

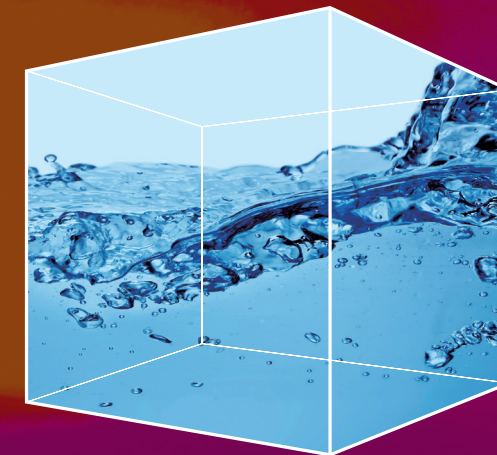
데이터센터를 살리는 새로운 기술,
Immersion Cooling 으로
환경과 에너지, 비용을 아껴드리는
우리는 원방테크입니다.



서울특별시 강남구 광평로51길 6-23
대표 02-6230-7100
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Immersion Cooling for



Data Center





The Best Partner for Smart Data Center

귀사의 기술이 첨단일수록
귀사의 데이터가 방대할수록
귀사의 비전이 클수록
데이터센터의 에너지 솔루션 파트너는 원방테크입니다.

World Wide | Wonbang Tech + Submer

Global Network

Wonbang Tech World Branch 13+, Submer SmartPods Installed 13+

세계 어디라도
데이터센터가 있는 곳이라면
Wonbang Tech의 노하우가 갑니다.
Submer의 기술이 함께 갑니다.



세계적인 HW 공급업체 및 표준 기술과
호환 가능한 신뢰의 제품입니다.

Rendering and Gaming, Colocation, Education and Research, Hyperscalers
Blockchain, Government, Banking and Fintech, Telecommunications

모든 데이터센터엔 첨단 이머전쿨링 기술이 필요합니다.



1 원방은 ESG 선도 기업

- 30년 동안 쌓은 ICR, DR, BCR, RDDC 노하우
- xREMS를 통한 Energy, Environment, Engineering의 시너지
- 기후 변화와 탄소 중립, 생물 다양성을 생각하고 고객 만족을 이루는 ESG 선도 기업



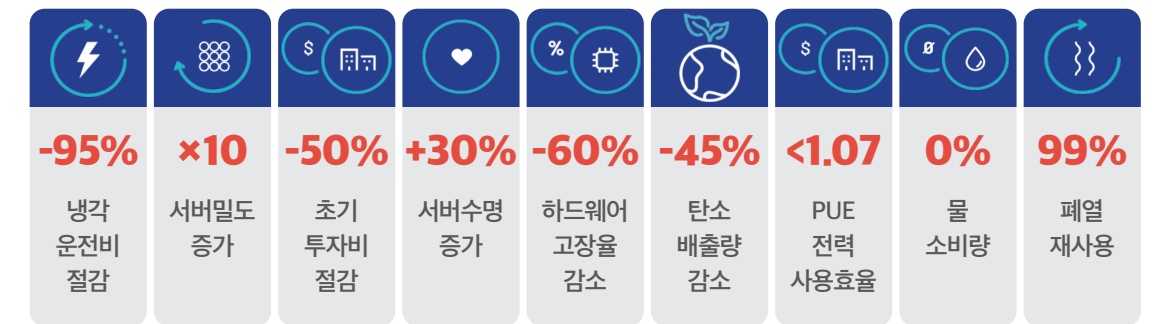
ESG (Environmental, Social, Governance)

환경 Environmental	사회 Social	투명경영 Governance
기후변화 및 탄소배출 대기 및 수질오염 생물의 다양성, 삼림 벌채 에너지 효율 폐기물 관리, 물 부족	데이터 보호 및 프라이버시 성별 및 다양성 직원참여 지역사회 관계 인권, 노동기준	이사회 구성 감사위원회 구조 뇌물 및 부패, 임원 보상 로비, 정치 기부금 내부 고발자 제도

