

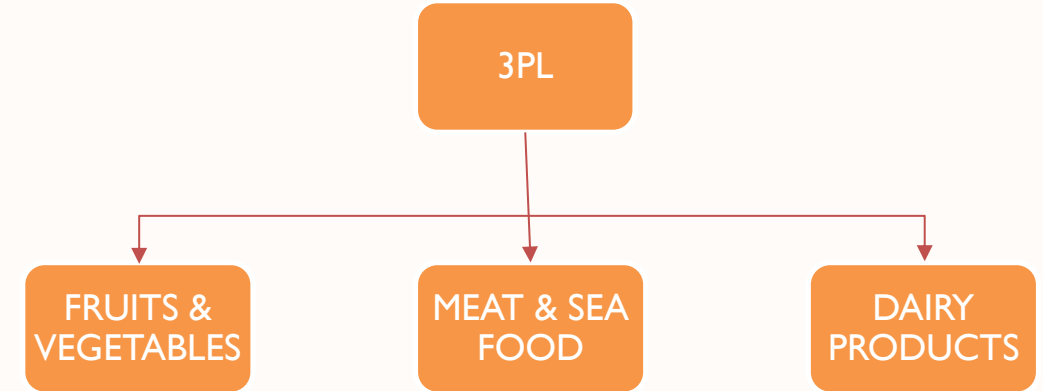
Godrej

Application Dossier

COLD STORAGE



- Managing the cold chain is crucial to protecting and meeting the demands of the supply chain. 3PL companies play a pivotal role in the present cold chain industry.
- Cold chain logistics companies provide storage options for multiple sub segments. They have evolved their services to customers over time. Instead of customers looking at refrigerated warehouses just as a commodity for the temperature-controlled space, they are now looking at third-party logistics companies as partners who can deliver full supply chain solutions.



				
 7-26 W 0 to 2°	 2-4 W -1 to 0°	 2-3 W -1 to 0°	 2-3 W 13 to 16°	 2-3 W -1 to 0°

				
 4-6 W -1 to 0°	 3-4 W 8 to 10°	 4-6 W 7 to 10°	 3-4 W 10 to 13°	 13-17 W 2 to 4°

	 2-8 W  -10 to -25°		 2-8 W  -10 to -25°		 2-50 W  -10 to -25°		 2-50 W  -10 to -25°
	 2-4 W  0 to 5°		 3-25 W  0 to 5°		 2-4 W  0 to 5°		 1-40 W  -10 to -30°

We Understand You

Challenges

Higher cubic space utilization

High human interaction and pilferage

Comply with national regulations

Storing multi-variety products with varying temp range

Cleanliness & maintenance

High investment cost

Our Value Proposition

High CBM utilization design

Infallible and secured cold storage solutions

FDA compliant Design

Storage system to withstand varying temp range

Powder coated & easy to clean

Rack supported cold room solutions

Application - 1

Storage of multi-variety products in cold room-(-30 to 4°C)

Crates/Bins/Cartons



Fruits & Vegetables

Crates/Bins



Processed meat & sea foods

Cartons



Dairy Product

Built in units



Bio pharma products

Product storage form



Crates



Cartons



Pallets

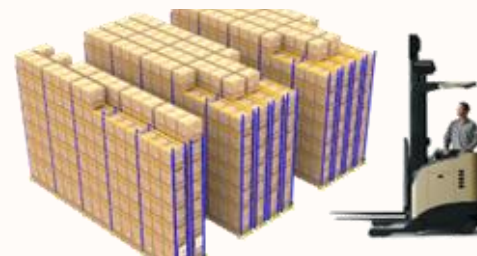
Recommended Solutions by Godrej

Double deep pallet racking + FLT/RT (manual)



