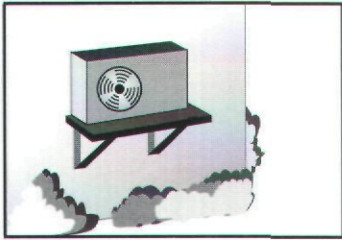
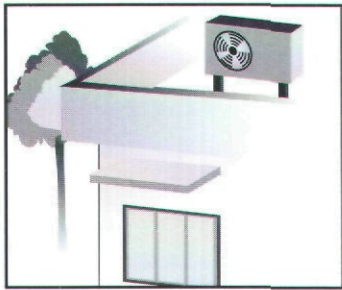




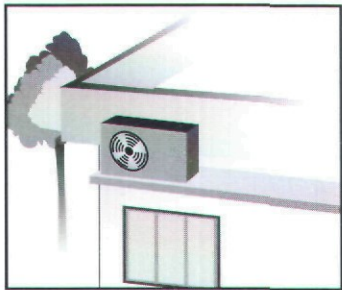
## Mounting of outdoor units



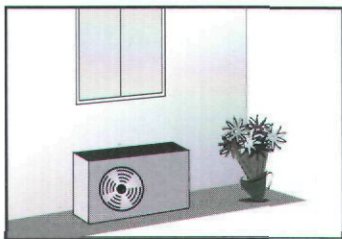
On wall



On roof



On sunshade



On skirting

All types of split units are connected to a box-like cabinet placed outside the conditioned space. This 'box' is the '**Outdoor Unit**' (ODU) through which the heat from the conditioned space is dissipated into the atmosphere. If we look inside the outdoor unit, we will find a **Compressor**, a **Finned-Coil Condenser** and a **Fan Motor** with a fan blade, used for blowing or sucking air through the finned coil. We would also find some electrical components and cables.

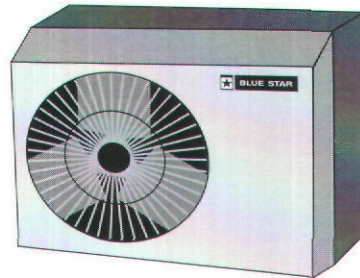


Fig. 17. Outdoor unit

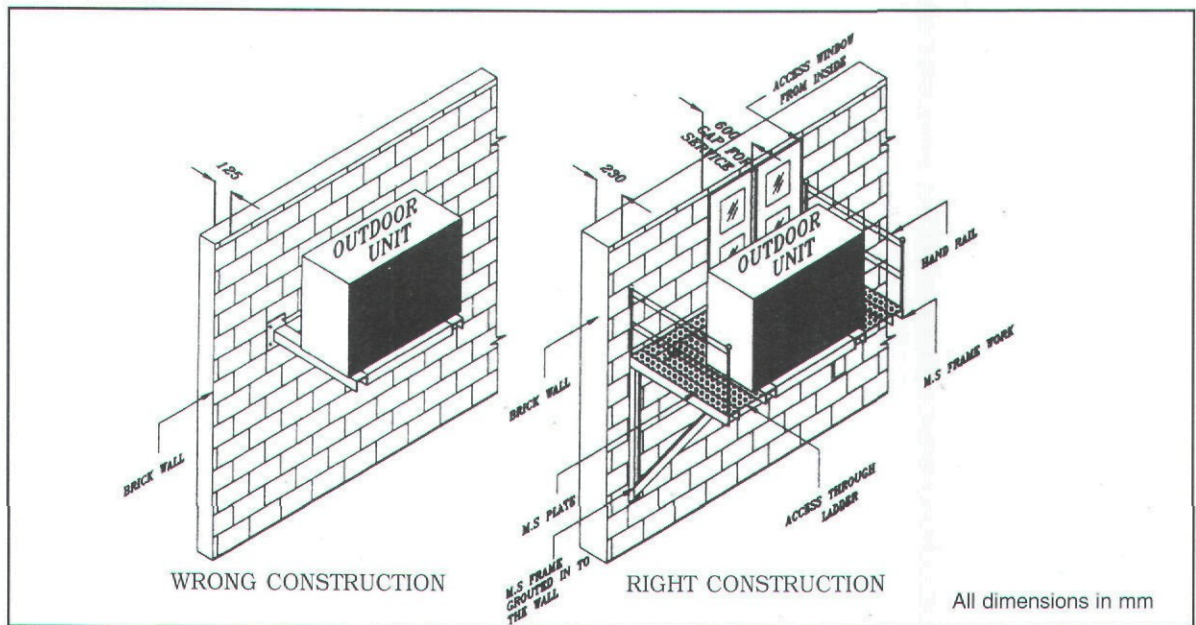
The outdoor unit is typically mounted on an external wall, the roof, sunshade or skirting around the building. The airconditioning engineer is careful about how and where the outdoor unit is mounted. Let us take a brief look at some of the key points.

