



COLD ROOM DESIGNING AND INSTALLATION

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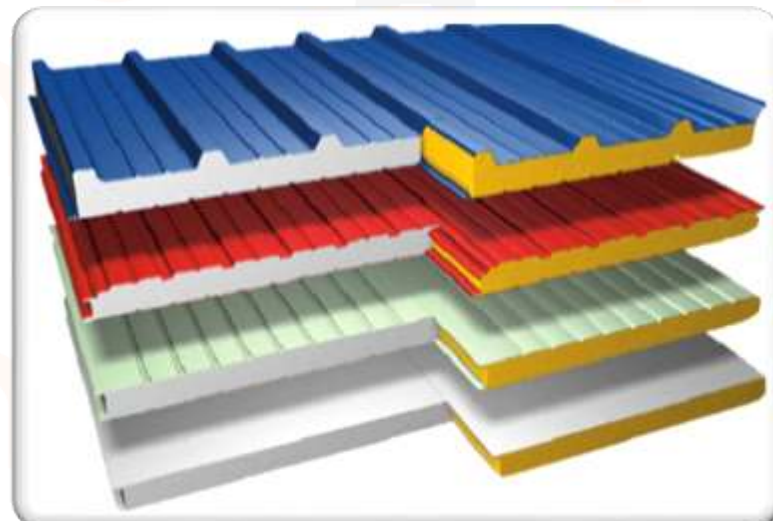


6. Installation Of Cold Storage Room



1. INTRODUCTION

- ❑ **PUF Panel** - Are made of **Polyurethane** which is usually sandwiched between two metal sheets. Sandwich Puf panels are widely used in steel structures in the present day due to their various advantages.
- ❑ Made as per required (thick in mm) and composite PUF sand The wall panels ich between Pre-Painted Galvanized Iron Sheet. PU foam of density as per your required of (40±2 kg/m³) as insulation. Pre-Painted Galvanized Iron Sheet shall have minimum coating of 4-5 micron epoxy primer and 25 micron polyester top coat on the finish surface and 7-8 micron primer alkyl base on reverse.



❑ **History of PUF Panel** - Polyurethane chemistry was first studied by German chemist, Friedrich Bayer in 1937. From In 1940, the first polyurethane elastomers were produced. These compounds gave millefleurs that could be used as an adequate alternative to rubber. When scientists found that polyurethanes could be made into fine threads, they were combined with nylon to make more lightweight, stretchable garments. Polyisocyanates became commercially available in 1952,

❑ **Chemistry Of PUF Panel** - Polyurethanes, also known polycarbamate's, belong to a larger class of compounds called polymers. Polymers are macromolecules made up of smaller, repeating units known as monomers. Generally, they consist of a primary long-chain backbone molecule with attached side groups. Polyurethanes are characterized by carbamate groups (-NHCO_2)

