

**WE ARE PRIMED FOR
EVERY TERRAIN!**



REEFER BODY



Reefer Body

CGS manufactured Insulated Reefer Bodies are designed to withstand harsh climatic and geographical conditions in the Middle East. Our Reefer Bodies are suitable for distribution of Chiller/Frozen Foods, Dry Products and other consumable or non-consumable products that require the product to be maintained and transported under monitored temperature-controlled environment by using compatible Carrier Cooling Unit.

CGS manufactures reefer bodies in standard sizes ranging from 1.5 m to 8.0 m in length. We also produce larger sizes on special chassis up to 9.5 m in length. The subframe of reefer bodies is made of high-strength steel grade.

Sandwich Panel Skins

The skin of an insulated panel can have a significant impact on the product as a whole. There are many different types of skin that can be used, depending on the final product.

Metal skin sheet

It is the most commonly used skin in reefer bodies all over the world. It has numerous benefits over fiber-based skin.

PVC

Steel's strength is combined with a food-safe coating in PVC Coated Steel Sheets. This is the most common type in pharmaceutical applications. PVC is commonly used on the inside surface.

GRP Skin

GRP skin is a lightweight option that provides better insulation but costs more than a white polyester sheet.



Metal Skin Specification

The metal skin coating should have a minimum zinc coating thickness of 20 microns. The paint coating should have a minimum thickness of 20 microns. The base metal thickness should be sufficient to withstand impact while also providing rigidity and strength to the body.



Fire Retardant Limitations of GRP Skin

Polyester resins are composed of carbon, hydrogen, and oxygen atoms and, like all organic compounds, will burn. The behavior of FRP in a fire is determined by a number of factors, including:

- Ease of ignition
- Surface spread of flame
- Fuel contribution
- Fire penetration



Penetration Resistance

Forces up to 30 kg on a 20mm ball cause no long-term deformation.



Thermal Capacity

Metal surface layers have a much lower heat storage capacity than fiber. As a result, the vehicle interior requires less time and energy to cool.



Thermal expansion

Metal has a thermal expansion coefficient that is approximately 50% less than aluminum and 70% less than GRP.



Advantages of the metal sheet over GRP Skin

Vapor Tightness

The Metal surface layers are completely vapor diffusion tight. There is no loss of insulation or payload due to moisture absorption.



Chemical/Biological Behavior

Resistance to commercial chemicals, as well as to rotting and decay.



Corrosion Resistance

The zinc/steel cathode effect provides chemical and physical protection.



Compression Strength

Only 10% compression at a surface load of 500 kg/m².



Panel Manufacturing Methods

A variety of sandwich panel manufacturing technologies are used in this industry around the world, each with its own set of benefits and drawbacks.

Closed Injection

The most common manufacturing process is the closed injection system where the inner and outer skins are placed in the mold with a spacer between them based on the thickness of the panel. The hydraulic press moves the mold. Insulation chemical is injected through pipes inside the mold. The ideal foam density is $40\pm 2 \text{ kg/m}^3$. This process can produce high-density panels, but the panel length is limited.

Open Pouring

Open pouring is a process in which the outer sheet is placed over the mold and prepared for paneling. Meanwhile, the inner sheet is moved in and lifted up by the vacuum. The bottom sheet is moved into the mold in the third step, and the chemical is poured over it at the start of the press. Pouring time is critical for good insulation and avoiding bubbles. The ideal foam density is $40\pm 2 \text{ kg/m}^3$. The advantage of this method is that long lengths can be produced; however, if reinforcement is used, heavy sheets cannot be lifted by vacuum.

Vacuum Press

Panels are produced in this process by applying negative pressure. The inner layer of the panel is placed in the mold first, and then PU foam or Styrofoam blocks are placed over it by an adhesive layer. In the third step, the bottom layer of the panel adheres again, and a vacuum is created over the entire panel by a rubber layer. This manufacturing process is primarily used for floor or roof panels with special reinforcement for customized applications.



Insulation types

Insulation chemicals of various types are used in the refrigeration industry.

