirements
Capacity Range	Up to 800 KW
Airflow Range	110K CFM+
Entering Air Temp	Up to 40°C (104°F)
Fan Type	ECM Direct Drive Fans
Additional Feature Options	Automatic Transfer Switch Controller Capacitor Backup Controls Teaming Application Backdraft Dampers
Filtration	2” or 4” Filters (MERV 8 or 11)
Harmonic Filtration	5% or Less of Total Demand Distortion
Power Draw	< 6% of Capacity Being Cooled in KW
Power Feed Requirement	415-480, 3 ph, 50/60 Hz

KEY SYSTEM COMPONENTS

GigaModular™ Coolant Distribution Unit (CDU)

Design Characteristic	Requirements
Capacity Range	Up to 14 MW at 4°C (7.2°F) Approach, up to 2.5 MW per Pump Module
Flow Rate	3750 LPM (991 GPM) per Module
Available Head Pressure	50 PSID
Maximum Secondary (PG25) Return Temperature	Up to 60°C (140°F)
Design Facility Water Temperature	Up to 45°C (113°F)
Connectivity	Modbus TCP, Restful API, Redfish, SNMPv3 or BACnet
Features	Scalable Solution Centralized two-way ring network control 316 Stainless Steel Plate Heat Exchanger EM Flow Meters
Secondary Side Filtration	Dual 25-Micron Filtration
Valve Options	CCV, PICV or ePICV valves
Power Draw	< 2% of Capacity Being Cooled in KW
Power Feed Requirement	380-480, 3 ph, 50/60 Hz