### Mounting, Safety and Serviceability

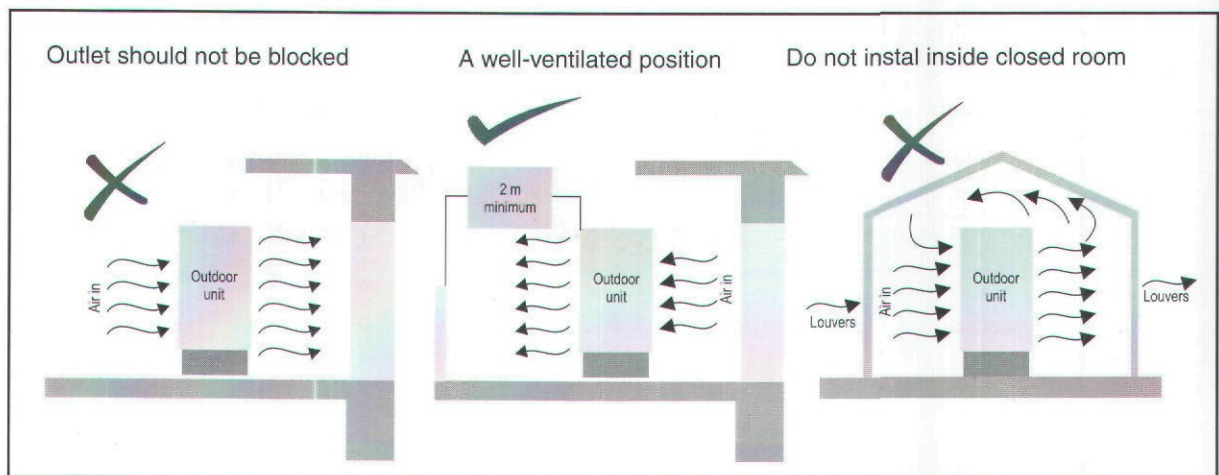
- When the unit is wall mounted, we must ensure that the wall to which the ODU support framework is grouted, is structurally sound and is capable of supporting the load of the ODU. This applies to any other structure on which the ODU is mounted.



- We should also make sure that the ODU support frame work is properly designed, with a catwalk to permit servicing and
- A safety railing must be provided around the structure.



**Fig. 18.** Typical Outdoor Unit supporting details for Ductable Splits



**Fig. 19.** Outdoor Unit installation do's and don'ts





## Coastal installations

Special care must be taken while installing ODUs on the sea coast. We must ensure that:

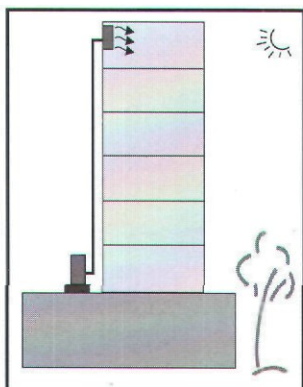
- the condenser fan outlet is not facing the sea wind. This is done to reduce the risk of the fan not running at all or losing speed while working against the wind
- the ODUs are not located near ground level, close to the beach, since sand can clog the condenser coils
- care is taken to give the supporting framework a good quality anti-corrosive paint treatment (epoxy or chlorinated rubber paint) and
- the isolator switch and electrical components are properly protected from moisture.

## Installation practices for Air-cooled units

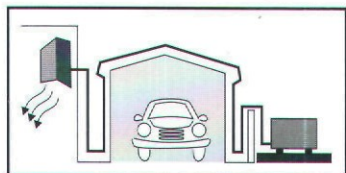
### Copper Standards for Piping

We know that the Indoor Unit (IDU) of any Split airconditioner is connected with the Outdoor Unit through refrigerant piping. Most often imported copper pipe is used for this purpose.

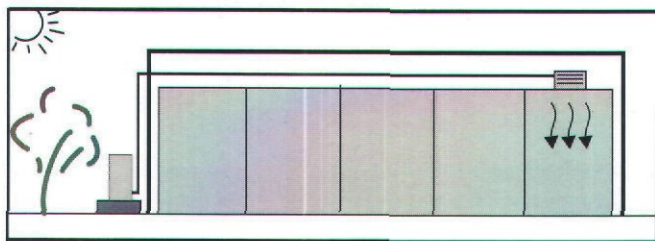
- Soft Drawn Copper Tubing is used for single phase Non Ducted split airconditioners
- Hard Drawn, L-Grade Copper Tubing is used for 3 Phase Ducted Splits / Packaged units.



