



◀ گانکس سردخانه و اتاق پیش سرد پرتابل

سردخانه بالای صفر تا +۱ درجه و سردخانه زیر صفر تا -۴۰ درجه

دیواره های پنلی ایزوله یا عایق پلی اورتان. درب های لولایی و کشویی



شرح فعالیت های شرکت وی سی صنعت در زمینه سردخانه:

الف) خدمات مشاوره و طراحی:

- ۱) محاسبه بار تبرید مورد نیاز و طراحی سیکل تبرید با استفاده از نرم افزارهای REFRIG BOX و COOL Pack
- ۲) طراحی سازه سردخانه همراه با نقشه کتی
- ۳) طراحی اپشن های خاص مانند کنترل هوشمند و مانیتورینگ سردخانه هابزینگ و...

ب) ساخت و تولید:

تجهیزات سردخانه های شرکت وی سی صنعت با بهره گیری نکتولوژی روز دنیا در طراحی و کیفیت و با رعایت استانداردهای مربوطه تولید می گردند. این محصولات شامل: سردخانه قابل حمل زیر صفر و بالای صفر، سردخانه ثابت مخصوص تولید مواد غذایی، دارویی، میوه، گوشت و ... سردخانه مودولار، سرخانه هابزینگ

ج) نصب و اجرا:

تیم نصب و اجرای شرکت وی سی صنعت با استفاده از متد های مدیریت پروژه جهت زمان بندی دقیق و سرعت نصب بالا با حفظ کیفیت، آماده همکاری با کارفرمایان و پیمانکاران، از اجرا تا تامین و نگهداری در زمینه سردخانه های زیر صفر و بالای صفر می باشد.

د) تست و معتبر سازی

- ۱) تست سردخانه های هابزینگ مطابق با اصول GMP شامل شمارش ذرات، اندازه گیری دما، رطوبت، صوت و غیره توسط مشاورین و متخصصین شرکت وی سی صنعت.
- ۲) طراحی جامع معتبر سازی، تجزیه و تحلیل خطرات، مراحل تولید و نظافتی.



Applications:

Sea Food & Meat Industry



Dairy & Ice Cream Industry



Hospital & Pharmaceutical Industry



Fruits & Vegetables



Horticulture & Floriculture



Ship Industry



Accessories:



Semi Hermetic Compressors



Scroll Compressors



Sealed Compressors



Condensing Units



Evaporators

Semi-Hermetic VS Hermetic:

| SEMI-HERMETIC | VS | HERMETIC |
|--|----|---|
| SEMI-HERMETIC (Semi-Sealed) | | HERMETIC (Sealed) |
| EASY TO ACCESS FOR REPAIR | | 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 MOTOR | | FAN COOLED MOTOR |
| LOW MOTOR TEMPERATURE | | NOT SUITABLE FOR VERY LOW TEMPERATURE APPLICATIONS |
| a) AVAILABLE FROM 1/2 TO 15 H.P. (AIR COOLED) | | AVAILABLE FROM 1/2 H.P. TO 15 H.P. |
| b) AVAILABLE FROM 1/2 TO 50 H.P. (WATER COOLED) | | |
| DESIGNED FOR EXTREMELY HIGH AMBIENT CONDITIONS UP TO 75° C | | DESIGNED FOR MAXIMUM 45° C / 50° C AMBIENT |
| SPARES EASILY AVAILABLE LIKE GASKETS, MOTOR WINDING, VALVE PLATE | | REPLACEMENT OF COMPRESSOR IS PREFERRED AS REPAIRING IS VERY DIFFICULT |

Design & Planning:

Our cold rooms and freezers can be built to your requirements or bought "off the shelf" in a range of standard sizes. Delivered as flat pack walk in cold rooms, these units combine very high levels of guaranteed performance with ease of assembly and a fully supported fast track service.

To understand actual need for the hospitality segment, we design special refrigeration system because of heavy usage & high frequency of door openings.