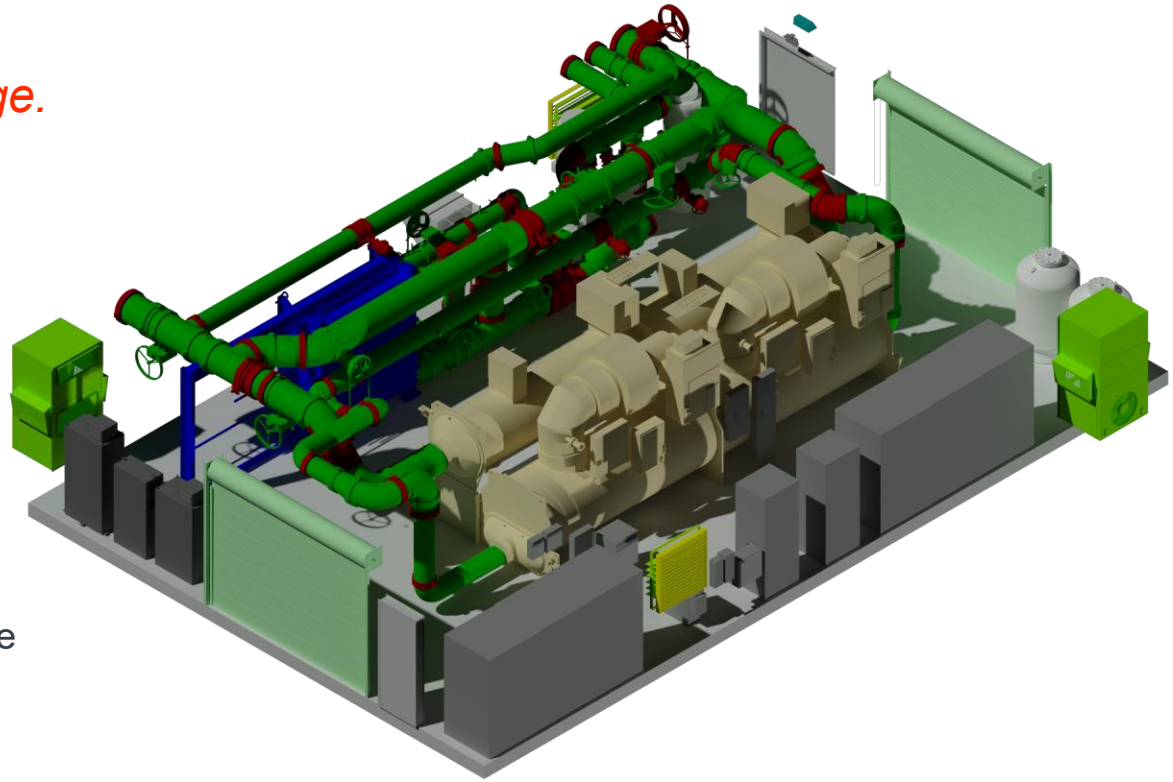
KEY SYSTEM COMPONENTS

Computer Room Air Handler (CRAH)

Design Characteristic	Requirements
Capacity Range	50kW to 360kW to support varied density zones
Airflow Range	5,000 - 50,000k CFM
Fan Type	ECM Direct Drive Fans
Entering Air Temp	Up to 43°C (110°F)
Additional Feature Options	Automatic Transfer Switch (ATS) Controller Capacitor Backup Condensate Pump Motorized return air damper
Filtration	2" (MERV 8 or 11) or 4" (MERV 8) Filters
Harmonic Filtration	5% or Less of Total Demand Distortion
Deployment Configuration	Downflow horizontal discharge for electrical room cooling Flexible for downflow white space use Optional upflow configuration
Power Feed Requirement	415-480, 3-phase, 60 Hz

BEST PRACTICES

Modular Cooling Plant Redundancy: The N+1 *Advantage.*



- **Scheduled Maintenance & Serviceability**
  Enables an individual MCP to be isolated and taken offline for routine preventive maintenance, seasonal inspections, or overhaul without interrupting cooling service to the facility.

- **Fault Tolerance & Operational Redundancy**
  Supports seamless continuity of operations if an active unit experiences an unplanned component trip or mechanical failure. The redundant plant automatically takes over to satisfy 100% of the required building or process cooling load.

- **Underestimated Load Support & Scalability**
  Acts as an operational buffer if actual site thermal demands temporarily exceed initial engineering estimates or ambient extreme conditions occur. In the event this reserve capacity becomes permanently baseline-loaded, an additional MCP module can be integrated into the modular infrastructure to reinstate true N+1 redundancy.

BEST PRACTICES

Freeze Protection

Outdoor equipment, including dry coolers and exposed piping, requires freeze protection when ambient temperatures drop below the fluid freezing point. Implement one or both of the following measures:

- **Select an Appropriate Fluid:** Use an appropriate fluid such as ethylene or propylene glycol rated for minimum design temperatures, maintaining proper concentration to protect against freeze or burst risks. If full-system glycol is not preferred, use isolation heat exchangers to limit glycol to exposed outdoor circuits.
- **Provide Supplemental Heating:** For pure water loops, apply supplemental heat (such as heat trace) to insulated outdoor piping and storage tanks during idle periods. Because dry cooler coils cannot be insulated, protect them using a separate glycol loop with an isolation heat exchanger, rather than direct supplemental heating.

Modular Cooling Plant Freeze Protection

- The packaged wall-mounted HVAC unit conditions the MCP to 60°F in winter (heating setpoint) and 85°F in summer (cooling setpoint).
- Additional cooling and heating capacity is factored into the sizing of the HVAC units for resiliency.
- Insulated piping is utilized for extra freeze protection and to safeguard heat traps, which are more common with elevated water temperatures.

