LIEBERT® PCW -HIGH CW DELTA T



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Launch Webcast – 06.04.2017



AGENDA

Development Strategy

- A Unit Part of a System
- Success Stories

Product Overview

- Technical Card
- Main differences from the standard Liebert[®] PCW
- Two NEW Fans Types for Different Needs
 - Efficiency Comparison

The Right Unit Design for the Right Application

Benchmarking

Sales Tools



EFFICIENCIES IMPROVEMENTS IN THE CW SOLUTIONS

Energy Yearly Consumption / 1 kW Cooling



VERTIV.

THERMAL MANAGEMENT SOLUTION



LIEBERT[®] PCW HIGH CW DELTA T - DEVELOPMENT

Market and Customer Requirements:

Data center technology trends allow higher server working temperatures, lower pPUE: increase of water T and water ΔT , reducing the water flow

Design Criteria for Data Centers:

Water 20°C – 32°C ; air to the server from 25°C to 27°C

Applications:

- Specific design for high delta T and high water T
- Adiabatic freecooling chillers operating at high delta T
- Higher cooling capacity in the same box --- Cooling density increasing

Highly Efficient CW Systems for 20/32°C

- Liebert[®] AFC
- Liebert[®] PCW High CW Delta T
- Variable water flow and supersaver





LIEBERT® PCW HIGH CW DELTA T - DEVELOPMENT

The Right Design Solution to Maximize Efficiency

High Water Delta T is a challenge for Chilled Water Unit Heat Exchange

Liebert[®] PCW High Chilled Water Delta T has been developed to answer to these new challenges

- Ad hoc coil designs which best suit pure water and glycol operations
- Top door grill to get the maximum from the entire coil face, and therefore optimize overall heat exchange.





NEW LIEBERT[®] PCW – HIGH CHILLED WATER DT EQUINIX FR6

Customer Requirements

 Equinix was looking for maximum freecooling operation. They also wanted to minimize pump consumption as a result of very high water Δ T

Our Technical Solution

 New Liebert[®] PCW designed for similar applications aiming at top efficiency even at challenging water conditions (for a CRAC unit delta T >8K means a totally new operating condition)

Winning Factor

• Unit with dimensions and performances which met the customer specifications.

WATER ΔT > 8K FOR MAXIMUM FREECOOLING



- Units Ordered and Delivered
- Witness Test Successfully passed
- High Customer Satisfaction



NEW LIEBERT[®] PCW – HIGH CHILLED WATER DT E-SHELTER FRA3

Customer Requirements

 E-shelter was looking for higher capacity / airflow per footprint and they were thinking of a CoolWall Solution from Weiss

Our Technical Solution

 New Liebert[®] PCW delivering up to 215 kW with water 16/23°C and return air of 35°C on a 2550 mm unit width! Never been done before!

Winning Factor

 E-Shelter found the solution extremely interesting in terms of kW / linear meter keeping the flexibility of the CRAC design vs the complexity of the CoolWall

> MAXIMUM COOLING CAPACITY PER LINEAR METER

e-shelter



- Units Ordered and Delivered
- Witness Test Successfully passed
- High Customer Satisfaction





Product Overview





LIEBERT[®] PCW HIGH CW DELTA T

Capacity Range 135 – 175 kW:

- Unit height 2950 mm (fans 600 mm) and depth 1050 mm
- Downflow Down version only (downflow up as SFA, but height 2950mm)
- Two types of fans: Standard and Optional
 With Optional fan, not possible to have electric heaters
- Fan speed modulation as standard for both fans
- Two versions: Glycol and no-Glycol (for Single Circuit Unit; for Dual Circuits only one version makes all)
 - Digit 5 = W = no- Glycol (up to 15% glycol), ex PH50WEL
 - Digit 5 = G = Glycol (16% and higher glycol), exPH50GEL
- Double power supply Parallel and Alternate premium only
- Open Door and Closed door design

UNIT MODEL	NET SENSIBLE COOLING	NSEER	FRAME	
	CAPACITY [kW]		WIDTH [mm]	
PH50¹	135.3	24.2	2550	
PH60¹	152.0	24.6	2950	
PH70¹	173.1	23.3	3200	
PH51 ²	150.0	23.4	2550	

¹ PH50/60/70 Performance data @ 35°C/30% RH return air CW 20/32 °C ² PH51 Performance data @ 37°C/30% RH return air CW 20/32 °C



2950 mm



LIEBERT[®] PCW HIGH CW DELTA T – DIGIT 18

Open doors => Digit 18 = 0

- Top part with grills →
- More efficient
- Not possible to have ducting/damper



Closed doors – no grills => Digit 18 = H

- Top part without
 grills
- Possible to have ducting/damper

LIEBERT® PCW HIGH CW DELTA T - STANDARD VS OPTIONAL FAN

OPTIONAL FAN

- More efficient than STANDARD FAN
- New shape, new dimensions of the fan
- Fan is taller → electric heaters not possible