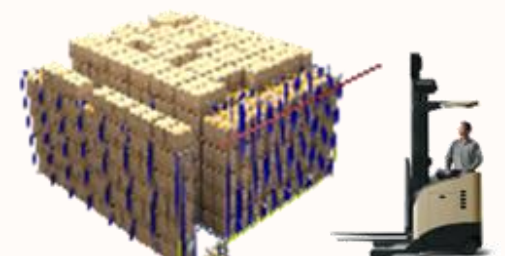
- Possible to build rack supported cold room chamber
- Floor contact is avoided with first storage level on ground beam, hence clean and hygienic ambience
- Good solution for dense storage application in cold store (up to 28% of storage CBM)
- Inventory count to be done manually with bar coding
- High usage of man-power since both put away and picking is done by MHE
- Medium – 12 to 15 pallets per hour

Drive-in racking + FLT/RT (semi automatic)



- Possible to build rack supported cold room chamber
- Possibility of floor contact and guide rails can be used for loading ground pallet to avoid floor contact
- Better solution for dense storage application in cold store (up to 43% of storage CBM)
- Inventory count to be done manually with bar coding
- High usage of man-power since both put away and picking is done by MHE
- Less – 8 to 10 pallets per hour

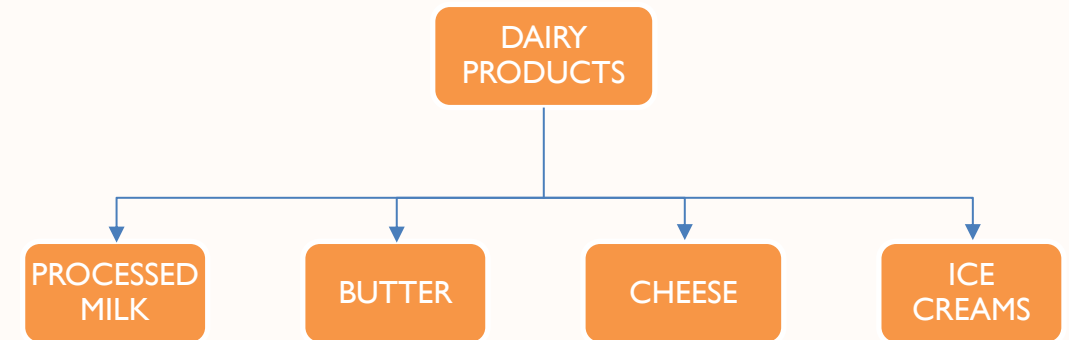
Shuttle racking + FLT/RT (semi automatic)



- Possible to build rack supported cold room chamber
- Floor contact is avoided with first storage level on ground beam, hence clean and hygienic ambience
- Perfect solution for dense storage application in cold store (up to 43% of storage CBM)
- Inventory count can be automated by shuttle equipment
- Lesser man-power is used for put-away and picking of pallets using MHE since the shuttle handles pallets inside the system
- High – 15 to 20 pallets per hour

Dairy Products – Chill & Frozen (5 °c to -25 °c)

- The dairy industry has a critical need for temperature-controlled storage as many industry products have a very short lifespan and are extremely sensitive to even small variations above the optimal.
- The cold storage of products for the dairy industry are divided into two sections: milk, butter, cheese, etc. stored at 273k to 278k (0 to 5 deg c) and ice cream which is held at 243k to 248k (-30 to -25 deg c). In the construction of modern cold stores, great importance is paid to labour and energy saving facilities.



	 	2 – 4 W 0 to 5 °		 	3 – 25 W 0 to 5 °		 	2 – 4 W 0 to 5 °		 	1 – 40 W -10 to -30 °
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W- Weeks | Temperature in °C

We Understand You

Challenges

- Higher cubic space utilization
- High human interaction and pilferage
- Comply with national regulations
- Storing multi-variety products with varying temp range
- Cleanliness & maintenance
- High investment cost

Our Value Proposition

- High CBM utilization design
- Infallible and secured cold storage solutions
- FDA compliant Design
- Storage system to withstand varying temp range
- Powder coated & easy to clean
- Rack supported cold room solutions

Application - 1

Storage of dairy products – Chill & deep freeze(4 °c to -18 °c)