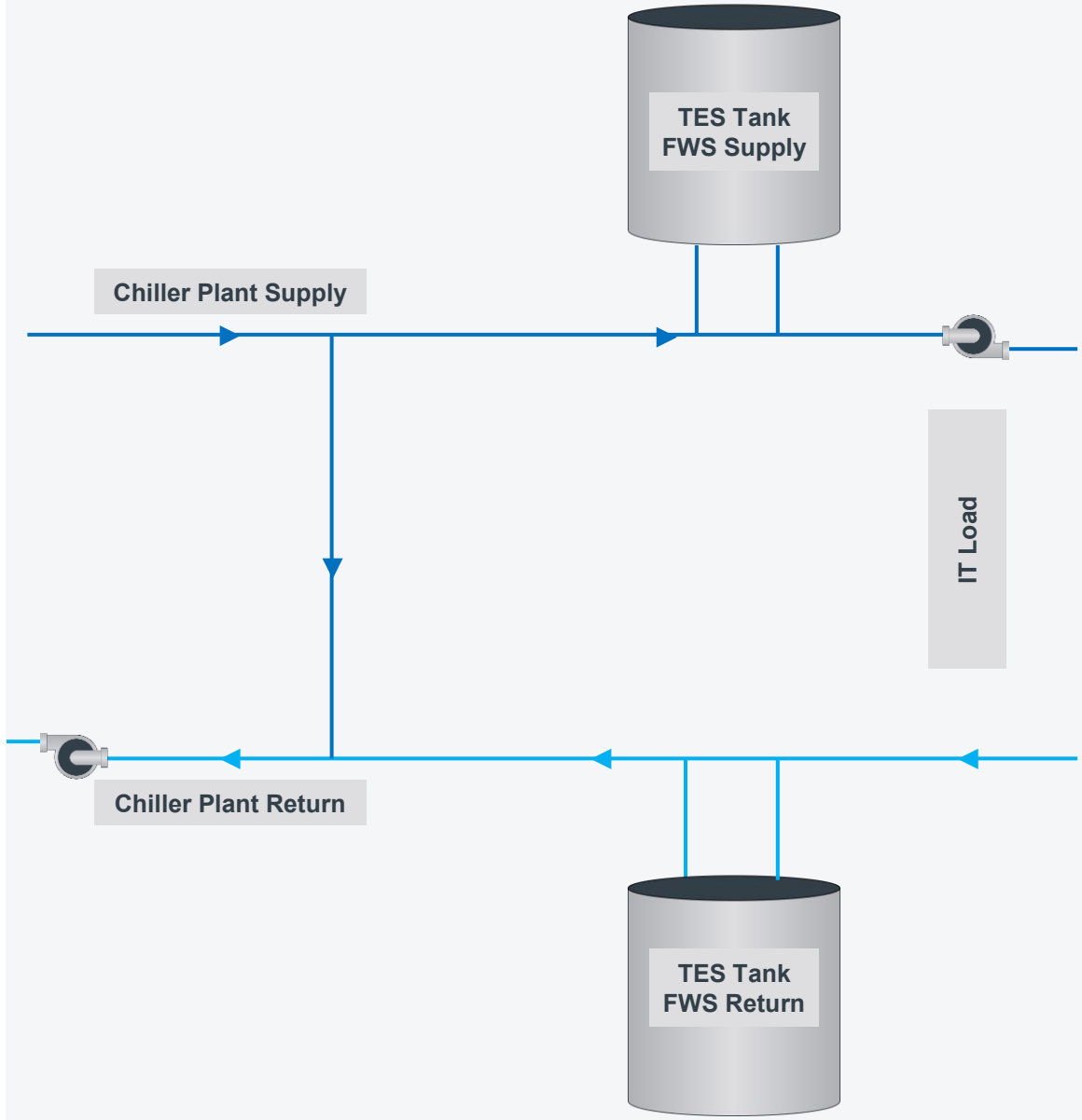
BEST PRACTICES

Thermal Energy Storage

Storage Location Matters

Thermal storage can be integrated into the chiller plant in several ways, with tank location determined by system needs.

- ✓ TES on FWS Supply
  - Provides capacity if the chiller plant is down
- ✓ TES on FWS Return
  - Smooths out chiller plant operation when compute loads fluctuate
    - When installed on the return side, the tank helps buffer large temperature swings in return water during rapid load changes.
    - Helping stabilize the return temperature enables chillers to maintain a consistent leaving-water temperature.



