

COLD ROOM AN OVERVIEW

An ISO 9001:2000 Organization

Refrigeration Technologies



DELTA INDUSTRIES™

(An ISO 9001:2015 Certified Company)



ENVIRONMENT
FRIENDLY



LESS ELECTRICITY
CONSUMPTION



WORLD CLASS
TECHNOLOGY



www.sutrah.in

www.deltaindustrys.in



SAVE MOTHER NATURE

{ DELTA COMMITMENT TOWARDS SAVING ENVIRONMENT }

The **GLOBAL WARMING** has led to increase in mean earth surface temperature and thus **MELTING OF POLAR ICE AND GLACIERS OF HIMALAYAN REGION.**

There are frequent melt down of glaciers that result in floods and other natural calamities. The melting of ice at the poles has increased the mean sea level. And further increase in temperature will in turn melt more ice, due to which low lying countries will come in circle of danger. Therefore it becomes our moral duty to not contribute in global warming and
SAVE OUR MOTHER NATURE.

{ **We offer our products with Eco-frenidly Refrigerants viz.
R 134a, R 404A, R 410A, R 407C, R717 (NH),
R744 (CO₂), Hydrocarbons etc.** }

Through our Green Factory program, every Delta facility is working to **REDUCE** emissions and energy use, **REUSE** more raw materials and **RECYCLE** manufacturing materials, paper and plastic. All major Delta plants already meet the toughest international environmental management standards (ISO 14001), covering a host of environmental areas such as waste disposal, water treatment and energy use.

And yet, Delta is going even further. As part of our Green Factory program, teams of Delta associates are setting energy-reduction targets for every area of our operations. Delta's Green Factory Initiatives have established our manufacturing operations as industry leaders in the efficient use of natural resources with minimal environmental impact.

COLD ROOMS

Delta is a market leader in refrigeration technology. Delta representing market with widest range of Cold Room by their own manufactured refrigeration system and evaporators. All refrigeration systems are designed according to the need of customers.

Delta cold room division customized and designed modular cold room of all sizes. We are serving customer through our cold room for Fresh food, Frozen food, Meat, Sea food, Ice Cream, Medical product and many more perishables products. Our technical department maintains an International standard and world class technology in their refrigeration system, which provides tremendous efficiency, durability, & reliability.

We have a long list of satisfied customers right across the board. We have installed our cold rooms for different industry such as, dairy, horticulture, floriculture, sea food and meat, hospitality, pharmaceuticals & food processing. If you are looking unmatched solutions for your refrigeration needs, let's move forward together to satisfy your need.

Delta acts as an imaginator, innovator, and implementor, that is why customer can get widest temp. Range in cold rooms from **+20°C to -80°C**. In our products humidity is a crucial factor to keep products extremely fresh for a longer period of time. Our experts always ensures humidity level as per products by using dehumidifier and ultrasonic humidifier.



BLAST FREEZERS

A blast freezer is a freezer which is extremely cold. It may also be known as a shock freezer. Such freezers are intended to rapidly bring the temperature of foods down, freezing them extremely quickly. These specialized freezers are used in the frozen food industry and they are also utilized in some commercial kitchens for specialty tasks.

When food is frozen, the water inside it crystallizes. If freezing takes place at relatively warm temperatures, the ice crystals which form will be large.

Advantages of Blast Freezing:

1. Rapid temperature reduction prevents the reproduction of microorganisms.
2. Increase shelf life of product.
3. Appearance, flavour, texture and nutritional value remain as natural.
4. High and constant quality.
5. Reduction in electricity consumption
6. Prevention of large ice crystals which can damage food.
7. Reduced kitchen waste as unused portions can safely be stored for later use.
8. Increased Kitchen efficiency lets you prepare large batches and use some portions later.
9. Cost effective operation & maintenance.
10. Production always available for the sale









A Blast Freezer in operation at installed site



COLD ROOMS

THE INSIDE STORY

-  Electricity Saving
-  Noise level reduction
-  Serviceable
-  High COP/ EER
-  ISR™ (Inverter Spike Resistant)
-  High Ambient Design



R404A, R717, R134a, R22 and CO₂

AIR-COOLED & WATER-COOLED CONDENSING UNITS

- Compressor for three phase and single phase 230 V/1/50Hz with fitted starting device and run capacitor.
- Condenser with grooved copper tubes and Aluminium Fins.
- Generously sized liquid receiver.
- High & Low pressure cut-out including mounting brackets, wired to terminal strip, Electrical wiring to the connection box IP65.
- Operating pressure up to 28 bar.
- High cooling capacity with reduced power consumption.
- Full exploitation of the finned package due to the careful matching of the high capacity external rotors fans.
- Fans with especially efficient low noise external rotor motors single phase & three phase.
- Precharged with ester oil for R134a and R404A/R507A.
- Designed for extremely high ambient condition upto 65°C/75°C.
- Copper pipe without any elbow coupler in single pipe with CNC bending machines.
- Special epoxy plus polyurethane metallic paint.
- Big size filter dryer, moisture indicator, solenoid valve, oil separator & accumulator.
- Shell & tube condenser made of copper and coppernickel (seawater resistant design) with newly developed tube geometry and low fouling profile on the coolant side.

