GUIDE SPECIFICATIONS FOR SOCIAL CENTRE: VRF SYSTEMS

1. General

1.1 The equipment for variable refrigerant flow (VRF) system shall be 100% inverter, air cooled, consisting of outdoor units and multiple indoor units for cooling the space.

1.2 The system shall consist of suitable outdoor units, indoor units as required, interconnecting refrigerant piping, control cabling and accessories as required.

1.3 It shall be possible to connect multiple indoor units on a single refrigerant circuit. The indoor units on any circuit may be of different type and should allow individual control.

1.4 The VRF system shall provide stable, trouble free and safe operations, and provide flexibility in operation of indoor units with independent control of each indoor unit, including partial operation. It shall be possible to switch on only those indoor units that require cooling/heating in individual areas.

1.5 The system shall be capable of automatic operation even with varying outdoor and indoor requirements and make use of low outdoor temperatures to achieve lower power consumption, without any manual adjustments.

1.6 The VRF system should be provided with adequate safety under abnormal operating conditions to prevent failure of the system. Under such scenarios, the system should trip in order to protect the refrigerant and electrical components.

1.7 Outdoor unit shall be pre-charged with first charge of Ozone friendly R410A refrigerant. Additional charge shall be added based on the refrigerant piping installed at site.

1.8 The VRF System Should be capable of cooling with operating range of (10°C to 56°C).

1.9 VRF units shall not be of Chinese manufacturing origin.

2 Outdoor Unit

2.1 The outdoor unit shall be a factory assembled unit housed in a sturdy weather proof casing, constructed form rust-proofed mild steel panels painted and tested for salt spray test for 1000 Hours as per ASTM B117.

2.2 The condenser coils should be manufactured from high efficiency heavy gauge aluminium fins mechanically bonded to inner grooved copper tubes. The coil shall be tested against leakage by air pressure of 650 PSI (4.5 MPa). Protection guards shall be provided on condenser inlet & outlet of outdoor unit. The condenser coils shall be made of pre coated corrosion resistant blue aluminium fins for increased products life. Fin coating should be provided as an option for high corrosive environment. The optional coating to enhance the life of coil should be capable of withstanding 1500 hrs of salt spray test as per ASTM B117.

2.3 The system shall be capable of automatic operation even with varying outdoor and indoor requirements and make use of low outdoor temperatures to achieve low power consumption, without any manual adjustments.

2.4 The outdoor unit should be from 24 HP and above and shall have multiple scroll inverter compressors and shall be able to operate even in case of breakdown of one of the compressors.

2.5 The outdoor unit shall be suitable for mix and match connection of various types and capacities of indoor units as per demand.

2.6 The outdoor unit shall operate at low noise level and an option for quiet and super quiet modes should be available as per requirement.

2.7 All the units shall be provided with built-in microprocessor control panel, for automatic operation and capacity control.

2.8 The system shall be flexible for level difference between multiple outdoor units up to 5 meters' height difference.

2.9 VRF system should at least meet the below requirements of refrigerant piping

Description		**For Unit**
Elevation between ODU & IDU	ODU is higher than IDU	90m
	ODU is lower than IDU	40m
Elevation between IDUs		40m
Maximum Piping Length from ODU to first IDU Refnet		110m
Maximum length from the ODU to the Farthest IDU		180m

2.10 All Systems shall be modular in nature for larger capacities. Modular system shall incorporate all required controls for parallel operation of compressors, condensers, fans, and indoor units as well as refrigerant liquid control. Modules should have compatibility to be connected up to total 4 modules to operate as a single system.

2.11 Each VRF module should be supplied with inbuilt accumulator of 34 litres for better liquid handling capability & safe operation during long piping length installations.

2.12 Outdoor units having multiple compressors should have back up function. The VRF System should function even if there is failure or maintenance downtime of one compressor. In a modular design, when multiple units have been combined to run as one larger unit, the system should be capable to work even if there is failure or shut down of one outdoor unit.

2.13 There should be oil swapping mechanism from one outdoor to another in multiple outdoor systems every two hours in order to maintain the oil balance in the system.

2.14 The VRF system should be capable of working between voltage range of 320V ~460V.

2.15 The outdoor units shall be suitable for operation up to an ambient temperature of 56°C without tripping.

2.16 The outdoor unit shall be capable of delivering constant cooling capacity without deration throughout the ambient temperature range from 35°C to 43°C.

2.17 The VRF system shall be designed with refrigerant-cooled heat sink to provide adequate cooling to inverter drive IPM to maintain its temperature of safe operating limit of 80°C for nonstop and trouble free operation at ambient temperature of 56°C.

3. Compressor

3.1 All compressors in each module /unit shall be 100% inverter type. Each unit shall have single / multiple hermetically sealed, inverter scroll compressor. The inverter compressor shall change the speed in accordance to the variation in cooling or heating load requirement.

3.2 The inverter scroll compressor should have direct injection of refrigerant into the compressor chamber to maintain the discharge line temperature under safe operating limit of 80°C. The compressor should have permanent magnet rotors.

4. Indoor Unit

4.1 The outdoor unit shall be coupled with air handling unit with Eurovent certification having:

a) Double skinned panels of 50mm thickness with internal insulation material PUF with 38±2 kg/cum density sandwiched between two sheets and fixed to extruded aluminium structural framework with thermal break profile.

b) Inner Sheet will be 0.60mm thick of Plain GSS.

c) Outer Sheet will be 0.60mm thick of Pre-coated GSS.

d) The entire framework shall be mounted on GSS Channel base.

e) Access doors shall be double skin type.

f) Condensate drain pan shall be of 1.2mm SS with 13mm thick nitrile rubber insulation.

4.2 The air handling unit shall be having:

a) Air Flow rate- 51000m3/hr

b) Internal Static pressure- 408 Pa

c) External Static pressure- 500 Pa

d) All motors for fans shall be EFF-1

e) EU4 Pre filter with filtration level of 90% at 10 microns.

f) Flexible bag filter EU7 with filtration level of 99% at 3 microns.

g) The fan can be forward/backward curved.

h) The cooling coil shall be of 6 row copper with aluminium fins and properly interlaced to match the unit quantity.

i) The AHU shall be connected with an appropriate AHU expansion valve kit compatible with the outdoor unit and matching the capacities of the Air Handling Units. The coil interlacing should be matching with the number of AHU kits.

5. Ancillary Items

5.1 Proprietary REFNET joints and headers, manufactured by VRF equipment supplier only, shall be used throughout the installation to reduce imbalance in refrigerant flow between indoor units. Size shall be suggested and approved by the VRF manufacturer.