OPTIMIZING COOLING EQUIPMENT EFFICIENCY

Dry Coolers with Adiabatic Pre-Cooling*

How It Works

- Dry cooler performance is governed by the temperature difference between the process fluid and the ambient dry-bulb air
- Adiabatic cooling introduces evaporated water into the inlet airstream, effectively lowering the dry-bulb temperature
- As the air temperature approaches the wet-bulb temperature, heat-transfer capacity increases
- The greatest performance gains are realized in hot, arid climates characterized by wide dry-bulb to wet-bulb (DB–WB) depressions

Mechanical Cooling Benefits

- Optimizes heat-rejection capacity during peak ambient temperatures
- Reduces chiller lift and compressor power demand
- Allows smaller dry cooler sizing or reduced load on existing units
- Cuts compressor and fan energy during high-temperature periods

Free Cooling Benefits

- Dry coolers can support both mechanical and free cooling (with isolation HX)
- Adiabatic pre-cooling widens the ambient temperature range where free cooling is possible
- Extends free-cooling hours and reduces chiller operation and energy use

System Design Options

- Scenario 1: Reduced Number of Dry Coolers
  - Lower first cost
  - Smaller footprint
  - Lower mechanical cooling cost
  - Maintained free cooling window
- Scenario 2: Same Number of Dry Coolers
  - Same first cost & footprint
  - Lower mechanical cooling cost
  - Expanded free-cooling window

If water consumption is allowed

SYSTEM CONTROLS

Reference Diagram

Effective controls are critical to chiller plant performance and reliability. Trane's data center–specific control platform helps promote efficiency, uptime and responsiveness by integrating all major components — chillers, dry coolers, pumps, valves, CDUs and fan coil walls — into one coordinated system.

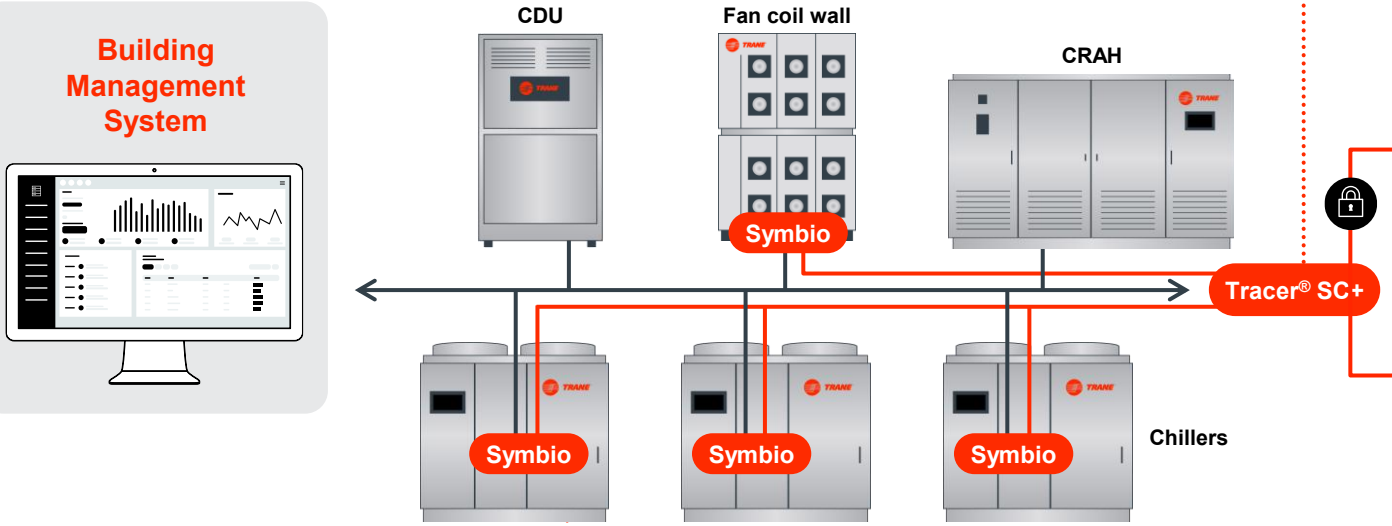
System Control

Tracer® is a unified thermal management system that simplifies operations by handling chiller rotation, staging, and sequencing with built-in tools that boost reliability and enable data-driven performance.