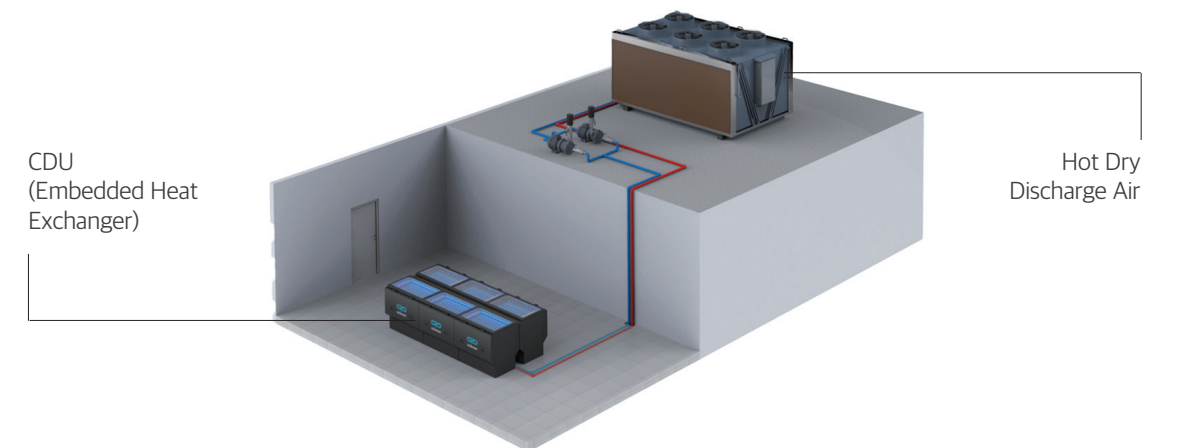
2 이머전쿨링의 효과

- 냉각비 95% 절감, 물소비량 0, 폐열 재사용 99%
- 에너지 효율 PUE=1.07, 탄소 배출량 -45%, 서버 수명 증가
- 기존 공랭식과 결합 가능, 45dB(A) 이하의 정숙한 작업 환경, 설치 면적 감소

Immersion Cooling Benefits



Turnkey Immersion Cooling



Smart Coolant

친환경 열매체유,
서버를 시원하게! 인체에 무해하게!



Technical Specs

Physical & Chemical Properties	Method	Typical Value
Fluid Type	-	Synthetic
Appearance	-	Bright & Clear
Saybolt Color	ASTM D156	21
Fire Point	ISO 2719	233°C
Pour Point	ISO 3016	-50°C
Density @20°C	ISO 3675	796 kg / m ³
Kinematic Viscosity @40°C	ISO 3104	5.1 mm ² / s (cSt)
Water Content	IEC 60914	≤20 mg / kg
Acidity	IEC 62021	≤0.01 mg KOH / g
Corrosive Sulphur	IEC 62535	Non-corrosive
PCB Content	IEC 61619	Non-detectable
Thermal Conductivity @40°C	-	0.14 W / m·K
Specific Heat @40 °C	-	2.26 kJ / Kg·K
Refractive Index nD20	-	1.445

Electrical Properties	Method	Typical Value
Breakdown Voltage	IEC 60156	≥50 kV
Dielectric Dissipation Factor @90°C	IEC 60247	≥0.005
Volume Resistivity	IEC 60247	10 ¹² Ω.cm

Environmental Properties	Method	Typical Value
Biodegradability (28 days)	OECD 301F	Readily Biodegradable
NSF Food-grade Certification	-	HT1
Global Warming Potential	-	None

Micro Pod

Edge & Cloud Computing을 위한
가장 스마트한 솔루션!



Technical Specs

Heat Dissipation Capacity (W)	Outdoor Configuration: 5 kW (in Direct Sunlight) Indoor Configuration: 6.7 kW
IT Gear Capacity (U)	19 in / 6 U, 800 mm Max Depth
IT Gear Width, Max	48.2 cm /19 in Std (53.3 cm / 21 in Under Request)
IT Gear Depth, Max	80 cm
Dimensions, LxWxH (cm, in)	149(L) x 89(W) x 135(H) cm Maximum Height with Lid Open: 180(H) cm 70.9(H) in
Weight, Empty (kg, lb)	260 kg
Weight, Full of SmartCoolant Weight (kg, lb)	403 kg
Footprint, LxW (m ² , f2)	1.33 m ²
Communications	Multiple Options for Integrated Pass-through Patch Panel and Cable Management / Ethernet Port
Ambient Air Temperature Min-max	-5°C ~ 40°C
Integrated Dry Cooler	Std
Water requirement	None
Maximum Power Consumption (with Optional Chiller)	TBD
Power Supply Options	(CE)230 V, 50 Hz / (UL) 240 V, 60 Hz
Backup Power	Multiple options for integrated - Battery Backup Units
SmartCoolant Capacity	180 L

SmartPodX

데이터센터를 위한
가장 스마트한 선택!