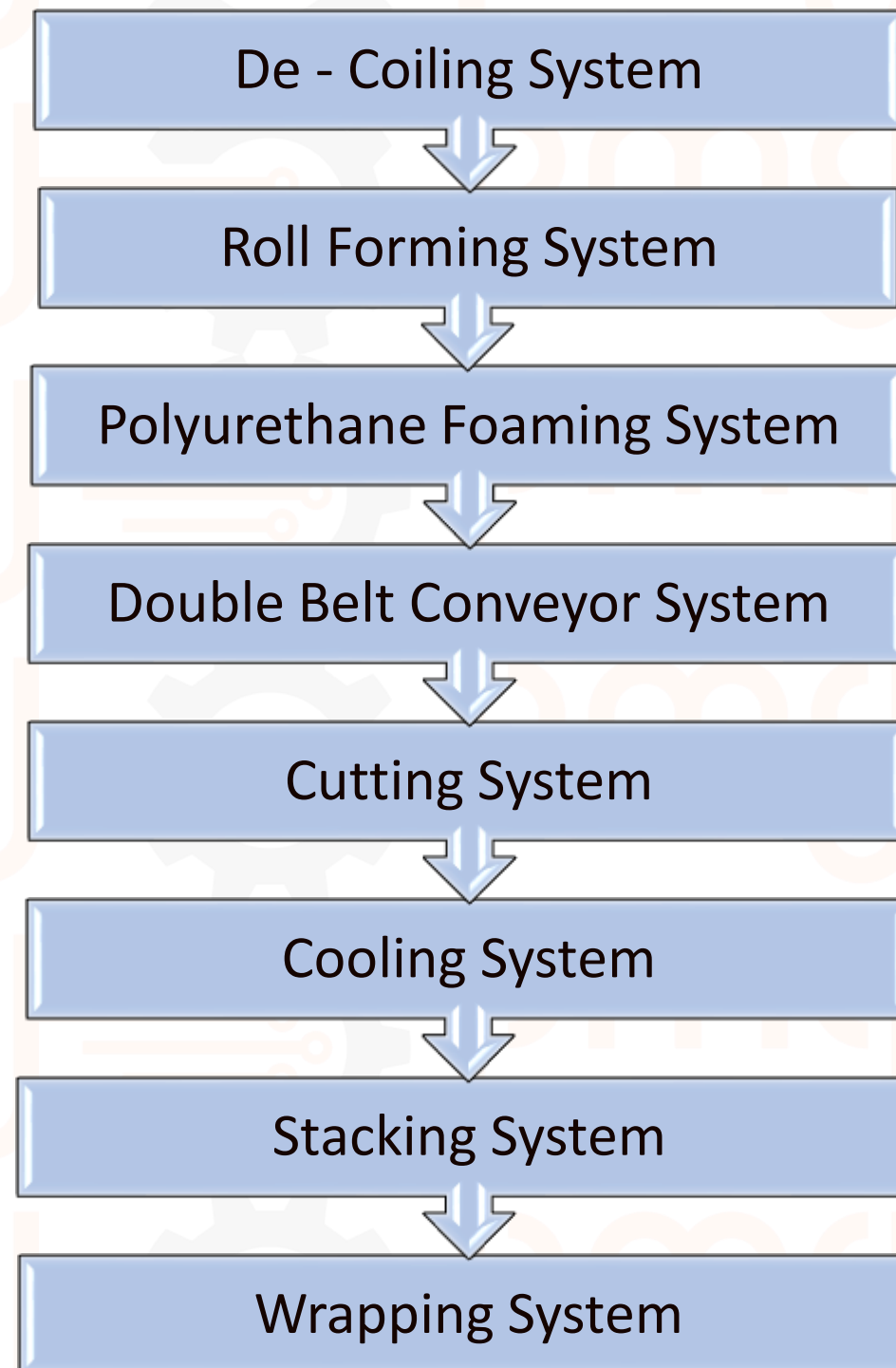
❑ **Raw Material Of PUF Panel** - A variety of raw materials are used to produce polyurethanes. These include monomers, prepolymers, stabilizers which protect the integrity of the polymer, and colorants.

2. TYPES OF PUF PANEL

- ☐ **Single Groove** - Are manufactured. While single groove panels are suitable for general purpose and application in buildings and shelters.
- ☐ **Double Groove** - Are manufactured. While double groove panels are suitable for cold room and cold chamber applications.