AI Enhancements

Take optimization further with our AI-driven efficiency engine. **Trane® AI Control** blends decades of expertise with real-time data to continuously improve your thermal management system and help capture every possible watt of savings.

Trane Thermal Management System



Digital Hub

Trane® Cloud
- Secure connectivity
- Remote service
- Analytics and diagnostics

Tracer® Synchrony®
- Chiller plant control
- Enhancement strategies
- Equipment monitoring

Insights + Optimization

When power is limited, your cooling system must run at peak efficiency—every kilowatt saved means more racks online. **Trane Intelligent Services** uses whole-system data to help deliver actionable energy-saving strategies.

Equipment Connectivity

Symbio® controls collect and translate key equipment data into the **Tracer SC+,** enabling data-driven service and optimization.

Predictive Maintenance

With your permission, we can securely connect to your equipment or Tracer SC+ to enable **Connected Mechanical Service**. By monitoring trends and performance data, we help identify issues early so your team or our technicians can act before failures occur. And when on-site support is needed, **Trane Service Agreements** and **local technicians** are ready to respond.

TRANE CLOUD

Digital Solutions

Trane Cloud connects your thermal management system to a secure, scalable digital environment where data becomes insight and insight becomes action. By bringing together equipment, controls and analytics in one place, it gives you and your operations team a shared view of system performance — so issues can be identified, prioritized and addressed with clarity.

- Centralized equipment, building and service data enable faster response and issue resolution
- Advanced analytics and expert guidance turns real-time data into prioritized insights, so you know what matters most
- System architecture supports future scalability
- Foundation for advanced services enables AI, predictive diagnostics and ongoing optimization

SECURE CONNECTIVITY

Digital Solutions

In data center environments, connectivity can’t come at the expense of security. Trane’s secure connectivity framework is designed to protect your systems, data and operations while still delivering the full value of digital services. With layered protections, controlled access and industry-aligned practices, you get the insights you need — without taking on unnecessary risk.

- Built-in security protects your system at every level
- Secure remote access lets you monitor and service your system without exposing critical infrastructure
- Data protection and encryption help keep your information secure in transit and at rest
- Role-based access and governance make sure the right people have access to the right data
- OTA updates help you stay current with evolving cybersecurity standards and best practices
- Dedicated Trane cybersecurity teams help keep you ahead of emerging threats and your system secure over time

NUVOLO

Asset and Maintenance Management

Nuvolo® delivers a modern, ServiceNow-native CMMS platform designed to help data centers operate with greater reliability, efficiency, and control. By unifying facilities and IT operations, Nuvolo enables seamless management of critical infrastructure — from chillers and generators to UPS systems and other mission-critical assets.

With automated maintenance workflows, real-time asset tracking, and built-in space and capacity management, the platform helps reduce downtime, extend equipment life, and strengthen compliance with evolving regulatory standards. Nuvolo also transforms operational data into actionable insights, empowering smarter capital planning and supporting sustainability goals. The result is a connected, proactive approach to data center operations that keeps facilities resilient and future-ready.

SUSTAINABILITY

Your Sustainability Goals Are Our Sustainability Goals

As the demand for data processing and storage grows, so does the need for sustainable practices.
Trane is committed to helping data centers achieve their sustainability goals while maintaining operational efficiency and strengthening community relations.

Trane offers solutions to help mitigate community relations concerns, including noise reduction and community engagement.