Cartons



Butter

Cartons



Ice creams

Cartons



Curd

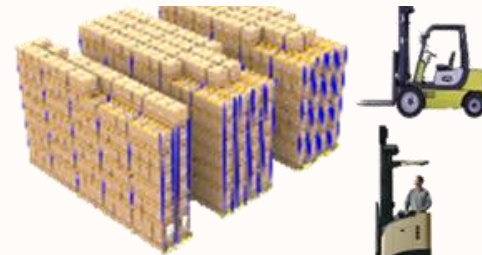
Built in units



Product storage form

Recommended Solutions by Godrej

Double deep pallet racking + FLT/RT (Manual)(pic)



- ~15 pallets per hour per MHE
- No possibility of honey-combing effect as we retrieve the pallet, vacant positions are created only at double deep.
- Cubic space utilization up to 28%
- Man-power is used for put-away and picking of pallets using MHE

Shuttle racking + FLT/RT (semi automatic)



- Handling of pallets inside the rack is by shuttles, which will ensure high throughput (average 20 pallets per hour per shuttle)
- Lesser possibility of honey-combing effect as we retrieve the pallet, vacant positions are created at the rear end.
- Perfect Solution for dense storage application in cold store (Up to 43% of storage CBM)
- Lesser man-power is used for put-away and picking of pallets using MHE since the shuttle handles pallets inside the system

Application - 2

Storage of incubated cheese - Chill(10°C)

CHEESE (INCUBATED)



Wrapped Blocks

Product storage form



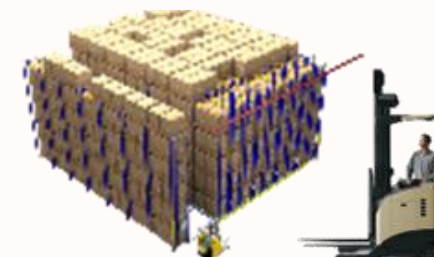
Recommended Solutions by Godrej

Shuttle racking + FLT/RT (semi automatic)



- Floor contact is avoided with first storage level on ground beam, hence clean and hygienic ambience
- Good solution for dense storage application in cold store (Up to 43% of storage CBM)
- Inventory count can be automated by shuttle equipment
- Lesser man-power is used for put-away and picking of pallets using MHE since the shuttle handles pallets inside the system

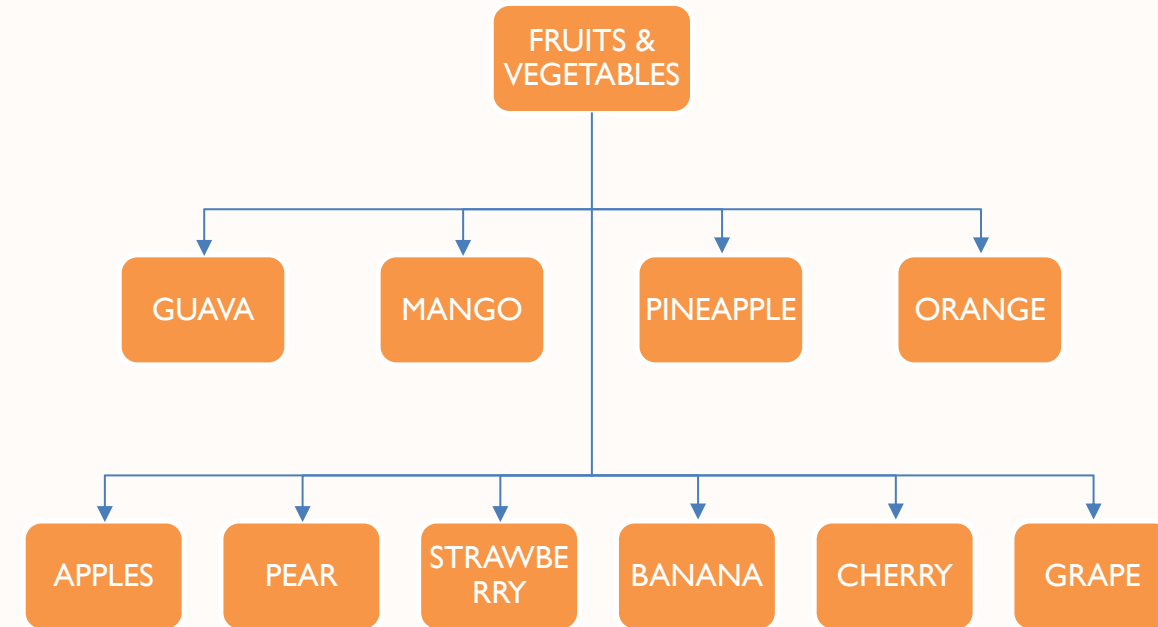
Mobile Pallet Racking + RT (semi automatic)