EVAPORATORS/ INDOOR UNITS

STRUCTURE FEATURES

- **Coil:** use new high efficient aluminum wave fin, high heat conductivity, fast water discharge, use high efficient copper pipe, high heat transfer, use new type liquid distributor & uniform frost
- **Fan:** low cost, high reliability, lower temperature- resistant and low noise external Rotor fans
- **Defrost:** use electric heating stainless steel pipe, high leak-proofness at the end, anti-electric leakage and long life
- **Casing:** use aluminum plate and stainless steel or cold plastic spraying plate, nice appearance and durable
- **Maintenance:** flexible to disassemble and lean
- **Service & food Industry:** special design for hotel & food industry

COMPRESSORS



SEMI HERMETIC RECIPROCATING COMPRESSORS



SCROLL COMPRESSORS



SEALED COMPRESSORS

ELECTRIC CONTROL PANELS

DELTA electrical control panel is operator friendly designed, which provides better safety with following.

- Single Phase Preventor, which protect compressor from single phasing, phase failure and phase reversal.
- Overload Protector current Sensing Device with current relay. This Safeguards compressor motor from the overload.
- Miniature Circuit Breaker with 4-POLE, which safeguards the Condensing Unit from short circuit.
- Electrical controller to check voltage, ampere, frequency, phase to phase and phase to neutral voltage.
- Phase indicator with 3 nos. for Red, Yellow and Blue.
- ON/Off Buttons with Light Indicators.
- Auto & Manual Mode switch over button.
- Indicating lamp with 5 nos. of LED to help the operator to make out fault, also from distance. For thermal protection unit, L.P./H.P. cutout, heater on and oil pressure cut out.
- Contractor of standard makes 3 No.s Separate for Compressors, Indoor Fan & Heaters.
- All electrical cables are of standard make.
- Control Panel MCB used for protection of Electrical Panel.
- Connectors: Finolex make with serial nos. used for connection with Condensing Unit & Evaporator.

COLD ROOM CONTROLLER: Microprocessor Based Controller with two Sensors used for cold room & evaporator coil to save life of cooling coil & defrosting electricity. Also With Flexibility to control Defrosting Timing & Duration, Option for manual defrosting & internet connectivity* with RS232 port to monitor all the parameters of cold room on computer, remote monitoring facility and communication of all faults alarm.



**Optional feature*

SOLAR POWERED COLD STORAGE



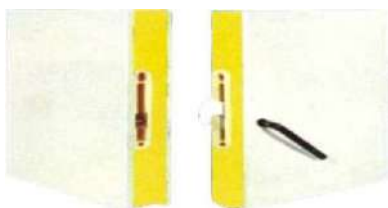
PUF PANELS & ACCESSORIES



PUF PANELS



DOORS



PUF PANELS

Cold room panels have a lightweight, self-supporting, aluminum / GI-sandwich construction with special aluminum / GI profile as wall joints. They are extremely robust, corrosion-resistant, and have waterproof sealing.

Key Features:

- These Cold room are designed & developed customized as per specific requirement of the customer.
- These are fire retardant as per code, sheeted cabinet using highquality PUF insulation, minimizing the out side ambient temperature.
- The panel Thickness can be made from 60 mm to 150 mm. with the maximum size of 1.2mtr X 6.5mtr.
- Standard density of these PUF filled panels shelter is 40 ± 2 k.g. however the same can be increased or decreased as per specific requirements.

Doors

High quality cold room door of different thickness and sizes like overlap door, flush type door and sliding door using imported lock and hinges. With thermal break parameter to avoid thermal conductivity otherwise lead to ice formation. For viewing the inside without opening the door, to check if the door swing-path is clear, view glass option is available.

Camlock

Posi-loc locking assemblies that provide perfect alignment of walls, ceiling, floor, corners and door frames

Hardware & Posi-seal Closure

Heavy-duty cast alloy handles and hinges with attractive brushed-chrome finish. Cushions closing of door, making it noiseless and firmly shut

Flooring

Useful to provide the result of an insulated regular floor and also to form a stable base for wall and partitions.

Puf slab with Kota stones are being used in big cold rooms.