As a global climate innovator and energy services provider we translate sustainability priorities into actionable tactics and strategies to help lower carbon emissions, conserve resources and reallocate energy.

Trane provides scalable solutions that help customers grow as they go, helping to balance CapEx and OpEx.

Trane’s innovative and scalable solutions create sustainable outcomes helping to support energy efficiency, regulatory compliance and cost savings.

TRANE SERVICE

As data centers expand in size and complexity, the need for dependable, efficient cooling grows with them. Trane's thermal management services are designed to meet these evolving demands — providing scalable, responsive support that adapts to changing loads, tighter schedules and zero-tolerance uptime requirements.

- Embedded expertise ensures reliable operation from design through expansion and refresh
- Proactive planning helps reduce risk and downtime
- Connected insights help optimize capacity and efficiency across the lifecycle

TRANE RENTAL SERVICES

Need unrivaled temporary thermal management and power solutions for your data center? Trust Trane Rental Services for:

- Level 2, 3, and 4 **commissioning services**, including line flushes and load bank testing
- **Expansion and retrofits** for new chip designs
- Planned **maintenance, emergency response, and redundancy** to protect SLAs
- Overcoming **new equipment lead times** to speed up new facility launches

As one of North America's largest OEM HVAC rental companies, Trane Rental Services leads the market. Our highly trained staff, rapid emergency response, and unmatched expertise are supported by 150 locations, 230 parts centers, and 2,600 technicians. Choose Trane Rental Services for reliable, expert solutions.