*Avoid big height difference between outdoor and indoor units*



*Avoid too many bends in the piping*



*Avoid long interconnecting piping*

## Length of Interconnecting Piping

We must always ensure that the right distance is maintained between the IDU and ODU. There are limits to the distance between them imposed by the equipment design. As the distance between the units increases the following happens:

- The refrigerant pressure drops, resulting in decreased cooling capacity.
- The lubricating oil does not return to the compressor easily, leading to compressor damage (it is a good idea to provide an oil trap every 3 meters or so on the suction line. This helps to return the lubricant to the compressor along with the return gas) and
- The extra refrigerant required by long tubing can lead to un-evaporated liquid refrigerant flowing into the compressor thereby damaging it.

## Refrigerant pipe insulation

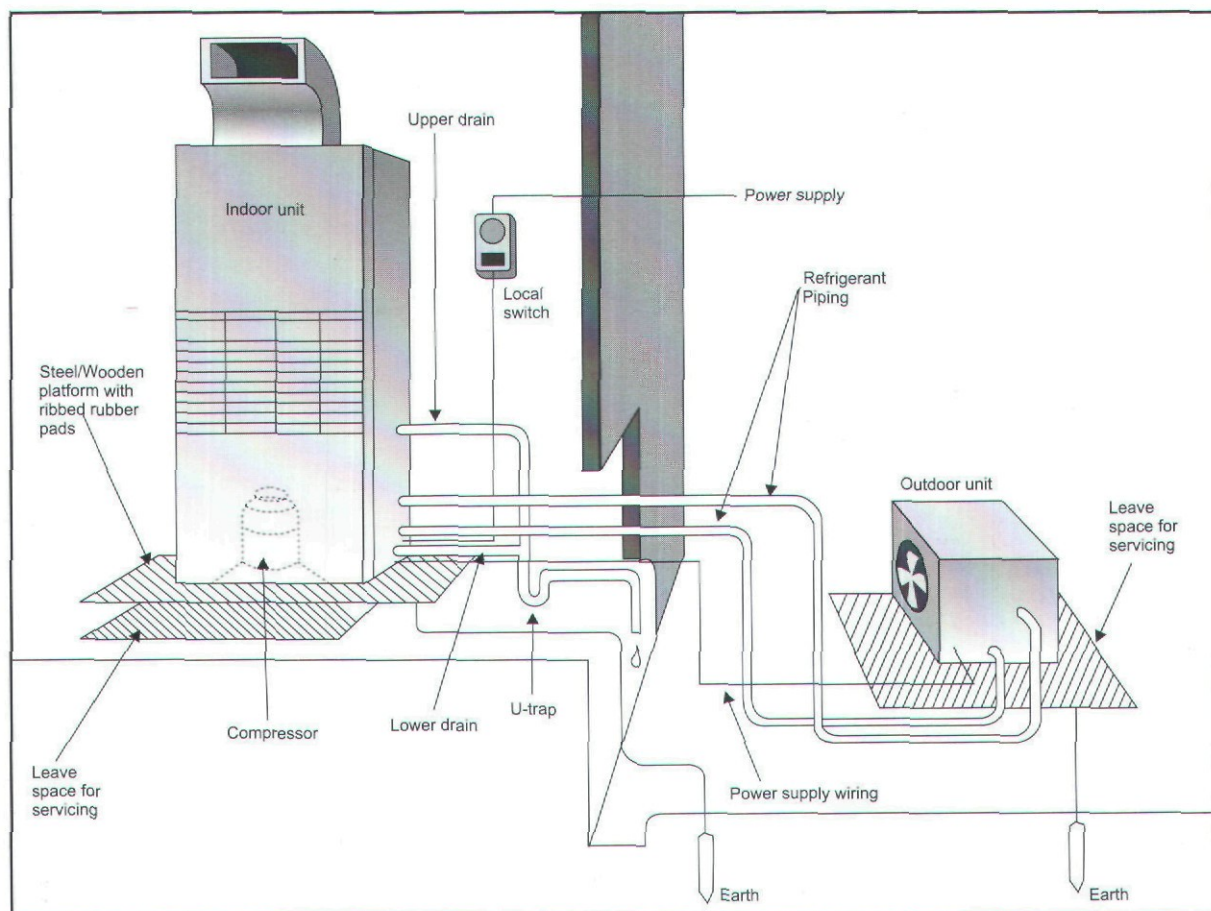
Refrigerant Piping carrying gas from evaporator (cooling coil) to the compressor is known as **Suction line** and the piping carrying liquid refrigerant from the condenser to the evaporator is known as **Liquid line**. By

insulating the pipes together, the suction line will carry only dry gas required for compression and the liquid line will carry only liquid for expansion/evaporation.



## Some typical Packaged AC and Ducted Split AC layouts

The figures on this page and the next illustrate in a very broad sense how Packaged AC systems (both air-cooled and water-cooled) and Ducted Split ACs are laid out and how their various components are interconnected.