Polyurethane Foam

The most popular insulant, polyurethane, has the lowest thermal conductivity (Better Insulation Performance) of any insulation material. Material preparation is essential in the production of our panels. Engineering begins before the raw materials enter the mixing chambers. PU foam is made up of two chemicals. Material preparation is a continuous and ongoing process which is one of the most important factors in determining the quality of the sandwich panel. Maintaining low porosity within the panel directly leads to higher-density foam. A more densely packed foam has a lower thermal conductivity (K-Value or λ -Lambda). The illustration below explains the concept of gaps between closed-cell and open-cell insulation.



Extruded Polystyrene

Commonly referred to as Styrofoam. This material is usually manufactured in the form of pre-extruded panels or sheets. These panels are suitable for flooring/roof applications where higher rigidity is required without sacrificing your products insulation requirements.

FEATURES



ROOF STAND

COOLING UNIT

ACCESS LADDER

CORNER CASTING

ROUND PROFILE

SS HINGES

TRIPPLE WING REAR DOOR

SIDE DOOR WITH RECESSED LOCK

WHITE POLYESTER PRE PAINTED METAL SHEET

MARKER LIGHTS

SASO CERTIFIED CRASH BARRIER

RETRACTABLE TAIL LIFTS

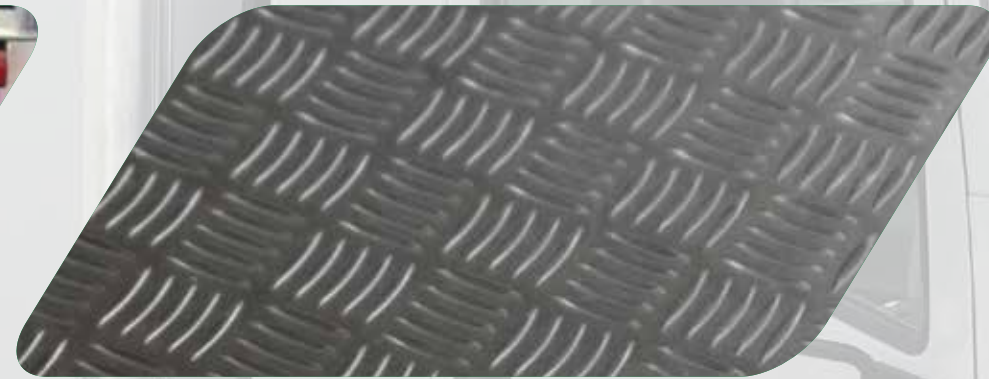
CONTAINER LOCKS

EXTERNAL KICK PLATE

Accessories & Addons



RETRACTABLE TAIL LIFTS



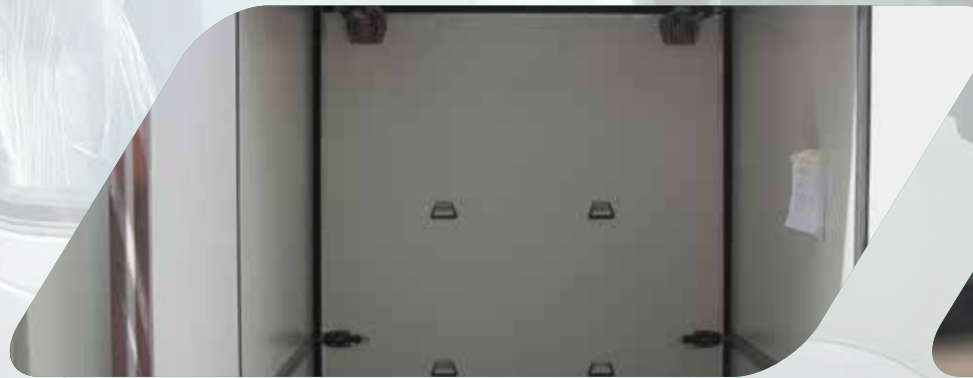
ALUMINIUM FLOORS



GRP SMOOTH FLOOR



ALUMINIUM T-SECTION FLOOR



MOVEABLE AND TILTABLE
PARTITION WALL



RETRACTABLE TAIL LIFTS



ALUMINIUM FASTENING RAILS WITH
BELTS



MEAT RAILS WITH DOUBLE
MEAT HOOKS



PLASTIC CURTAIN



MOVEABLE, TILTABLE PARTITION
WALL WITH SLIDING DOOR

Reefer Body Structure

Reefer Body K value

K value is a critical factor in the design and manufacture of reefer bodies. Reefer bodies should have an optimal thermal conductivity value to keep the products fresh while also extending the life of the cooling unit with low fuel consumption. The K value must adhere to international standards. The minimum value for two different types of reefer bodies is given below:

- The ideal K-value for a chiller must be less than $0.7 \text{ W/m}^2\text{-k}$
- The optimal K-value for a freezer must be less than $0.4 \text{ W/m}^2\text{-k}$

Assembly of body & sealing

Reefer bodies can be built by assembling single-piece panels or by combining cold storage panels and joining them together. The first method provides the best sealing and closed body structure with no leakage. In the latter, there is a risk of water/cooling leaking, as well as the body structure becoming weak and having a shorter working life.

If a body has a high K value and high-density panels but is not properly sealed, it will not provide the required results.

Rubber sealing

Rubber sealing in general must be resistant to harsh environments, provide good protection against dust and moisture, and maintain the inside temperature of the body in order to maximize the use of the cooling unit.

Floor construction

