



System Comparison- "BEST OF BOTH WORLDS" model



S No	Description	VRF System	VWF System-AMICHI	AC Chiller System
1	System Design	Compact & Modular	Compact & Modular	Bulky generally
2	Plant room space	VRF ODU to be located at each floor level or at Terrace level	VWF to be located at each floor level or at Terrace level.	To be located at the terrace along with associated accessories like pumps.
	Covered space	Not required	Not required	Not required
	Area required	VRF ODU:10sqmt/each floor/or at terrace level	VWF ODU:10sqmt/each floor/or at terrace level	50-100 sqft @ terrace level
	Air side distribution	CSU / Cassette or hi wall unit shall be proposed based on the interior.	CSU / Cassette or hi wall unit shall be proposed based on the interior. Additional floor space required if AHU.	Additional floor space required for AHU
	Filtration Levels	Restriction due to low static of standard units.	Not a concern	Not a concern
3	IDUs & ODUs limits	Relatively higher	Lesser	No limit
	Flexibility	Constrained- Same make IDUs for ODUs	Better- different make IDUs	Better- different make IDUs
	Future Expansion	Additional ODU space & all copper piping from header need to be changed, which is not feasible as Main pipings is always above false ceiling.	Modular and easy to expand	Modular and easy to expand
4	Piping	Piping lengths are limited to 200m. Long pipes are yield to the chance of leakages and drop in the refrigerant pressure in the pipe.- oil issues also.	Piping lengths are not limited. Less chance for leakages as all the pipes are generally welded.	Piping lengths are not limited. Less chance for leakages as all the pipes are welded.
	Piping material	Copper pipings with refnet joints	MS pipe/PPR pipes/uPVC/cPVC	MS pipes pipes generally as per ASTM standards
5	ASHRAE Standard 15 Compliance	Challenges in meeting this requirements due to long length of refrigerant pipes and volume of refrigerant charged in the system.	Complies the requirements	Complies the requirements
6	Equipment requirement for higher load(>100-200) TR	Since ODUs are located at each floor level More ODU are required to meet the demand. Also, duration in cooling capacity is high to high ambient conditions, Approximately 2 to 3 ODUs / floor.	Flexibility as per space requirement and can be limited to maximum of 3 units.	Flexibility as per space requirement and can be limited to maximum of 3 units.
7	Cooling for critical rooms	Capacities to enhanced to meet the air volume for critical room requirements.	Considered part of chiller system and can be met without increasing the capacity	Considered part of chiller system and can be met without increasing the capacity
8	Diversity	Limited and no diversity can be applied with customised CSU or AHU.	Diversity has been considered as per input	Diversity has been considered as per input
9	Maintenance cost	Expensive to maintain due to refrigerant leaks, more no of PCB's and complex design, maintenance cost.	Easy to maintain less cost	Easy to maintain & less cost
	Frequency of maintenance required	Periodic maintenance is required	Periodic maintenance is required	Periodic maintenance is required
10	Management	Limited access for management and interface with BMS	Easy to manage and interface with BMS	Easy to manage and interface with BMS
11	Redundancy/Diversity	Less compared to the Chiller System.	Available based on load profiles	Available based on load profiles
12	Chemical Treatment	Not required	Not required	Required for water cooled chillers only
13	Make-up Water requirements	Not required	Not required	Required for water cooled chillers only
14	Connected Power- IKW/TR	Relatively higher	Less @ IPLV/NPLV/SPLV	Medium
15	Efficiency-COP	<3.8	Higher	Higher
16	Overall Life Expectancy	Average (typically 10 to 12 years)	Longer life expectancy (typically 20 to 25 years).	Longer life expectancy (typically 20 to 25 years).
17	Refrigerant, Water Leakage & safety	High and results in major breakdown and loss of cooling to the entire floor. Potential threat of refrigerant leakage and the units to be selected to meet the ASHRAE Std 15 compliance.	Low and limited to chiller only.	Low and limited to chiller only.
		Condensate water leakage will be concern if CSU are opted.	Restricted to AHU and condensate water leakage will be a concern if CSU are opted	Restricted to AHU and condensate water leakage will be a concern if CSU are opted
		Higher volume refrigerant leaks can harm human beings. (500PSIG)	Leak risk inside the room (140 PSIG)	Leak risk inside the room 140 PSIG
18	Compressor	Inverter based compressor with reduced power consumption	EVI cold ambient scroll compressors with DC Inverters with highly reduced power consumption. Multistage scroll compressors are an added advantage.	Inverter based compressor with reduced power consumption
19	Integration system	Separate un-shared systems	Shared & integrated system	Shared & integrated system
20	Certification	No certification from any Class/Standard	Eurovent certified	AHRI/Eurovent certified
21	Energy standards	Generally comply	Exceeds ASHRAE 90.1, BEE-S&L, ECBC 2017 standards	Generally comply
22	Deration	Higher-Piping deration as 8% for 50mtr piping length. 10% for 80mtr	Minimum	Medium
23	Climate change & Sustainability	Higher GWP due to increased use of refrigerants	Less GWP	Less GWP
	Fresh air & COVID19	Only for cassetten& CSU units	Greater	Greater
24	Applications	Heat pump & cooling application	Heat pump, heat recovery, cooling & brine application	Heat pump, heat recovery, cooling & brine application
	Temp range	Heating(Heat pump) & cooling	Heat pump, cooling & brine application also	Heat pump, cooling & brine application also
	Make up air	Constraints in specific applications like Hospitals, dairies, hotel, pharma, server rooms etc.	Wide range of applications with as per standards like ASHRAE 170, ASHRAE 62.1 etc	Wide range of applications with as per standards. Ex Hospitals- ASHRAE 170 etc
	Radiant cooling & Under floor heating	Not feasible	Feasible	Feasible
25	Safety of Occupants	Need to have Refrigerant Leak detection System for Conjusted areas as any minor leak can lead to surge in refrigerant concentration in room more than 3000ppm quickly and can lead to harm for humaqn body	As water used as refrigerant which is green gas, expensive refrigerant leak detection not required	As water used as refrigerant which is green gas, expensive refrigerant leak detection not required
26	Precise Temperature & Humidity Control Applications	Not Possible	Possible	Possible
27	Life cycle Analysis	Relatively less Capex, high opex, high maintenance & ODU replacement after 10 years leading to lesser ROI over a span of 20 yrs	Relatively high Capex, low Opex, low maintenance & high ROI over a life span of 20 years.	Relatively high Capex, low Opex, low maintenance & high ROI over a life span of 20 years.