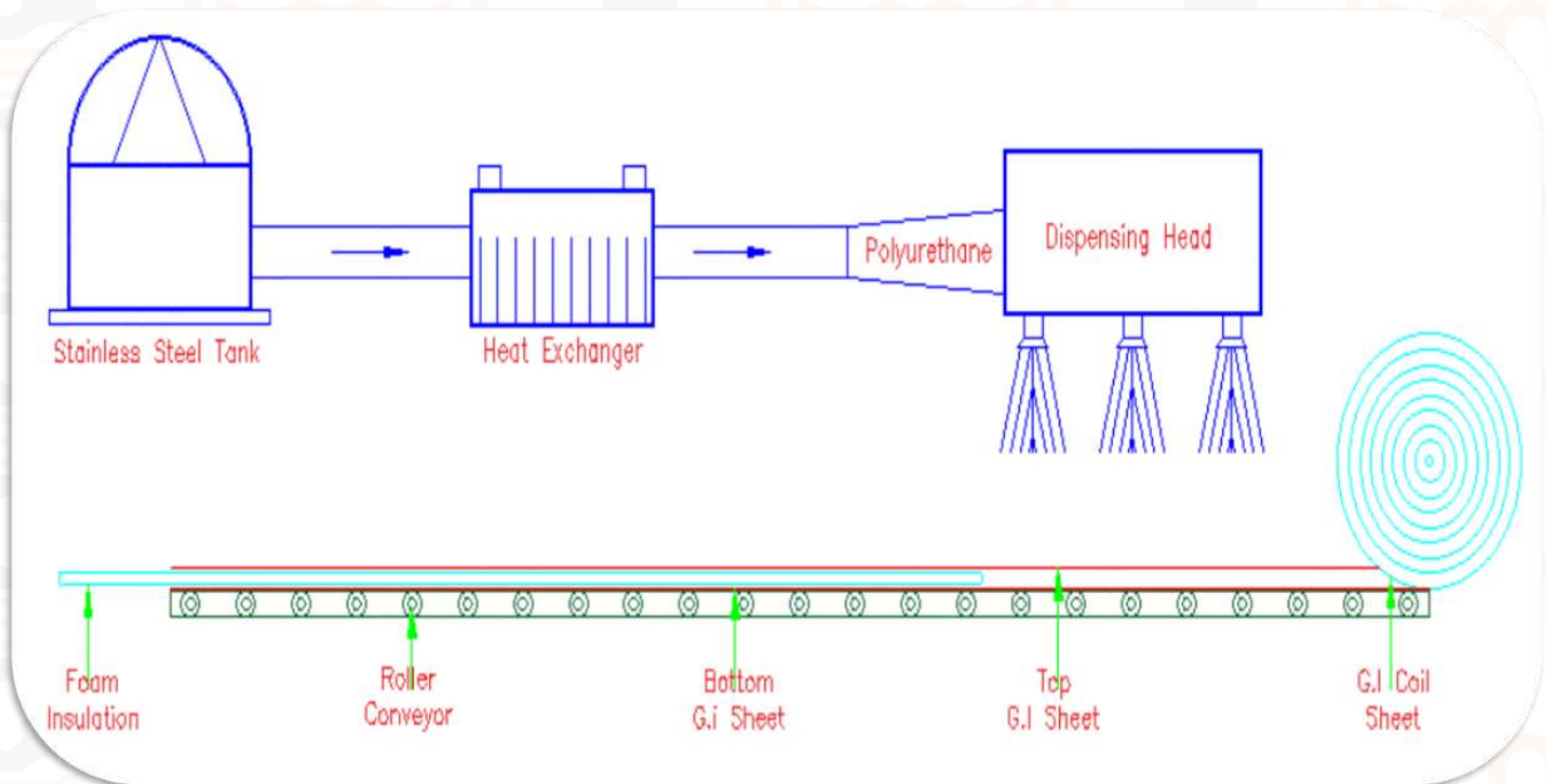


3. PROCESS FLOW CHART



- ❑ **De – Coiling System** - DE coiling system is to feed the colour steel sheet (PPGI: Pre-Painted Galvanized Iron) to the sandwich panel production line continuously and it can be manufactured as a cone type and an arm type.
- ❑ **Rolling Forming System** - Roll forming, also spelled roll-forming or roll forming, is a type of rolling involving the continuous bending of a long strip of sheet metal (typically coiled steel) into a desired cross-section.
- ❑ **Polyurethane Foaming System** - Polyurethane foams (often referred to as urethane foams) are prepared by the reaction of a polyisocyanate with a polyol in the presence of a blowing agent.
- ❑ **Double Belt Conveyor System** - Transport system for the highly flexible interlinking of different production areas. The modular and sturdy conveyor system is designed for interlinking, buffering.
- ❑ **Cutting System** - A cutting system is a machine that is used for separating materials. Thereby a variety of materials, such as aluminium, tin, steel (even hardened steel), titanium, wood, ceramics or plastics.