- Floor contact is avoided with undercarriage hence clean and hygienic ambience
- Perfect solution for dense storage application in cold store (Up to 50% of storage CBM)
- Inventory management is possible with bar coding and can be integrated with WMS
- Man-power is used for put-away and picking of pallets using MHE

Fruits & vegetables – Chill (2 °C to 4 °C)

- Cold storage is the primary method for extending the life of fruits & vegetables. Apples quickly soften and become mealy in texture when kept at ambient temperatures. To maintain the quality longer than one week, fruit must be kept in refrigeration.
- Apples have the longest storage life of the tree fruits and can be kept in cold storage up to four months under ideal conditions and up to 12 months in controlled atmospheres. Temperatures in cold storage range from -1 °C to 16 °C, depending on the chilling sensitivity of the variety and products.
- Most varieties can be stored at temperatures near 2 °C, but regular monitoring of room temperature is recommended to prevent freezing in rooms that do not maintain a consistent temperature.



				
 7-26 W	 2-4 W	 2-3 W	 2-3 W	 2-3 W
 0 to 2°	 -1 to 0°	 -1 to 0°	 13 to 16°	 -1 to 0°

				
 4-6 W	 3-4 W	 4-6 W	 3-4 W	 13-17 W
 -1 to 0°	 8 to 10°	 7 to 10°	 10 to 13°	 2 to 4°

We Understand You

Challenges

- Higher cubic space utilization
- High human interaction and pilferage
- Comply with national regulations
- Storing multi-variety products with varying temp range
- Cleanliness & maintenance
- High investment cost

Our Value Proposition

- High CBM utilization design
- Infallible and secured cold storage solutions
- FDA compliant Design
- Storage system to withstand varying temp range
- Powder coated & easy to clean
- Rack supported cold room solutions

Application - 1

Storage of fruits & vegetables -Chill (2 °C to 4 °C)

Crates/Bins/Cartons



Apples

Cartons



Strawberry

Crates



Bananas

Crates/Gunny bags



Potato

Crates/Bins



Carrot

Product storage form



Recommended Solutions by Godrej

Multi-tier mezzanine



- Perfect solution for dense storage in cold store (up to 70% CBM).
- Most of the movements are in straight lines hence SKU are easy to identify & handle but fully depend on manual labour.
- Vertical height can be split into multi floor & each bay in the floor can be provided with decking levels.
- Energy saving due to lesser area to be cooled.
- Throughput can be increased by using equipment's like lifts, loading gates, staircases.
- Upto 15 metres.

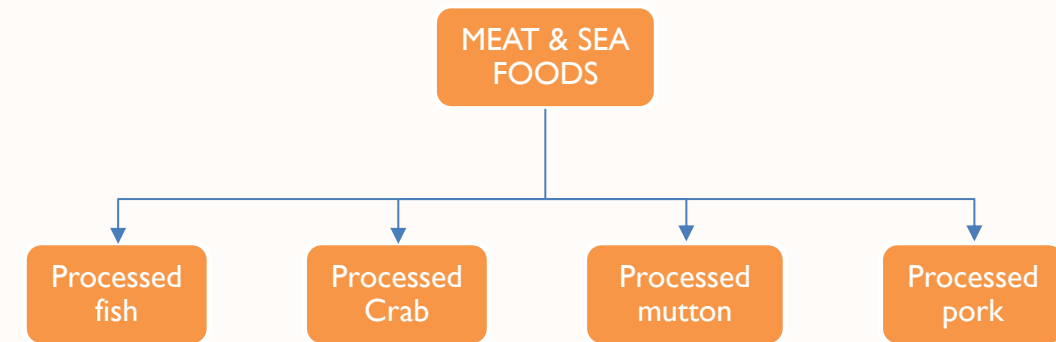
Drive in racking + FLT/RT (manual)