STANDARD FAN

- Higher maximal airflow
- Lower efficiency compared to OPTIONAL FAN

FAN TYPE	MAXIMUM AIRFLOW [m ³ /h]			
STANDARD FAN	47432			
OPTIONAL FAN	45207			

LIEBERT[®] PCW HIGH CW DELTA T - POWER CONSUMPTION

THE GRAPH BELOW SHOWS HOW MUCH WE CAN SAVE ON POWER CONSUMPTION WHEN USING PH50WEL

Power Consumption

- STANDARD FAN vs. OPTIONAL FAN

Net Capacity

- 150 kW

Savings:

Electricity cost: 0.13 €/kWh STANDARD FAN = 9,100 €/year OPTIONAL FAN = 8,100 €/year

1000€ or (11%) yearly saving by choosing OPTIONAL FAN

LIEBERT[®] PCW HIGH CW DELTA T - POWER CONSUMPTION

- The table below shows the difference between using standard and optional fans
- Optional fans consume LESS ENERGY at the SAME COOLING CAPACITY than the standard one
- Energy saving is significant, in most of the cases it's between 9-12%

UNIT MODEL	NET SENSIBLE COOLING CAPACITY [kW]	AIRFLOW [m ³ /h]	FAN TYPE	POWER INPUT [kW]
PH50WEL	130	35450	STANDARD	4,99
PH50WEL	130	35250	OPTIONAL	4,51
PH51WEL	130	46500	STANDARD	9,49
PH51WEL	130	45960	OPTIONAL	8,38
PH60WEL	130	36200	STANDARD	4,45
PH60WEL	130	36050	OPTIONAL	4,06
PH70WEL	130	34970	STANDARD	3,58
PH70WEL	130	34900	OPTIONAL	3,26

The Right Unit Design for the Right Application

THE RIGHT UNIT DESIGN FOR THE RIGHT APPLICATION

When choosing the best unit depending upon customers requirement,

the main factor to consider is

WATER TEMPERATURE

• $\Delta T \le 8K \rightarrow USE STANDARD PCW UNIT$

• $8K \le \Delta T \le 10K \rightarrow THIS SOLUTION NEEDS TO BE EVALUATED$

- In some case we can use standard Liebert® PCW and in another cases Liebert® PCW High CW Delta T
- This situation requires deeper analysis of the entire system in order to find the best solution according to customers needs (e.g. cooling capacity, efficiency, pressure drop, dimensions)

• $\Delta T \ge 10 \text{ K} \rightarrow \text{USE NEW Liebert}^{\mathbb{R}}$ PCW High CW Delta T

Benchmarking

LIEBERT[®] PCW HIGH CW DELTA T BENCHMARK

HIGH ΔT **CHILLED WATER UNIT AND OUR COMPETITORS**

STULZ – SCHNEIDER – HIREF

Offers high Δ T units only as a <u>SPECIALS – no catalogue data</u>

Mistubishi Electric

<u>RC Group</u> looks like the brand positioned by Mitsubishi for DC application **Climaveneta** will be dedicated to comfort application

RC Offers high Δ T unit as a <u>STANDARD</u>

- Product line name: <u>X Type</u>
- Main feature of the unit is "X" shape coil
- Different water conditions compared to VERTIV

MANUFACTURER	WATER INLET TEMP. [°C]	WATER OUTLET TEMP. [°C]	ΔΤ
VERTIV	20	32	12
RCGROUP	18	28	10

VERTIV ADVANTAGE - Higher water inlet temperature means MORE FREECOOLING

BENCHMARK - FLEXIBILITY OF X-TYPE AND LIEBERT[®] PCW HIGH CW DELTA T

Major Difference

The major difference between the X-type and Liebert[®] PCW High CW Delta T is the coil shape, which doesn't allow the X-Type to be as flexible as Liebert[®] PCW when there is the need to apply it for a special request

Main Problems

- There is a problem with free space in general, so placing important devices such as an ATS and PICV is becoming a big issue
- Price of the "X" shape coil is significantly higher than standard coil
- There is only one possibility for water connection to the unit

LIEBERT[®] PCW HIGH CW DELTA T VS X-TYPE – CAPACITY VS NSEER

TY VS. NSEER Liebert[®] PCW High CW Delta T has lower NSEER in this area. The main reason for this is a smaller footprint of the unit:

- The X Type has an advantage due to its bigger coil
- The footprint of the X Type is $\underline{14\% \ bigger}$ than PCW High CW Delta T

- PCW High CW Delta T has a greater cooling capacity range than X - Type

The table below shows the dimensions of both units

MANUFACTURER	UNIT TYPE	WIDTH [mm]	DEPTH [mm]	HEIGHT [mm]
VERTIV	PH70WEL	3200	1050	2950
RCGROUP	T4S	3540	1100	2900

PCW High CW Delta T vs. X – Type COOLING RANGE

MANUFACTURER	UNIT LINE	CAPACITY RANGE [kW]		
VERTIV	PCW2032	58 - 208		
RCGROUP	X - TYPE	52 - 182		

- PCW High CW Delta T has bigger **<u>capacity range</u>**

- PCW High CW Delta T has a higher total capacity

Sales Tools

LIEBERT[®] PCW HIGH CW DELTA T SALES TOOLS

Price Configurator

New Complete Liebert® PCW Renewed Brochure

Hirating Selection Software

Product Documentation & User Manual

Liebert* PCW Solutions for High Chiled Water Delta Temperature L Version (single chilled water circuit) X Version (redundant – double chilled water circuit) Unit Marcé et chillen et solution

VERTIV.