Interior & Exterior Ramps

Movement of material become easy due to use of ramp, without causing any damage to floor.

Sweep Gasket

The heavy duty sealing gasket under the door keeps it flexible at any temperature, which makes it completely airtight.



APPLICATIONS

Dairy & Ice Cream Industry

Delta specialize in maintain accurate temperature for dairy and ice cream industry. Once the ice- cream melts then it becomes useless, so it is very necessary to understand need and then design cold room with multiple units so that customers always be at safer side. Delta designs special units for blast freezing to achieve instant cold temperature. By this process, we can quickly hard ice-cream without hampering its flavour, texture, appearance and it also reduces crystal formation. We also design cold room for other critical dairy products such as butter, cheese, panner, and non dairy cream etc.



Horticulture & Floriculture

Delta design cold room with highest quality & refrigeration system to maintain temperature, humidity level and air flow, which ensures freshness of fruits, vegetables, flower & other perishable products.

To maintain freshness & blossom of flower it is very necessary to control the air flow speed, so to maintain this condition, Delta makes special kind of evaporators for their cold room.



APPLICATIONS

Sea Food & Meat Industry

Delta provides complete solution to sea food and meat industry. The cooling requirements vary at different stages of production. So, we are serving this industry with pre chilling room, blast freezer & cold room. Delta designs special Air Cooled & Water Cooled condensing units and high CFM evaporators for this.



Hospital, Research and Pharmaceutical Industry

Purpose of this industry is to store vaccine, blood samples, drugs, bio products and lots of chemicals. These cold rooms are designed with lot of safety factors like humidity and high & low- temperatures alarm to ensure that room conditions are maintained.



APPLICATIONS

Hotel Industry & Restaurant

To understand actual need for the hospitality segment, we design special refrigeration system because of heavy usage & high frequency of door openings. Delta provides an option of SS finish and food-grade-sheet on panel and evaporators are of complete SS 304 also. Delta maintain absolute humidity level inside the cold room and we also customize it accordingly to the need like view window & auto door close mechanism, which helps to maintain uniform temperature and thus maintain factors like quality & hygiene.

& Restaurant



Hotel Industry

APPLICATIONS

BANANA & MANGO RIPENING

Condition For Ripening of Mango and Banana..

	Mango	Banana
Fruit Temperature	20 to 18°C	20 to 22°C
Relative Humidity	90-95 %	90-95%
Duration of Exposure to ethylene	12-24 hrs	24-48 hrs
Ethylene Concentration	100-150 ppm	100-150 ppm
Carbon dioxide	<1%	<1%

Features of our ripening project:

- The room is insulated with high-efficiency PUF panels to control the temperature.
- The room is designed to have adequate refrigeration.
- Ethylene Generators for optimum ripening of the fruits.
- High CFM evaporators to maintain uniform air-flow.
- For best ripening results, maintains proper humidity levels by installing Humidifier.
- Unique energy efficient refrigeration units with complete one year warranty.



BANANA & MANGO R I P E N I N G



Few questions to be asked:

Delta has extensive experience in the design and manufacturing of cold room to suit customer specific requirement. According to the need of customer Delta technical department calculate heat load calculation & design refrigeration system also they have knowledge of thermal property of foods, cooling and freezing times of foods, food microbiology, methods of precooling fruits, vegetables and cut flowers that give best solution to customer. To give you a best solution Delta needs to analyze on some views, for that Delta engineers discussed with you on some points.

These are the following factors that come into consideration while giving you a proper & best result.

- What is the product you want to store?
- What is your requirement to store the products or blast freezing of product?
- What is the quantity of product that you need to store at one time?
- What is the time duration & planning of flow of material inside the cold room?
- How long time it will be stored?
- What is the Incoming temperature of product?
- What is the temperature pull down time required?
- How much is the frequency of door opening in a day?
- What is your stacking & storage pattern?
- How is the usage of Cold room heavy or light?

On the basis on above information along with experience Delta Cold room division engineers do all the heat load calculation & design all the indoor & outdoor units, which fulfill all customer requirements. Along with these refrigeration units all the designing & fabrication of puf panels being done by experts. So, if your business needs cold room, we are always available to provide you a complete solution under One roof.