The Characteristics

Total Dissipation Capacity	50 kW
IT Hardware Capacity	21U/19 OU
Dimensions	120(L) x 90(W) x 119(H) cm
Max Height(Lid open)	195(Max H) cm
Weight(Empty) with CDU	411 kg
SmartCoolant Capacity	576 L
Total Weight (Full of SmartCoolant with CDU)	872 kg

The CDU

Max Power Consumption	750 W
Mechanical Power Usage Effectiveness	1.015
Number of CDUS	1
Power Supply (CE/UL)	3 Phase+N 380-400 V 50 Hz/208 V 60 Hz
Power Supply Connection - Each CDU(CE/UL)	Industrial Connector 3P+E+N 16A IEC 60309 / 20 AMP NEMA PLUG L2120
Water Supply Connection - Each CDU(CE/UL)	G11 / 4" BSPP Female / 11 / 4" NPT Male - Zero-leak Quick Water Couplings
Head Loss in the CDU	1.3 bar @ 9 m ³ / h / 18.6 psi @ 2,378 gph

The Deployment

Water Supply Inlet temperature	Recommended < 32° C
Water Flow Rate	9m ³ / h
Warm Water Outlet Temperature	Expected +5°C / +9°F over Selected Water Inlet Temperature
Floor Load Capacity(Full of Coolant + with CDU) OCP IT Hardware Worst Case Considered	1,422 kg / m ² / 13.9 kN / m ²
Floor Footprint(LxWf)*	0.74 m ²
Footprint(LxW)*	1.07 m ²

SmartPodXL, XL+

데이터센터를 더 효과적으로!
더 오래 지속되게!



The Characteristics

	XL	XL+
Total Dissipation Capacity	50 kW	100 kW
IT Hardware Capacity	44U / 42 OU	41U / 39 OU
Dimensions	229(L) x 90(W) x 119(H) cm	
Max Height (Lid open)	195(Max H) cm	
Weight (Empty) with CDU	671 kg	767 kg
SmartCoolant Capacity	1187 L	
Total Weight (Full of SmartCoolant with CDU)	1,620.5 kg	1,716.5 kg

The CDU

	XL	XL+
Max Power Consumption	750 W	1,500 W
Mechanical Power Usage Effectiveness	1.015	
Number of CDUS	1	2
Power Supply (CE/UL)	3 Phase+N 380-400 V 50 Hz / 208 V 60 Hz	
Power Supply Connection - Each CDU (CE/UL)	Industrial Connector 3P+E+N 16A IEC 60309 / 20 AMP NEMA PLUG L2120	
Water Supply Connection - Each CDU (CE/UL)	G11 / 4" BSPP Female / 11 / 4" NPT Male - Zero-leak Quick Water Couplings	
Head Loss in the CDU	1.3 bar @ 9 m ³ / h / 18.6 psi @ 2,378 gph	

The Deployment

	XL	XL+
Water Supply Inlet temperature	Recommended < 32° C / 89.6°F	
Water Flow Rate	9m ³ / h	18m ³ / h
Warm Water Outlet Temperature	Expected +5°C/+9°F over Selected Water Inlet Temperature	
Floor Load Capacity(Full of Coolant + with CDU) OCP IT Hardware Worst Case Considered	1,432 kg / m ² / 14 kN / m ²	1,480 kg / m ² / 14.5 kN / m ²
Floor Footprint(LxWf)*	1.41 m ²	
Footprint(LxW)*	2.05 m ²	

Our Products Specification

MegaPod

모듈식으로 무한 구성 가능한 데이터센터.
어디나 쉽게 배치할 수 있는 컨테이너형 솔루션!