- Perfect solution for dense storage application in cold store (up to 43% CBM).
- Throughput is comparative less since MHE is driven inside each bay. ~10 pallets per hour per MHE.
- Each item is stored in independent levels without stacking.
- Energy saving due to lesser area to be cooled.
- Medium human interaction as MHE is driven inside the rack.
- Up to 10 metres.

Meat & Sea Foods – Frozen (-10°C to -25 °C)

- The cold storage of products for the processed food industry are divided into two sections: meat products stored at -15 to -18 deg c and sea foods which is held at -30 to -25 deg c. In the construction of modern cold stores, great importance is paid to labour and energy saving facilities.
- The International Institute of Refrigeration recommends a storage temperature of -18°C for lean fish such as cod and haddock and -24°C for fatty species such as herring and mackerel. A production cold store is usually a part of the fish processing plant for storing frozen finished products.



		2 – 8 W			2 – 8 W			2 – 50 W			2 – 50 W
	-10 to -25 °		-10 to -25 °		-10 to -25 °		-10 to -25 °				

We Understand You

Challenges

- Higher cubic space utilization
- High human interaction and pilferage
- Comply with national regulations
- Storing multi-variety products with varying temp range
- Cleanliness & maintenance
- High investment cost

Our Value Proposition

- High CBM utilization design
- Infallible and secured cold storage solutions
- FDA compliant Design
- Storage system to withstand varying temp range
- Powder coated & easy to clean
- Rack supported cold room solutions

Application - 1

Storage of processed meat & sea foods- Frozen(-18 °C to -30 °C)



Processed crab



Processed fish



Processed meat

Product storage form



Crates



Bins

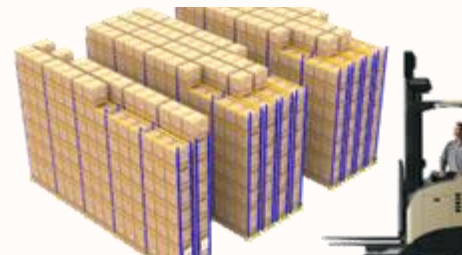
Recommended Solutions by Godrej

Double deep pallet racking + FLT/RT (manual)



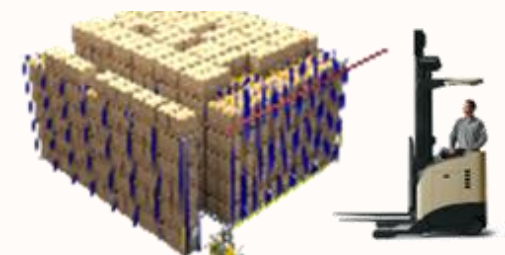
- Floor contact is avoided with first storage level on ground beam, hence clean and hygienic ambience
- Better solution for dense storage application in cold store (up to 28% of storage CBM)
- Inventory count to be done manually with bar coding
- High usage of man-power since both put away and picking is done by MHE
- Medium – 12 to 15 pallets/hr

Drive-in racking + FLT/RT (semi automatic)



- Possibility of floor contact, although guide rails can be used for loading ground pallet to avoid floor contact
- Good solution for dense storage application in cold store (up to 43% of storage CBM)
- Inventory count to be done manually with bar coding
- High usage of man-power since both put away and picking is done by MHE
- Less – 8 to 10 pallets per hour

Shuttle racking + FLT/RT (semi automatic)



- Floor contact is avoided with first storage level on ground beam, for clean and hygienic
- Good solution for dense storage application in cold store (up to 43% of CBM)
- Inventory count can be automated by shuttle
- Lesser man-power is used for put-away and picking of pallets using MHE since the shuttle handles pallets inside system
- High – 15 to 20 pallets/hr



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