TECHNICAL COMPARISON

SEMI-HERMETIC	VS	HERMETIC
SEMI-HERMETIC (Semi-Sealed)		HERMETIC (Sealed)
EASY TO ACCESS FOR REPAIRS		NOT POSSIBLE
NOISE LEVEL 75dB (A)		88 dB (A) NOISE LEVEL
VIBRATION ARE VERY LESS		MORE VIBRATIONS DUE TO ONE SHELL ASSEMBLY
WIDE VOLTAGE SELECTION AVAILABILITY		LESS IN COMPARISON OF SEMI HERMETIC
LESS POWER CONSUMPTION FOR THE SAME H.P. COMPRESSOR		HIGHER POWER CONSUMPTION DUE TO MORE MOVING PARTS
SUCTION GAS COOLED MOTORS		FAN COOLED MOTORS
LOW MOTOR TEMPERTAURE		NOT SUITABLE FOR VERY LOW TEMPERATURE APPLICATIONS
a) AVAILABLE FROM 0.5 TO 50 H.P. (AIR COOLED)		AVAILABLE FROM 0.5 H.P. TO 15 H.P
b) AVAILABLE FROM 0.5 TO 50 H.P. (WATER COOLED)		
DESIGNED FOR EXTREMELY HIGH AMBIENT CONDITIONS (UPTO 75° c)		DESIGNED FOR MAXIMUM 46° C / 50° C AMBIENT
SPARES EASILY AVAILABLE LIKE GASKETS, MOTOR WINDING, VALVE PLATE		REPLACEMENT OF COMPRESSORS IS PREFERRED AS REPAIRING IS VERY DIFFICULT

POWER & COOLING CAPACITY COMPARISONS

Model No.	European Hermetic	2SB 55.3 (Sea-Bird Semi-Hermetic)
Displacement	16.73m ³ /hr	16.24m ³ /hr.
Gas	404A	404A
Selection	-30°C Evaporating temp. 50°C Condensing temp.	-30°C Evaporating temp. 50°C Condensing temp.
Cooling Capacity (Watt)	1870 Watt	2690 Watt
Cooling Capacity (Btu/ hr.)	6377 Btu/ hr.	9173 Btu/hr.
Power Input	2.64 Kw.	2.39 Kw.
Sub Cooling	0 K	0 K (without liquid sub cooling)
Super Heat	10 K	10 K
COP/EER	0.71	1.12

Result: Cooling Capacity increased by 43.84 %
Power Consumption (Kw) decreased by 9.5%

Other Advantages:

- Warranty
- Spares Easily Available
- Low Noise

After Sales Support:

Though at every level Delta ensures its product's performance and services but we would welcome your query at:

All India Sales & Services Network: Ph.: +91 99866 81944, 0824 2409439

S A L E S
&
Services



Products	Storage Temperature C	% RH	Recommended Storage
Apples	-1 to +1	85 - 90	2-7 M
Apricots	-0.5 to +1.6	78 - 85	1-2 W
Bananas	+11.7	85	2W
Beans, dried	+0.7	70	6M
Beef (fresh)	+1.75	87	3W
Beef (frozen)	-18 to -20	80 - 85	3-8 M
Butter	-10 to -1	75 - 80	6M
Cabbage	0 to +1	85 - 90	1-3 M
Carrots, bundled	0	85 - 90	1-2 W
Cauliflower	0 to +2	85 - 90	2-3 W
Cucumbers	+2 to +7	75 - 85	2W
Cheese	-1 to +1.5	65 - 75	3-10 M
Cherries	+0.5 to +1	80	1-3 W
Chocolate	+4.5	75	6M
Dates	-4.5	75	12 M
Eggs	-1 to -0.5	80 - 85	8M
Fish (Fresh)	-0.5 to +4	90 - 95	1-2 W
Fish (frozen)	-20 to -12	90 - 95	8-10 M
Grapes	-1 to +3	85 - 90	1-4 M
Honey	+1	75	6M
Ice Cream	-30 to -20	85	2-12 W
Lamb (Fresh)	0 to +1	80 - 90	5-10 D
Lamb (Frozen)	-24 to -12	80 - 90	10 M
Lemons	+5 to +10	80 - 90	2M
Lettuce	0 to +1	85 - 90	1-2 M
Lobster	-7	80	1M
Margarine	+0.5	80	6M
Melons	+2 to +7	80 - 90	1-8 W
Milk	0 to +2	80 - 85	1W
Mutton (Fresh)	0	80 - 85	10 D
Mutton (Frozen)	-12 to -18	80 - 85	3-8 M
Oranges	0 to +1.2	85 - 90	8-10 M
Peas, Green	0	80 - 90	1-3 W
Peaches	-0.5 to +1	80 - 85	2-4 W
Parsley	+1.5	80	1-2 W
Patatoes	+3 to +6	85 - 90	6M
Poultry (Fresh)	0	80	1W
Poultry (frozen)	-30 to -10	80	3-12 M
Tomatoes, Green	+10 to +20	85 - 90	3-4 W
Vegetables, Frozen	-24 to -18	—	6-12 M

*Data is subject to variation

M = Month W = Week



PROVIDING BEST OF PRODUCTS & SERVICES

W O R L D W I D E



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