Solutions for High Chilled Water Delta Temperature L Version (single chilled water circuit) X Version (redundant – double chilled water circuit) Plataz Documenter Plataz Documentero

LIEBERT[®] PCW HIGH CW DELTA T - HIRATING

LIEBERT[®] PCW HIGH CW DELTA T HOW TO CONFIGURE THE PRODUCT

		LBT PCW TYPE					
		PCW Basic Unit [1-5] Air Discharge [6] Cooling System Type [7] Fan Type Predisposition [8] Power Supply [9] Valve [10]	Please Select PH50W PH60W PH70W PH50G PH50G PH70G PH70G PH51W S - Power Suppry 400 2 - CW Two Way Value	(In The Ra ✓ OV/3Ph/50 ve Standa	aised Floor) V DHz + N V ard Pressure V		
				•			
		Microprocessor Control [12]	D - ICOM & Coldfire I	Display La	arge Temperature & Humidity Senso	r 💙	
		Heating And Re-heating [13]	0 - None		~		
Liebert PCW for High Chilled Water Delta T		Air Filter [14]	1 - F5 (EU5) Dust Sp	oot	~		
Liebert HP	M	Coil And Pipes [15]	H - Bottom Connection	ons 🗸			
		Colour [16]	1 - Black RAL 7021 C	Colour 🗸			
LBT PCW OPTIONS		High Voltage Options [17]	D - Standard Power S	Supply	\sim		
		Option Package [18]	G - Option Package #	# 3 - Predi	lisposition for Smart Aisle + ECONOI	MIZER 🗸	
Motorized Damper None V		Monitoring [19]	P - IntelliSlot Unity C	Card For M	1odbus, BACnet, SNMP and WEB ✔		
Motorized Spring Return Damper None V		Sensors [20]	0 - Sensors - None		~		
Predisposition For Floor Tiles Support Kit None	~	Packing [21]	P - PLP And Pallet	~			
Main Switch On Front Panel 055183 - Main Switch On Front Panel	~	Special Feature Requirements [22]	Name Descripted M	LBT P	PCW ACCESSORIES		
Alarm Card 051258 - Alarm Card V		Qty	None Required V				
Supply Air Temperature Probe With Electric Heating - sensor already included None		~			Smoke And Fire Sensors	482972 - Kit Smoke And Fire Detector 🗸	
Simple Monitoring None	LBT PCW BASE FI	RAMES			482913 - Temperature and Humidity Sensor	2	
Threaded Connections 055185 - Threaded End Connections N	•				Leak Detector	480160 - Kit Leakage Detector 🗸	
Ethernet Switch ETHSWIPW - 5-Port Ethernet Switch O	n B				iCOM Cabling For Remote Sensors	5m-254952 10m-254856 20m-254857 30m-2548	58 40m-254859 50m-254860
ESP Pressure Control In The Raised Floor None					Fresh Air	None	
	Air	Discharge [6] S - All Sides V		В	Base Frame With Antivibration Damper H<=800mm	055297 - Base Frames With Antivibration D	ampers For PH050W/G & PH51W V
0000000		Fan Type [7] L - EC Fan Standard	~		Kit Legs From 30 To 370 mm	None 🗸	
		Heaters [8] 0 - None V			Air Economizer Module (Packaging PLP And Pallet)	455580 - Air Economizer Module For PH50V	//G & PH51W ₩
powered by Configure One		Packing [9] P - PLP And Pallet	~		Vertical Flow Extension Hood	None V	
		Power Supply 0 - Power Supply 400	0V/3Ph/50Hz + N ∨		For raised floor with 630 mm free space	None 🗸	
	Base Module	SFA Qty [13] None Required 💙			Floor Tiles Support Kit F5 Filter Start Up Replacement Kit	None V 455571 - F5 Filter Replacement Kit For PHF	0W/G & PH51W V

TAKE AWAY MESSAGES

The High Chilled Water Delta T Design Idea Improves the Efficiency Level of a Chilled Water System

- Longer and extended freecooling operation
- Reduced water flows and lower pumping energy

This new design point has a strong impact on CRAC unit design

- Liebert[®] PCW High Chilled Water Delta T is the best unit in the market answering to these new challenges
- The new design includes:
 - Bigger Coil
 - New solution for open door (to exploit its increased height)
 - Two new types of fans
 - Ad hoc solution for pure water and for glycol applications

Liebert[®] AFC screw with freecooling can represent the way to propose a complete and unique solution to our customers

