

# IMMERSION COOLING FOR ANY WORKLOAD ANYWHERE

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**PNC | DFCXI** TECHNICAL DATASHEETS

[www.asperitas.com](http://www.asperitas.com)



## IMMERSION COOLING SOLUTION

### Immersed Computing®: sustainable, high density data centres and edge nodes anywhere

Asperitas is a leading European cleantech provider of sustainable thermal management solutions, with a clear vision to maximise the effective use of energy for compute. Our mission is to help customers grow their digital infrastructure responsibly through high quality solutions like Immersed Computing®, our unique liquid cooling concept that enables record breaking densities, warm water cooling, and high-performance operations with minimal overhead energy.



Fully integrated and plug and play, our immersion cooling solutions enable highly efficient and flexible deployment of high-density CPU and GPU workloads, in both large scale core data centres and decentralised edge nodes. Our ambition is to build the intelligent thermal layer for the next generation compute stack, enabling sustainable growth wherever it's needed.

### INDUSTRY AWARDS





## TECHNICAL SPECS | PNC

### CAPACITY

ASHRAE W3 solution footprint	18 kW/m <sup>2</sup> , 32°C
Power capacity	44 kW at 2N
Cooling capacity	Typical 30 kW at 32°C, 1.2 kW/U (up to 1.8 kW/U)
IT capacity (immersed)	24U x 19" (optional 21") + 2U x 19" switches
IT capacity (air-cooled switches)	Up to 4U x 19" (optional)
Non-IT Power	110W
Maximum heat dissipation	350W/CPU, 400W/GPU

### DIMENSIONS & WEIGHT

Dimensions (L x D x H)	1500 x 714 x 1591 mm
Product footprint	1.1 m <sup>2</sup>
Solution footprint	2.9 m <sup>2</sup> optimal with service aisles
Height clearance requirement	2460 mm
Service space	1200mm (space for service trolley and passage)
Product weight	600 kg
Operational weight (without IT)	1080 kg
Operational weight (with IT)	1680 kg (based on 25 kg/U)

### TECHNOLOGY

Cooling technology	Natural convection, passive (no pumps)
CDU (Coolant Distribution Unit)	N/A
Main components	2 heat exchangers, PLC controller, rPDUs and power panel
Dielectric liquid type	Single-phase hydrocarbon (meeting OCP base fluid requirements)
Dielectric liquid volume	550-650 litres (IT-dependent)

### WATER

Water input	Typical 32°C (above dew point, up to 45°C) (IT-dependent)
Water output	Typical 42°C (ΔT = 10°C)
Water flow	Nominal 0.5 l/s (25 kPa PDC), maximum 1.6 l/s overall
Maximum operating pressure	1000 kPa (10 bar-g)
Water connection	4 x 1" BSPP inner thread, stainless steel 316
Water quality	Liquid Cooling Guidelines for Datacom Equipment Centers, ASHRAE (2014) Second Edition

### ELECTRICAL

Power feed	3-phase 400V/63A (optional 32A)
Electrical connection	2 x Mennekes 5-pin CEE 63A male center pin
Switch gear, electrical selectivity	Integrated

### QUALITY & SAFETY

Liquid containment	Dual hull with insulation, level monitoring feature
Heat rejection effectiveness	> 98%
Autonomous safety system	Tank autonomous action (high-high) to shut-off power and cooling supply in emergency
Redundancy	Fully 2N power, ride-through time on cooling
Sensors	Level, water leak, dielectric fluid temperatures, water (in/out temperatures, flow & pressure)
Control modes	On water side by 3 set points: flowrate, return temperature, temperature change
Serviceability	All parts are live serviceable
Environment conditions	-20°C to 55°C non-condensing

*Supports compliance with the EU Energy Efficiency Directive, EU Taxonomy for Sustainable Activities, EU Code of Conduct for Data Centre Efficiency, EU Ecodesign for Servers & Storage and the EU Corporate Sustainability Reporting Directive, by creating positive impact on KPI's like PUE, WUE, ERF, Total Energy Use (kWh), Waste Heat Reuse Potential (kWh, °C) among others.*



## TECHNICAL SPECS | DFCX1

### CAPACITY

ASHRAE W3 solution footprint	29kW/m <sup>2</sup> , 32°C
Power capacity	44kW at 2N
Cooling capacity	Typical 44kW at 32°C, 3.68kW/U (up to 5kW/U w/TF)
IT capacity (immersed)	12U x 19" (optional 21") up to 1000mm
IT capacity (air-cooled switches)	Up to 2U x 19" up to 600mm
Non-IT Power	< 1 kW (pumps & PLC)
Maximum heat dissipation	> 1000 W/chip

### DIMENSIONS & WEIGHT

Dimensions (L x D x H)	640 x 1320 x 2000 mm
Product footprint	0.8 m <sup>2</sup>
Solution footprint	2.0 m <sup>2</sup> optimal with service aisles, 3.9 m <sup>2</sup> with lateral clearance
Height clearance requirement	2500 mm
Service space	1200 mm (clearance for service trolley and passage) + 600mm (lateral clearance for maintenance)
Product weight	610 kg
Operational weight (without IT)	974 kg
Operational weight (with IT)	1274 kg (based on 25 kg/U)