The floor panels of reefer bodies must be designed in accordance with the truck's payload. The normal load capacity of the floor is 500 kg/m². If an electric pallet jack or forklift operation is involved, additional reinforcement in the floor should be added to bear the localized loading. The top layer of the floor must be properly sealed to prevent water leakage inside the floor, which can cause body damage. If the body is being used for fish or ice transport, the entire borderline of the walls/floor must be covered with a grp layer.

Border Profile

The border profile is the covering that is attached to all of the body's joints. It should be used as a covering rather than a structural component of the body. The aerodynamic shape will provide less resistance to air and damage from sandstorms.

Water Proof rivets

Rivets used in reefer bodies can be made of aluminum, galvanized steel, or S.S., but the most important factor is that the rivets must be waterproof. Else the moisture can be absorbed inside the panel, causing damage and ultimately lowering the body's thermal efficiency. S.S. rivets are the best choice among rivet materials as they are corrosion-resistant and long-lasting.

Hinges & locks

Hinges and locks can be made of S.S. or galvanized steel. Stainless steel products are resistant to corrosion.

Kick Plate

Inside the body, there is an aluminum kick plate that connects the floor to the wall panels. A single piece ensures good rigidity, proper moisture sealing, and protection against pallets striking walls.

Body mounting on Chassis

Reefer bodies must be bolted to the chassis only according to chassis manufacturer recommendations. The body size must correspond to the chassis, and no cutting or extension of the chassis is permitted.

Ceiling light

The number of ceiling lights should be according to the length of the body. It should have sufficient illumination and be properly sealed so that no moisture can enter the roof panel. The minimum value for illumination level for light is 480 lux.

Marker light

The body side, front, and rear marker lights must comply with traffic police regulations.

Registration plate and light

The registration plate must be mounted on the rear right side of the chassis in a visible location with adequate lighting.

Roof panel construction

Roof panels must be strong enough to support meat rails or movable tilt-able partition walls.

Structural Rigidity

The body's structure must meet international standards. The cargo load must be supported by the front, side, and rear walls in both static and dynamic conditions. These loads should be calculated under acceleration, sudden braking, U-turn, and lane change conditions. The resulting deflection in the body must be within elastic limits defined by standards.

Applications



Pharmaceuticals



Meat Processing



Catering and Hospitality



Fast Food Chain Industries



Food & Beverage



Dairy Industries



Fruits & Vegetables



Fish Processing



Bakery Industry



Poultry Processing



AUTOMOTIVE REFRIGERATION SPECIAL PRODUCTS

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