HYBRID COOLING SOLUTION

nVent and **CoollT** have joined forces to create an enclosure for very high density computing environments. An nVent Schroff RackChiller Rear Door Cooler is combined with a CoolIT Direct Contact Liquid Cooling Distribution Unit to achieve new levels of rack-level cooling efficiency.





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RackChiller Rear Door Operating Parameters

RackChiller Rear Door 800mm x 2,000mm

Parameters		Operating Point 1	Operating Point 2	Operating Point 3	Operating Point 4
Р	[W]	25500	17000	11000	5700
T _{water,in}	[°C]	15	20	30	40
T _{air,in}	[°C]	35	33	40	46
T _{air,out}	[°C]	22,5	25	33	41,5
Results		Operating Point 1	Operating Point 2	Operating Point 3	Operating Point 4
P / ΔT _{in}	[W/K]	1275	1308	1100	950
V' _{air} (projection)	[m3/h]	6120	6375	4714	3800
V' _{water} (projection)	[l/min]	64	65	66	64
Feasibility		feasible	feasible	feasible	feasible
T _{water,out}	[°C]	21	24	32	41
Δp _{air}	[Pa]	24	26	15	10
Δp_{water} (no walve)	[kPa]	15	15	15	15
Δp_{water} (with valve)	[kPa]	59	61	62	59

- T_{air,in}: Rear Door Cooler air intake temperature equals the Server return air temperature
- T_{air,out}: Rear Door Cooler air out temperature equals the Server supply air temperature equals the data center room temperature





CHx80 Operating Parameters based on Rear Door Operating Points

Results	Operating Point 1	Operating Point 2	
RDC Return [°C]	21	24	
Server Supply [°C]	38,7	40,4	
Server Return [°C]	60	60	
Approach dT [K]	18,1	16,7	
Capacity from			
approch curve [kW]	74,8	69,0	

Results	Operating Point 3	Operating Point 4	
RDC Return [°C]	32	41	
Server Supply [°C]	45,1	49,9	
Server Return [°C]	60	60	
Approach dT [K]	12,7	8,6	
Capacity from			
approch curve [kW]	52,5	35,6	

Server Supply/Return liquid temperatures

CHx80 Performance

ASHRAE W4 (45°C); 25% PG Secondary





Operating Point 1









Operating Point 3





Operating Point 4





Summary: Operating Points

Parameter	Unit	Operating Point 1	Operating Point 2	Operating Point 3	Operating Point 4
Server return water temp.	[°C]	60	60	60	60
Facilty supply water temp.	[°C]	15	20	30	40
Room temp.	[°C]	22,5	25	33	41.5
Rear Door Cooler capacity	[kW]	25,5	17	11	5,7
RackChiller Rear Door return / CHx80 primary supply temp.	[°C]	21	24	32	41
CHx80 approach temp. diff.	[°C]	18,1	16,7	12,7	8,6
CHx80 capacity	[kW]	74,8	69	52,5	35,6
Combined capacity	[kW]	100.3	86	63.6	41.3
Percentage air-cooled	[%]	25	20	17	14
Percentage liquid-cooled	[%]	75	80	83	86