- ❑ **Cooling System** - The cooling system is designed to load the panels in vertical position inside a conveyor system that allow an efficient heat dispersion. To save valuable space.
- ❑ **Stacking System** - Stacking system is to stack the cooled sandwich panels automatically with input quantity by operator. It can be manufactured as a vacuum pad type or a mechanical lifter type. After stacking process, a sandwich panel bundle is moved to wrapping process by longitudinal feeding conveyors
- ❑ **Wrapping System** - The wrapping system as a last process in sandwich panel production line, it is necessary to prevent pollution on panel surface, rust at cut surface.



4. DESIGN DATA OF COLD STORAGE ROOM

4.1 What are the major component in a cold room.

- ☐ Puf Panel - Polyutherane Foam Puf Panel.
- ☐ Insulation Door.
- ☐ Refrigeration System - Indoor + Outdoor Unit.
- ☐ Electrical Panel to Control Refrigeration System.



4.2 What size of PUF panel & door is recommended for various application.

PUF Panel Considering the density of 0.4kg/m³ as the below Temp.

- ☐ A. 7°C to 25°C (60 mm)
- ☐ B. 0°C to 7°C (80 mm)
- ☐ C. -15°C to 0°C (100 mm)
- ☐ D. -30°C to -15°C (120 mm)
- ☐ E. -40°C to -30°C (150 mm)

4.3 How the calculate refrigeration Capacity (Heat Load) of a Cold Room.

We need to calculate the heat load first, The basis of below parameters.

- ☐ Storage application or blast freezing application
- ☐ Room Size.
- ☐ Required Room temperature.
- ☐ R.H required for the product. (Relative Humidity)
- ☐ Product.
- ☐ Product Quantity.
- ☐ Puf Panel Thickness.
- ☐ Ambient Temperature.
- ☐ Daily Loading Quantity.
- ☐ Product Incoming Temperature.
- ☐ Pull Down Time (If Any).
- ☐ No of People working in the cold room.
- ☐ People working for how many hours in the cold room.

5. TYPE OF COLD STORAGE ROOM

Bulk Cold Storage Room.

Multi-Purpose Cold Storage Room.

Small Cold Storage Room.

Frozen Food Storage Room.