We understand that every project is different, so to suit your individual requirements we offer a full design and planning service.





ModularZone

-40°C to +60°C



VC SANAT Modular Coldrooms

VC SANAT Modular Coldrooms are "off the shelf" freezer, chiller and dual compartment coldrooms, ranging in sizes from 1.70m x 1.10m up to 5.0m x 5.0m.

These simple yet high quality units are delivered flat packed with assembly instructions along with a range of tools and accessories. To view the items included please visit

www.vcsanat.org



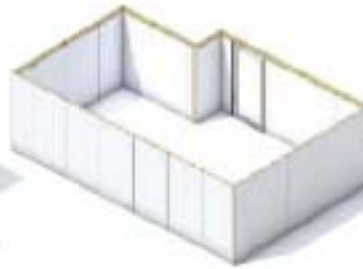
Multi-chamber



Single Chamber



Dual Compartment



L Shape



Angled

Coldroom Selector

VC SANAT Modular Boxes for chiller rooms and freezer rooms, temperature range -21°C to 1°C

| | Width (m) | Length (m) | Height (m) | Room Vol. (m ³) |
|---------|-----------|------------|------------|-----------------------------|
| Room 1 | 1.70 | 1.10 | 2.30 | 4.3 |
| Room 2 | 1.70 | 1.45 | 2.30 | 5.7 |
| Room 3 | 1.70 | 1.80 | 2.30 | 7.0 |
| Room 4 | 2.00 | 1.10 | 2.30 | 5.1 |
| Room 5 | 2.00 | 1.45 | 2.30 | 6.7 |
| Room 6 | 2.00 | 1.80 | 2.30 | 8.3 |
| Room 7 | 2.00 | 2.00 | 2.30 | 9.2 |
| Room 8 | 2.20 | 1.10 | 2.30 | 5.6 |
| Room 9 | 2.20 | 1.45 | 2.30 | 7.3 |
| Room 10 | 2.20 | 1.80 | 2.30 | 9.1 |
| Room 11 | 2.20 | 2.20 | 2.30 | 11.1 |
| Room 12 | 2.60 | 1.10 | 2.30 | 6.6 |
| Room 13 | 2.60 | 1.45 | 2.30 | 8.7 |
| Room 14 | 2.60 | 1.80 | 2.30 | 10.8 |
| Room 15 | 2.90 | 1.10 | 2.30 | 7.3 |
| Room 16 | 2.90 | 1.45 | 2.30 | 9.7 |
| Room 17 | 2.90 | 1.80 | 2.30 | 12.0 |
| Room 18 | 3.30 | 1.10 | 2.30 | 8.3 |
| Room 19 | 3.30 | 1.45 | 2.30 | 11.0 |
| Room 20 | 3.30 | 1.80 | 2.30 | 13.7 |

VC SANAT Multi Compartment Coldrooms

| | Total Room Sizes | | | |
|---------|-----------------------|------------|------------|-----------------------------|
| | Total Rooms Width (m) | Length (m) | Height (m) | Room Vol. (m ³) |
| Room 21 | 2.00 | 2.00 | 2.30 | 4.6 |
| Room 22 | 2.50 | 2.50 | 2.30 | 7.2 |
| Room 23 | 3.00 | 3.00 | 2.30 | 10.4 |
| Room 24 | 4.00 | 4.00 | 2.30 | 18.4 |
| Room 25 | 5.00 | 5.00 | 2.30 | 28.8 |

Prices and quotes can be obtained from the VC SANAT cold room Department on 021-77657290-2.

