CHAPTER 4

ANALYSIS AND SELECT DESIGN PLANS

For any air-conditioning works, the analysis and selection of solutions/plan is essential. When choosing the air-conditioning design, in addition to the cooling requirements must also consider the following factors: economic indicators, technical indicators and aesthetics of the system.

Each plan has different advantages and disadvantages. Therefore, it is considered carefully to choose the plan accordingly.

Types of air conditioning system:
- Local air conditioning system
- Central air conditioning system
- Vrv central air-conditioning system using variable levels

4.1 LOCAL AIR CONDITIONING SYSTEM:

Is the only air-conditioning system in a narrow range, usually just a independent room or a few small room.

In fact this type of air conditioner consists of four common types:

* Window air conditioners (Window type): typically installed on the wall looks like the window so called window type air conditioners.

Window air conditioners are air conditioners with small capacity from 7,000 to 24,000 Btu / h with the following main model 7,000, 9,000, 12,000, 18,000 and 24,000 Btu / h. Depending on the maker of the model can be more or less.

* Split Air conditioner (split type): To overcome the disadvantages of the window air conditioner is not installed in the room deep in the works and the limitations of the model, they invented split type air conditioner, where the outdoor units and indoor units are separated into two blocks. So this form of air conditioners also known as type split air conditioners or 2 pieces air conditioners.

Split air conditioner consists of two clusters are Outdoor and indoor units arranged separated. Connecting between the 02 clusters are copper pipe with gas and electric wire to control. Compressors are often located in inside Outdoor clusters, work control of the machine from the cooler through a wired controller or remote control.

*Multi-split Air conditioner (multi-split type): multi –split type is consisted of 1 Outdoor unit and 2 to 4 indoor units. Each indoor cluster is called a system. These
systems operate independently. Multi-split air conditioners can have different type of cooler.

Multi-split type has characteristics and structure similar to split type. However, due to the same Outdoor, it saves installed space.

* Free blow floor standing split air conditioner (Free blow floor standing split type): Free blow floor standing split type are average capacity. This is a very good machine to be installed at the restaurant and the lobby of the agency. The capacity is from 36,000 to 100,000 Btu / h.

Installation is the same principle as split type consisted of outdoor, indoor units and copper pipe, electric wire system connecting between them.

The advantage of the machine is cold and blowing directly into the circulation space. So it loss a little heat, small installation costs. On the other hand the noise level is small, although the average capacity it may be installed in the room without fear of being affected.

Outdoor: is exchanging heat cluster with copper pipe aluminum wings. Outdoor fan is axial fans which can blow in horizontal or vertical directions.

Indoor unit: the box in form of the mass (in cabinet). Blowing doors placed above, horizontal flow. On the diffuser with the flow direction, the wings can move back and forth or standing still. Intakes located below the same side with the blowing door, inlet dust filter in front of intakes, users need cleaning filters carefully in regularly.

Cooler controller located on the front of the cooler, there is a full range of control functions allows you to room temperature, the movement speed of the fan. etc..

4.2 CENTRAL AIR CONDITIONING SYSTEMS.

Central air conditioning system is a system in which moist heat treatment was conducted in a center and is led by the wind channel to the consumers.

In practice, cabinet air conditioner in cabinet is also the central air conditioning type. In this system, the air will be moist heat treatment in a large air-conditioner, then bring the system of the channel to the consumers.

There are two types:

* The Chiller water-cooled system: As the whole process is giving heat to the wind environment. The system layout one or more forced fans to increase the heat exchange process in the surrounding environment. After the steam condensed by reducing the temperature will be cooler. Continue the process of exchange.

* The Chiller water-cooled system: It is different from wind cooling by using water to deduct heat. When the water was pouring from the top down by a circulating water pump. When the heat will be taken to make the process of condensation.
Advantages:
- Installation and operation is relatively easy
- Reduction of sound and dust well, so for areas requiring low noise is often used models of cabinets.
- Thanks to the large air volume should be very suitable for crowded areas such as: cinemas, theaters, halls, meeting rooms, restaurant, dance hall, dining room.
- The cost is generally not high.

Disadvantages:
- The too large wind channel system should only be used in the building with a large installing space.
- For central air conditioning systems by moist heat treatment in a single place only suitable for large and crowded rooms.. For work buildings, hotels, offices … is the object of many small rooms with different modes of operation, small installing space, and the simultaneity do not higher then the system is not suitable.
- Central air conditioning system requires regular working 100% load. In many cases, some room which are not working still to be cooled.

4.3 VRV CENTRAL AIR-CONDITIONING SYSTEM USING VARIABLE LEVELS:

Air conditioner in dispersion is an air conditioner in which the processing of air dispersed in many places. The air conditioning system mentioned above are a lot cooler air treatment, cooling coil located in the rooms, so they are refrigeration system in distributed type

Actually, air conditioner in dispersion has two common forms:

* VRV air conditioner (Variable Refrigerant Volume): VRV air conditioner born from the last 70 years for energy saving requirements and the urgent requirements of the building.

So far, no known Vietnamese name that reflect the nature VRV air conditioners. However the experts have agreed to call VRV as it is widely used by other nations.

VRV air conditioner is invented by Daikin (Japan). Currently, most vendors produce VRV air conditioners with different names, but in essence, nothing else.

The name VRV comes from the first words in English: Variable Refrigerant Volume, i.e. air conditioning system has the ability to adjust the fluid flow and circulation then can change the capacity of the external load.

VRV air conditioners formed to overcome the disadvantages of split air conditioners such as gas pipe’s length, the height difference between outdoor and indoor units and
limited cooler capacity. For VRV air conditioners, distance between outdoor and indoor units can be extended up to 100 m and different height reached 50m. VRV air conditioners’ capacity also achieve average power values.

* Water-cooled air conditioner (Water chiller): The water–cooled air conditioning system is a system in which cooler cluster does not directly handle the air but cooling water to 70C. Then the water was led by insulated heat pipes to the frame of heat exchanger called the FCU and AHU to handle the air humidity. Thus, in this system, the water used as a coolant.

**SELECTION OF DESIGNS:**

Based on the specific characteristics of the project, the design capacity, customers’ requirements and other special requirements, we will choose the CENTRAL AIR-CONDITIONING CHILLER SYSTEM is the most suitable for the project.