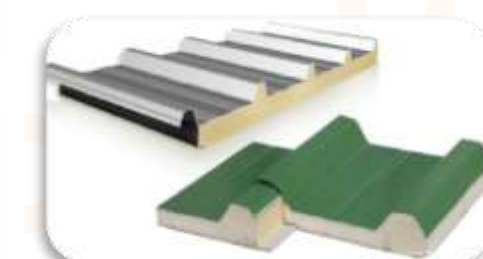
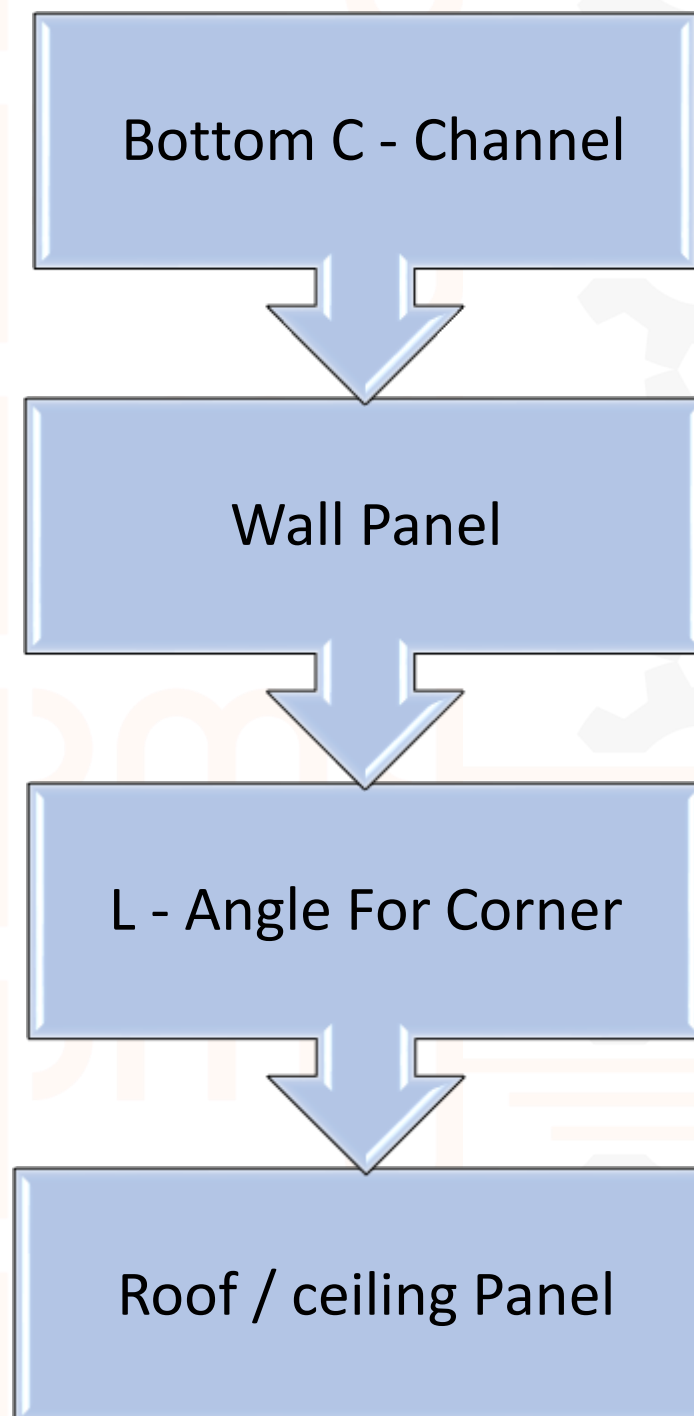
Mini Units / Walk-in Cold Storage Room.