Operating Temperatures

The table below shows the operating temperature of insulating materials available in the market for controlled environments.

| | Temperature range |
|----------------------|-------------------|
| PIR | -40°C to +60°C |
| PUR | -50°C to 50°C |
| Mineral Fibre | +0°C to 230°C |
| Expanded Polystyrene | -25°C to 75°C |



To determine the minimum panel thickness required for a given temperature condition, the following formula is used:

$$D = \lambda \times \Delta t / Q$$

- D = thickness of insulation
- λ = thermal conductivity of insulation (m)
- Δt = temperature difference between internal and external face (°C)
- Q = heat flow, set at 10 (W/m²)

For example:

A freezer unit within a building with an internal operating temperature of -30°C and external ambient temperature of 20°C, would require the insulated panel thicknesses below:

| | Thickness Required |
|----------------------|--------------------|
| PIR | 100mm |
| PUR | 100mm |
| Expanded Polystyrene | 185mm |
| Mineral Fibre | 200mm |

Heat Transmission

Thermal Conductivity (λ) 0.0195 W/mK

| Panel Thickness (mm) | 50 | 60 | 80 | 100 | 125 | 150 | 175 | 200 | 220 |
|-----------------------|-------|-------|-------|-------|-------|-------|------|------|-------|
| U-value | 0.39 | 0.31 | 0.25 | 0.20 | 0.16 | 0.13 | 0.11 | 0.10 | 0.095 |
| Temp. Difference (°C) | | | | | | | | | |
| 10 | 3.90 | 3.25 | 2.44 | 1.95 | 1.56 | 1.30 | 1.11 | 0.99 | 0.89 |
| 15 | 5.85 | 4.88 | 3.66 | 2.93 | 2.34 | 1.95 | 1.67 | 1.46 | 1.33 |
| 20 | 7.80 | 6.50 | 4.88 | 3.90 | 3.12 | 2.60 | 2.23 | 1.96 | 1.77 |
| 25 | 9.75 | 8.13 | 6.09 | 4.88 | 3.90 | 3.25 | 2.79 | 2.44 | 2.22 |
| 30 | 11.70 | 9.75 | 7.31 | 5.85 | 4.68 | 3.90 | 3.34 | 2.93 | 2.66 |
| 35 | 13.65 | 11.38 | 8.53 | 6.83 | 5.46 | 4.55 | 3.90 | 3.41 | 3.10 |
| 40 | 15.60 | 13.00 | 9.75 | 7.80 | 6.24 | 5.0 | 4.46 | 3.90 | 3.55 |
| 45 | 17.55 | 14.63 | 10.97 | 8.78 | 7.02 | 5.85 | 5.01 | 4.39 | 3.99 |
| 50 | 19.50 | 16.25 | 12.19 | 9.75 | 7.80 | 6.50 | 5.57 | 4.88 | 4.43 |
| 55 | 21.45 | 17.88 | 13.41 | 10.73 | 8.58 | 7.15 | 6.13 | 5.36 | 4.88 |
| 60 | 23.40 | 19.50 | 14.63 | 11.70 | 9.36 | 7.80 | 6.69 | 5.85 | 5.32 |
| 65 | 25.35 | 21.13 | 15.84 | 12.68 | 10.14 | 8.45 | 7.24 | 6.34 | 5.76 |
| 70 | 27.30 | 22.75 | 17.06 | 13.65 | 10.92 | 9.10 | 7.80 | 6.83 | 6.20 |
| 75 | 29.25 | 24.38 | 18.28 | 14.63 | 11.70 | 9.75 | 8.36 | 7.31 | 6.65 |
| 80 | 31.20 | 26.00 | 19.50 | 15.60 | 12.48 | 10.40 | 8.91 | 7.80 | 7.09 |

The heat gain by conduction should be limited to 10W/m². (See Code of Practice for the Design of Coldstore Envelopes).
For enhanced energy performance, the heat gain by conduction should be limited to 8 W/m².

Panels

Systems Available

VC SANAT Modular Coldrooms are available in two formats; **continuous** and **camlock**.