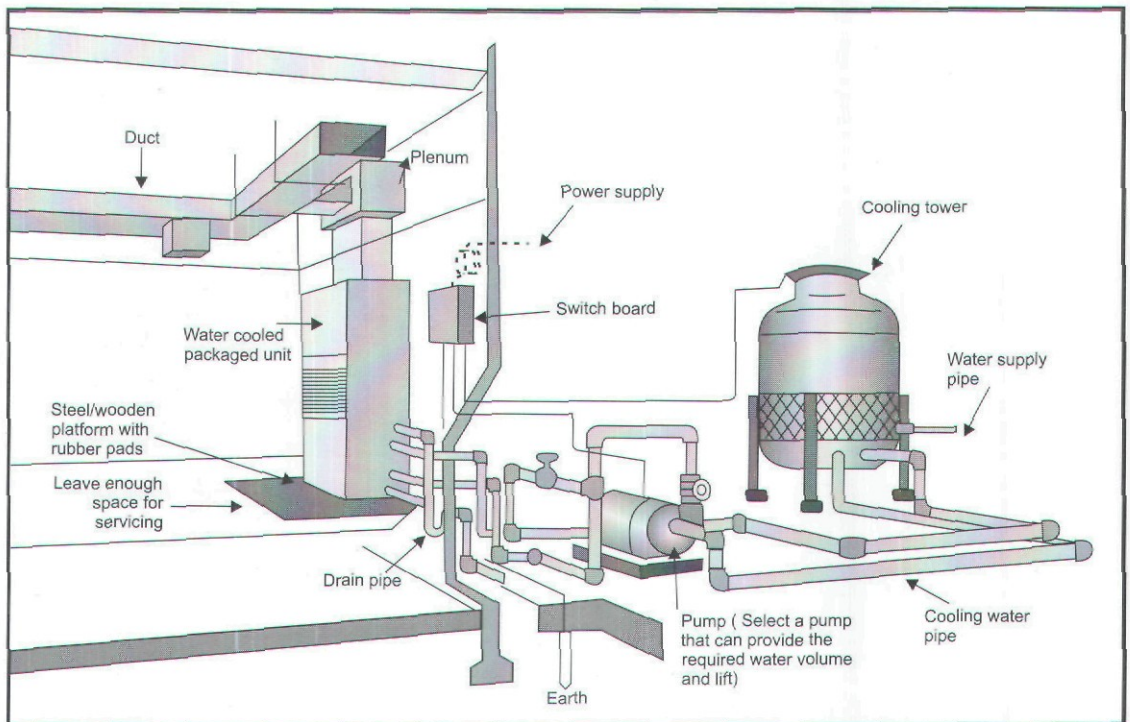
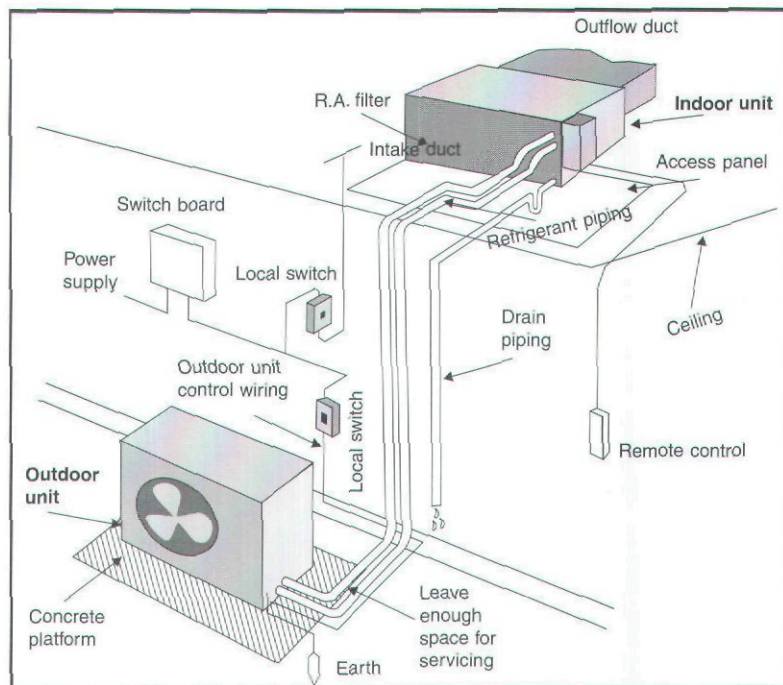


**Fig. 20.** Typical layout of Floor mounted Air-cooled Packaged Airconditioner





**Fig. 21.** Typical layout of Air-cooled Ducted Split Airconditioner



**Fig. 22.** Typical layout of Water-cooled Floor mounted Packaged Airconditioner