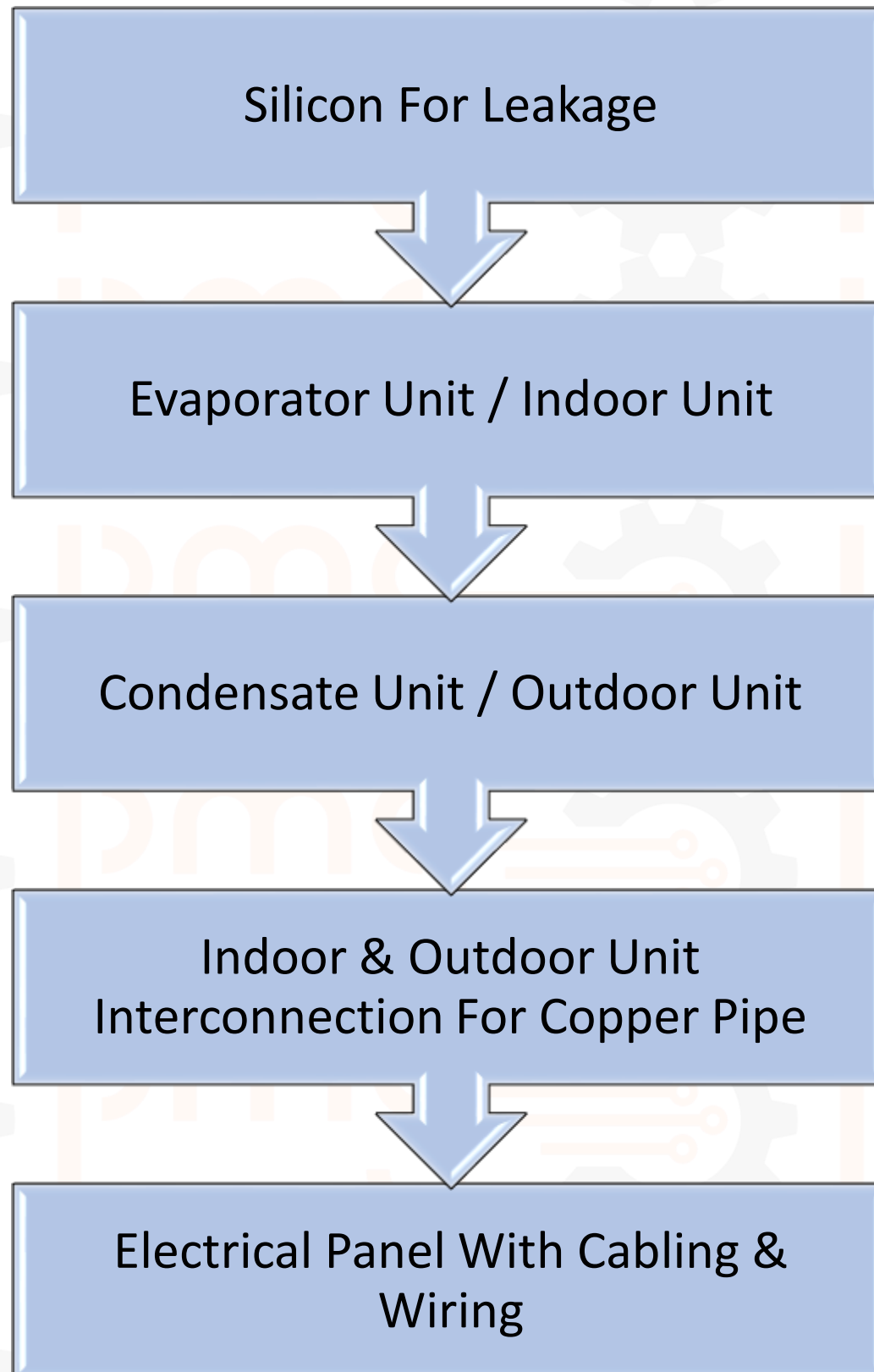
Controlled Atmosphere Cold Storage Room

- ❑ **Bulk Cold Storage Room** - These stores are generally used for storing a single commodity that operates on a seasonal basis for example, stores for potatoes, apples, chillies, etc. Sean It uses the stored natural cold energy in the winter for free cooling in the summer.
- ❑ **Multi-Purpose Cold Storage Room** - These are designed to store various commodities and products used throughout year and include different types of meat like lamb and chicken. A cold store operational programme (products, chilled storage and freezing) is designed with specific parameters.
- ❑ **Small Cold Storage Room** - These cold stores are designed with pre-cooling facilities for produce that is to be exported, such as fresh fruits like grapes etc. Small scale producers can choose from various options when it comes to cooling systems.
- ❑ **Frozen Food Storage Room** - These food stores are designed with processing and freezing facilities, optional for food items such as fish, meat, poultry, dairy products and processed food and vegetables. Frozen foods generally have an excellent safety record. They are typically stored around a temperature of -18C, Most frozen food products are stored between 0 to minus 30°F.

- ❑ **Mini Units / Walk-in Cold Storage Room** - These are located at distribution centres. Walk-in cold stores can be utilised for multiple applications in the pharmaceutical, cosmetic, food and beverages, dairy & other industries for all sorts of products intended for storage at low temperatures. They have a temperature range of -18C to -22C.
- ❑ **Controlled Atmosphere Cold Storage Room** - These are designed for specific food and vegetables mainly. It is a system in which fresh, perishable products such as fruit and vegetables are stored under environmental conditions that add to their shelf life after the produce is harvested from the crop. In the last fifty years, CA storage has become a fundamental aspect of the food storage industry, making it possible for even seasonal fruits and vegetables to be available all year round.

6. INSTALLATION OF COLD STORAGE ROOM





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