Continuous

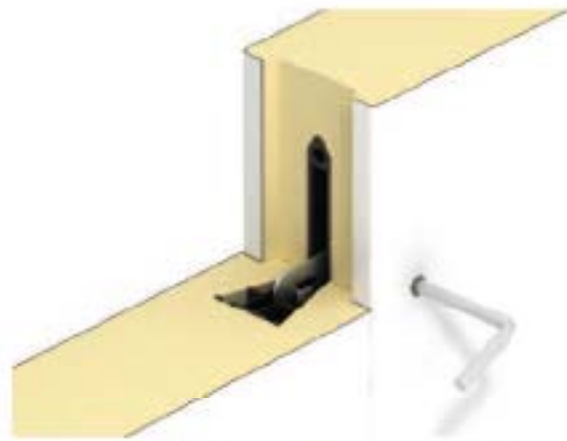
The insulated panels are supplied with rebated corners which allow them to slot together smoothly. There are no visible camlock holes or visible rivets once the unit is put together.



The continuous system panels are available in a range of thicknesses from 80mm up to and including 200mm and in widths from 250mm up to and including 1200mm.

Camlock

The insulated panels for the floors, ceiling and walls are connected using camlocks with plastic housing and corrosion protected clamping hooks, formed into the panels when they are manufactured. The camlocks are easy to operate from the inside so the unit doesn't have to be accessible from the outside to erect. This system does not require cutting or drilling; it is easy to assemble and dissemble.



Insulated panels for the camlock system are available in 80 and 100mm thicknesses and in widths from 140mm up to and including 1200mm.

Coatings

The external sheet of the insulated panels consists of hot galvanised zinc / aluminium coated metal, with a high performance Kingspan coating of either Kingspan XL Forte™ or Spectrum®. This guarantees smooth and resistant surfaces with sealed edges.

A stainless steel finish is also available; please contact Kingspan envirocare® Technical services for information.

A range of internal Kingspan Cleansafe coatings are available for specific controlled environment conditions. For further information please see the Kingspan Coating

Selector for controlled environments, available from the Kingspan Marketing Department on 01352 717251.



Doors

A range of hinged and sliding doors, with or without vision panels are available.

Note: All standard hinged doors to be fitted into Kingspan 1100mm wide cold store panels.



Quick Calculation of Cold Rooms:

Cooling needs quick calculation

The following chart shows recommended cooling needs for high temperature process rooms and cold storage rooms at positive and negative temperature according to the calculation basis.

| Cold room size (m³) | | Recommended cooling needs for process handling rooms and cold storage rooms (kW) | | | | |
|-----------------------|--------|--|---------------------|----------------------------|------------------------|------------------------------|
| | | HIGH TEMPERATURE (+12°C) | | POSITIVE TEMPERATURE (0°C) | | NEGATIVE TEMPERATURE (-20°C) |
| | | Non insulated floor | Insulated floor | Non insulated floor | Insulated floor | |
| | | 80 mm panel | Non insulated walls | 80 mm panel thickness | 100 mm panel thickness | |
| Commercial cold rooms | 5 | | | 800 | 1 100 | 850 |
| | 10 | 1 200 | 2 300 | 1 100 | 1 700 | 1 200 |
| | 15 | 1 800 | 3 000 | 1 500 | 2 300 | 1 500 |
| | 20 | 1 800 | 3 700 | 1 900 | 2 800 | 1 800 |
| | 25 | 2 100 | 4 300 | 2 200 | 3 300 | 2 100 |
| | 30 | 2 500 | 4 800 | 2 600 | 3 800 | 2 400 |
| | 40 | 3 100 | 5 100 | 3 200 | 4 700 | 2 900 |
| | 50 | 3 600 | 7 000 | 3 800 | 5 300 | 3 300 |
| | 70 | 4 800 | 9 000 | 5 000 | 6 800 | 4 300 |
| | 100 | 5 600 | 11 000 | 6 000 | 8 000 | 5 000 |
| Industrial cold rooms | | 100 mm panel | Non insulated walls | 100 mm panel thickness | 150 mm panel thickness | |
| | 150 | 8 000 | 12 900 | 8 000 | 10 500 | 6 300 |
| | 200 | 10 500 | 16 000 | 10 000 | 13 000 | 7 800 |
| | 250 | 12 500 | 19 000 | 12 000 | 15 000 | 9 300 |
| | 300 | 15 000 | 22 500 | 14 000 | 18 000 | 10 400 |
| | 400 | 19 000 | 28 000 | 18 000 | 23 000 | 12 800 |
| | 500 | 24 000 | 35 000 | 22 000 | 27 000 | 15 200 |
| | 700 | 29 000 | 43 000 | 30 000 | 35 000 | 20 000 |
| | 1000 | 38 000 | 56 000 | 34 000 | 40 000 | 25 000 |
| | 1500 | 50 000 | 74 000 | 45 000 | 56 000 | 31 000 |
| | 2000 | 65 000 | 95 000 | 63 000 | 73 000 | 40 000 |
| | 2500 | 75 000 | 110 000 | 75 000 | 84 000 | 47 000 |
| 3000 | 85 000 | 125 000 | 85 000 | 94 000 | 53 000 | |