Trane.com/rentals

1-800-755-5115

INTEGRATED ELECTRICAL & POWER ARCHITECTURE

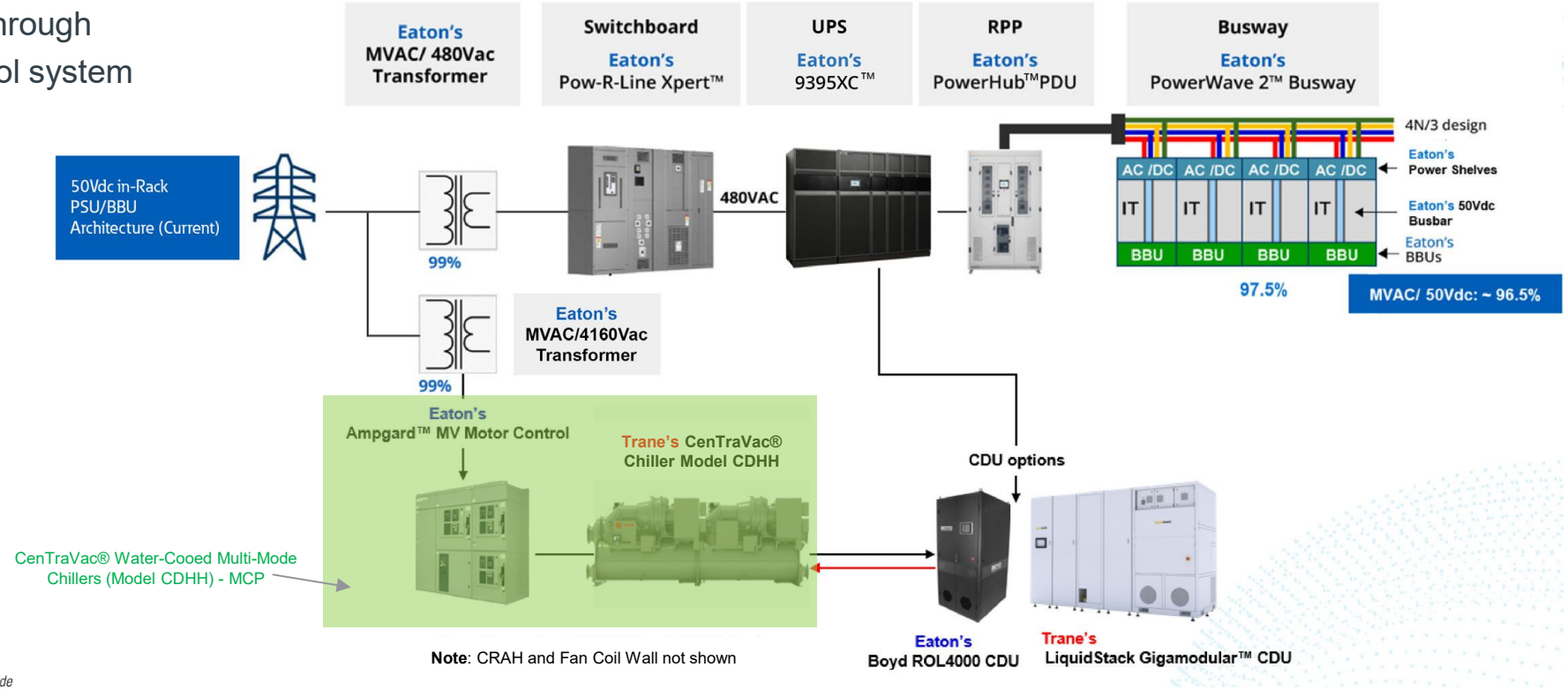
Trane + Eaton

Unified Power Distribution

- Trane mechanical and HVAC systems connect directly to Eaton switchgear, distribution panels, and circuit protection devices.
- Eaton's modular switchgear supports scalable expansions and high-density power architectures used in AI and high-load environments.
- Selective coordination offers reliable power delivery to mission-critical cooling equipment.

Power Quality & Backup Integration

- Eaton UPS systems provide ride-through power to help prevent HVAC control system resets during disturbances.
- Power quality conditioning (harmonic filtering, surge suppression) protects Trane VFDs & control electronics.
- Integration with Eaton transfer switches and generator systems provides seamless transition to emergency power.



Note: CRAH and Fan Coil Wall not shown

TRANE

EATON
Powering Business Worldwide

CONTROLS, MONITORING AND ENHANCEMENT

Trane + Eaton

Advanced Metering & System Visibility

- Eaton metering and Power Xpert platforms deliver real-time visibility into mechanical-system loads (kW, kWh, demand, harmonics).
- Data streams integrate into Trane BMS/EMS platforms for unified dashboards that combine power and thermal system performance.
- Enables energy benchmarking, capacity planning, and predictive maintenance.

Controls & Automation Synergy

- Trane controls interface with Eaton intelligent breakers, relays, and gateways using open protocols (BACnet, Modbus, Ethernet/IP).
- Supports coordinated load shedding, start-up sequencing, and protective logic tied to electrical system conditions.
- Enables remote monitoring, alarm forwarding, and secure updates across mechanical and electrical equipment.

Resiliency, Safety & Compliance

- Eaton arc-flash mitigation and UL-listed electrical components enhance service safety for Trane system maintenance.
- Redundant power paths and dual-feed configurations ensure high availability for liquid-cooling and mechanical systems.
- Combined diagnostics from both systems accelerate troubleshooting and help reduce downtime.