Tehchnical Specs

		MegaPod 100	MegaPod 200	MegaPod 400	MegaPod 800
Power	Total IT Load	100 kW	200 kW	400 kW	800 kW
	Power Supply	3x400 V 50 Hz / 3x415 V 60 Hz 3 ph+N+PE			
	Power Supply Redundancy	A+B Optional			
	UPS	Optional			
	rPDU	2xPDU per SmartPod			
	OCP Power Shelf	Optional			
rPDU / OCP Power Shelf Redundancy	Optional				
Immersion Rack / Tank	Immersion Rack / Tank Type	SmartPod XL			SmartPod XL+
	Capacity	2x44U / 42 OU	4x44 U / 42 OU	8x44 U / 42 OU	8x41 U / 39 OU
	Distribution	2x50 kW	4x50 kW	8x50 kW	8x100 kW
	Redundancy	Optional			N / A
	Fluid	SmartCoolant			
IT Gear Handling	Overhead Rail+Lifting Device				
Fire Supression System		Automatic, Gas Based			
Monitoring and Reporting	Monitoring	Operating and Environmental Parameters			
	Monitoring and Reporting Platform	Submer Portal			
	Platform Integration	API			
Enclosure	Type	ISO 10' High Cube Container ¹	ISO 20' High Cube Container ²	ISO 40' High Cube Container ³	
	Comfort	A / C Unit			
Cooling Module	Type	Dry Cooler / Adiabatic Cooling Tower			
	Fan Type	EC Type			
	Pumping System Redundancy	2 N			
	Size	ISO 10' High Cube Container ¹	ISO 20' High Cube Container ²	ISO 40' High Cube Container ³	
General	Configuration	Stacked / Side by Side			
	Operating Temperature Range	-20°C - +50°C (-4°F - +122°F)			
	Tier III Ready	Optional			N / A

1. ISO 10' High Cube Container 2,991(L) × 2,438(W) × 2,896(H) mm / 10'(L) × 8'(W) × 9'6"(H) ft
2. ISO 20' High Cube Container 6,058(L) × 2,438(W) × 2,896(H) mm / 20'(L) × 8'(W) × 9'6"(H) ft
3. ISO 40' High Cube Container 12,192(L) × 2,438(W) × 2,896(H) mm / 40'(L) × 8'(W) × 9'6"(H) ft

Smart Tools

Air Cooled vs Submer Cooled

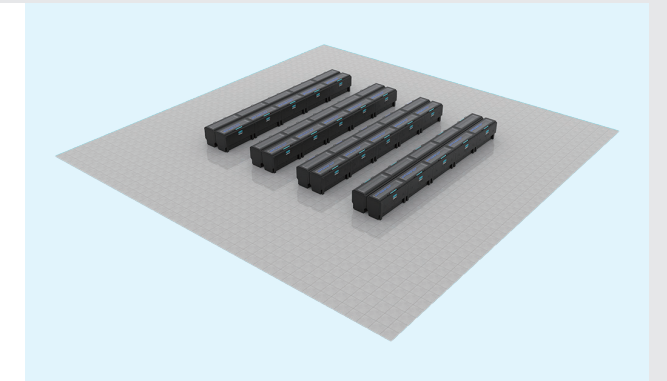
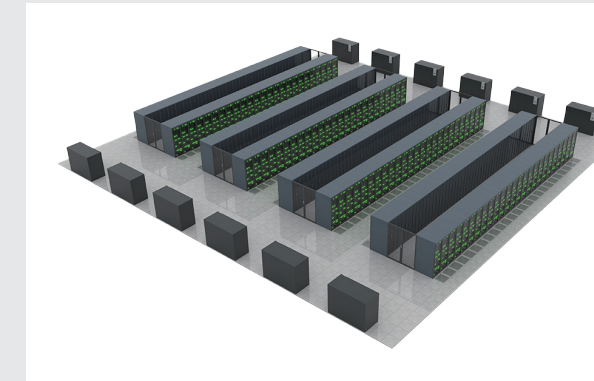
공냉식과 이머전 쿨링의 영업 비용, 운영 지출, 효과성, 환경 기여를 비교해 주십시오.
지구를 구하는 선택을 지금 시작해보십시오.

Air Cooled

KW Average per Rack: 20 PUE: 1.67
Nº Rack: 200 Heat Dissipation per Rack > 20 kw

Submer Cooled

KW Average per Pod: 100 PUE: 1.02
Nº Pods: 40 Heat Dissipation per Pod > 20 kw



Air Cooled		Submer Cooled	
200 racks	Units	40 pods	
4,000 kw	Total Power kw	4,000 kw	
2,395 kw / IT	IT Load	3,922 kw / IT	
1.67	Total PUE	1.02	
Opex			
35,064,000 kw	Annual Energy Use	17,532,000 kw	
4,558,320 \$	Annual Energy Cost	2,279,160 \$	
Efficiency			
192 m ²	Space	86.00 m ²	
4 years	IT life-span	6 years	
90-180 days	Deployment	15-40 days	
85 dB(A)	Noise	40 dB (A)	
Save the Planet			
63,816,480 L / year	Waste of Water	0 L / year	
153,580,320 MT / year	Carbon Footprint	90,465,120 MT / year	

* Electricity \$0.13 / kwh
Standard Rack 1,200x800 mm

* Electricity \$0.13 / kwh
SmartPodXL > 100 kw