### TECHNOLOGY

Cooling technology	Forced convection, bulk & targeted flow (TF)
CDU (Coolant Distribution Unit)	Integrated
Main components	1 heat exchanger, 2 pumps, PLC controller, rPDUs and power panel
Dielectric liquid type	Single-phase hydrocarbon (meeting OCP base fluid requirements)
Dielectric liquid volume	400-450 litres (IT-dependent)

### WATER

Water input	Typical 32°C (above dew point, IT-dependent)
Water output	Typical 42°C (ΔT = 10°C)
Water flow	Typical 1.13 l/s (1.55 l/s at 60 kW)
Maximum operating pressure	1000 kPa (10 bar-g)
Water connection	2 x 2" tri-clamp (feed and return), stainless steel 316
Water quality	Liquid Cooling Guidelines for Datacom Equipment Centers, ASHRAE (2014) Second Edition

### ELECTRICAL

Power feed	3-phase 400V/63A (optional 32A) for rPDUs, 1-phase 230V/16A for cooling and safety system
Electrical connection	2 x Mennekes 5-pin CEE 63A male center pin for rPDUs, 2 x Shuko 3-pin CEE 16A male center pin for cooling and safety system
Switch gear, electrical selectivity	Integrated for proprietary rPDUs (optional for alternative vendor rPDUs)

### QUALITY & SAFETY

Liquid containment	Dual hull with insulation, level monitoring feature
Heat rejection effectiveness	> 97%
Autonomous safety system	Tank autonomous action (high-high) to shut-off power and cooling supply in emergency
Sensors	Reservoir level, tray leak, dielectric fluid (in/out & top of the tank temperatures, flowrate, in/out pressure), water in/out temperatures
Control modes	Water flowrate set point
Redundancy	Fully 2N power, continuous cooling, 2N concurrent maintainable pumps
Serviceability	All parts are live serviceable & CBM controls options
Environment conditions	-20°C to 55°C non-condensing

*Supports compliance with the EU Energy Efficiency Directive, EU Taxonomy for Sustainable Activities, EU Code of Conduct for Data Centre Efficiency, EU Ecodesign for Servers & Storage and the EU Corporate Sustainability Reporting Directive, by creating positive impact on KPI's like PUE, WUE, ERF, Total Energy Use (kWh), Waste Heat Reuse Potential (kWh, °C) among others.*

## KEY BENEFITS



Reduced **floorspace**



Reduced **CAPEX and OPEX**



Reduced **energy usage**



Reduced **carbon emissions**



Enabled **energy recovery**



Reduced **facility maintenance**



Increased **compute density**



Increased **IT components lifecycle**



Increased **reliability** lower heat & oxidation strain



Increased **resilience** under high heat & load

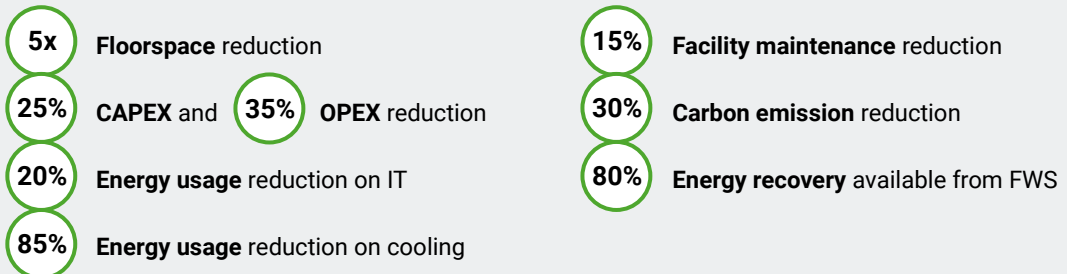


**Redundancy** with continuous cooling

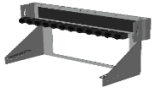



### CASE STUDY GREENFIELD DEPLOYMENT GERMANY

Case Study based on outcomes from OCP TCO Model using Schneider Electric Reference Design RD65 for 1MW DC, Climate Zone 5A ASHRAE 169 (DE), resulting in **below achievements** with PUE L3 = 1.13 and ERF = 97% (encompassing the entire datacentre envelope)



## OPTIONS & ACCESSORIES

CATEGORY	DESCRIPTION	PNC	DFCX1
PDU	Inlet meter	Options	Options
	Phases meters		
	Outlets meters		
	Outlets switches		
Server mount	EIA 19"	Standard	Standard
	OCP 21"	Optional	Optional
Network switch mount	Internal immersed in tank up to 2U 19"	Standard	N/A
	 External side brackets up to 2U x 19" each side	Optional	N/A
	 External backside brackets up to 4U x 19"	Optional	N/A
	2U air-cooled in cabinet 600mm long	N/A	Standard
Industrial protocol	Modbus TCP	Standard	Standard
	Modbus RTU	N/A	Optional
	OPC UA	Standard	Standard
	Restful API	N/A	Standard
HMI	Atvise	Standard	N/A
	Phoenix	N/A	Standard

Dive into next-generation immersion cooling with Asperitas and get ready for the demands of the future.

Contact [sales@asperitas.com](mailto:sales@asperitas.com)