DESIGN RESOURCES

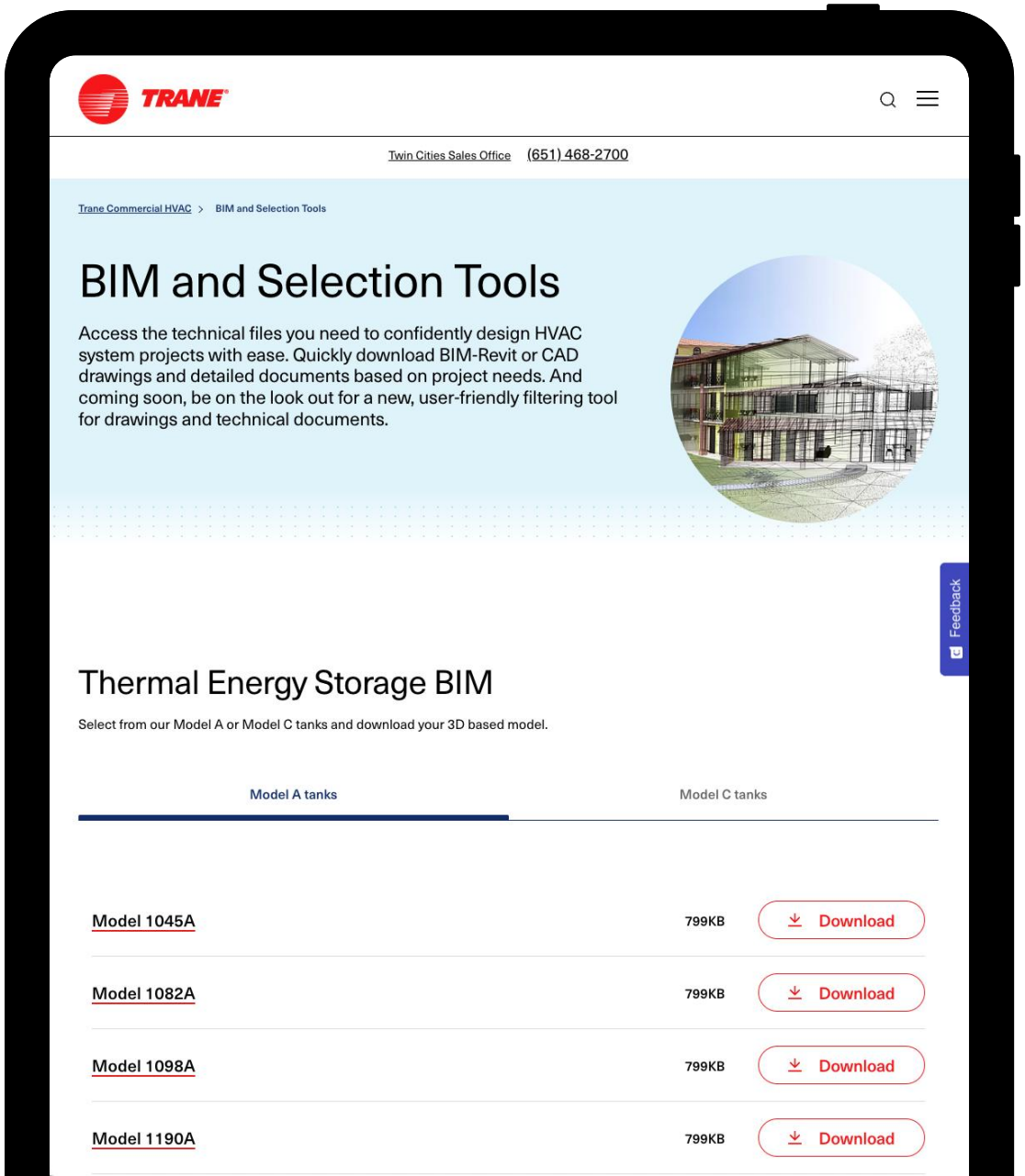
Trane provides a complete suite of resources to support the design of high-performance thermal management systems for data centers.

- Mechanical components are selected for site-specific conditions, with detailed submittal packages available
- System control sequences and operating modes can be customized for any chiller plant configuration
- TRACE™ modeling tools evaluate annual energy performance and efficiency
- Application guides and Trane experts are available to assist with design, optimization and implementation

Reach out to Trane today for more information.

HELPFUL LINKS

Trane BIM and Selection Tools →



Trane.com/ReferenceDesign

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Trane – by Trane Technologies (NYSE: TT), a global climate innovator – creates comfortable, energy efficient indoor environments through a broad portfolio of heating, ventilating and air conditioning systems and controls, services, parts and supply. For more information, please visit *trane.com or tranetechnologies.com.*

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