Cold room calculator

For a more accurate calculation we recommend the use of our on-line cold room calculator. It is available at <http://www.vcsanat.com>

By entering basic design data, such as cold room type, application, dimensions and insulation thickness, you will get a quick estimation based on other standard assumptions. You will also be able to customise your calculation by entering further data and to select the most suitable refrigeration unit according to your needs.



www.vcsanat.org

Cooling needs correction factors

We suggest the application of some correction factors in order to get the cooling needs for a non-standard cold room:

$$P_{CR} = P \times F_1 \times F_2 \times F_3 \times F_4$$

where P_{CR} represents the corrected cooling capacity, P represents non corrected cooling capacity and correction factors F take the following values:

F_1 : Ambient temperature

To get the cooling need at an ambient temperature other than 35°C as shown in calculation basis, the following values for the correction factor F_1 can be used:

- Ambient temperature = 40°C: $F_1 = 1,05$
- Ambient temperature = 45°C: $F_1 = 1,10$

F_2 : Fruits and vegetables respiration rate

Fruits and vegetables ripening process inside positive temperature cold rooms produces heat. This respiration heat could be assessed in up to 50% additional cooling needs depending of the product typology.

As indication, we suggest a value $F_2 = 1,25$

F_3 : Product high rotation rate

Cooling needs shown in charts are calculated with a product standard rotation rate, according to calculation basis. A double rotation rate represents an additional 50% cooling needs, so $F_3 = 1,50$

F_4 : Thin isolation panel

An isolation panel thickness thinner than the recommended thickness means a small increase in cooling needs. As indication, an insulation panel 20mm thinner than standard gives the following values for the correcting factor:

- 20 mm thinner panel: $F_4 = 1,10$

Calculation example

Apple conservation in a 1250 m³ industrial cold room, insulated with 100 mm thickness panel and non insulated floor:

1. From the values in the chart, interpolate the value of cooling needs relative to 1250 m³.

$$P = 48.000 \text{ W}$$

2. Correct the value with the fruits and vegetable respiration rate factor $F_2 = 1,25$

$$P_{CR} = P \times 1,25 = 60.000 \text{ W}$$

Cooling needs calculation basis

Cooling needs shown for each cold room volume have been calculated according to the following hypothesis:

- Ambient temperature: 35°C
- Product density: 250 kg/m³
- Product daily rotation depending on cold room volume: 10% ($V < 100 \text{ m}^3$), 5% ($100 \text{ m}^3 < V < 1000 \text{ m}^3$), and 0% ($V \geq 1000 \text{ m}^3$)
- Product specific heat: PT: 3,2 kJ/kg·K, NT: 1,8 kJ/kg·K
- Product inlet temperature: 35°C (PT) / -5°C (NT)
- Isolation panel: injected polyurethane with 40 kg/m³ density and 0,025 W/mK conductivity
- 18 hours compressor working time.

VCSANAT

دفتر و نمایشگاه مرکزی:

تهران، خیابان انقلاب، پیچ شمیران

خیابان صفی عیاش، خیابان اسانلو،

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