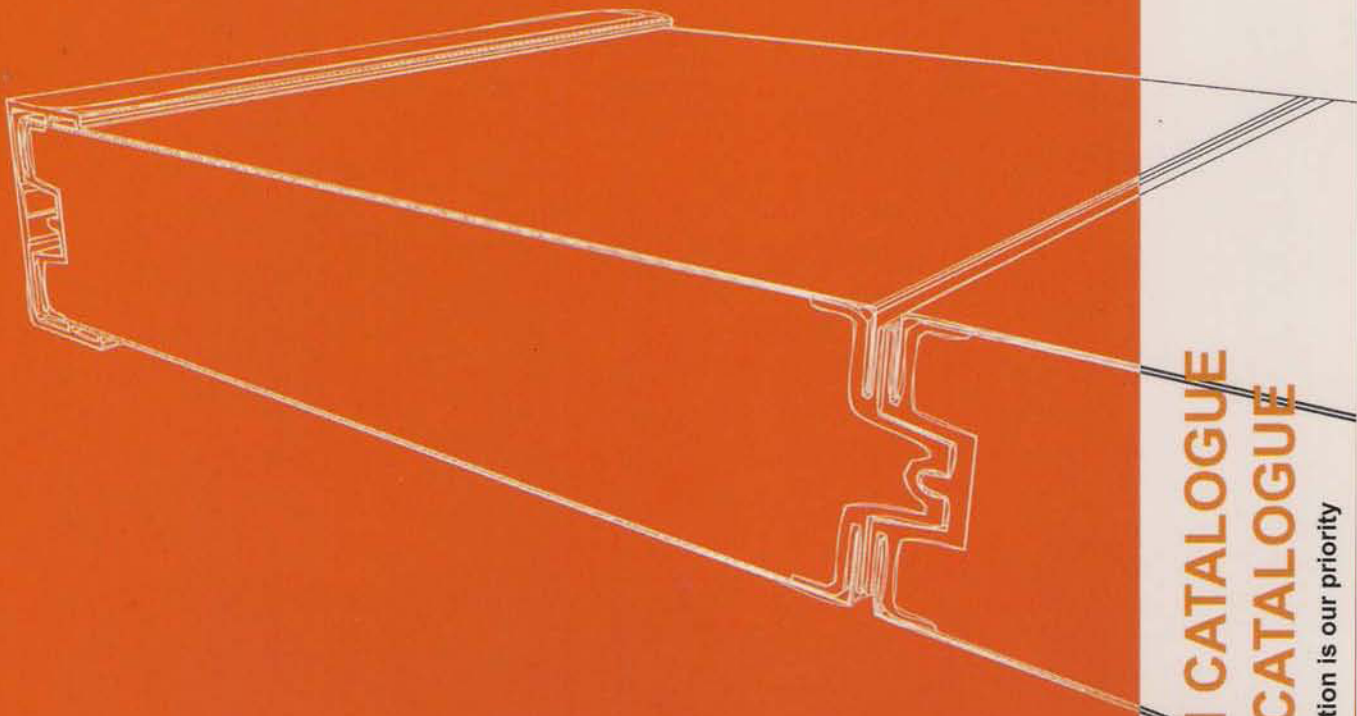


# NPK ANZEL

BY TTC COMPANY GROUP

COLDROOM  
CLEANROOM  
TELECOM CONTAINER  
TELECOM TOWER  
OUTDOOR CABINET  
TELEPHONE BOOTH  
METER



บริษัท พี เอส เอ็ม ซี จำกัด P S M C Co.,Ltd.  
POLY SERVICES MANAGEMENT & CONSULTANTS

๕๗๓/๔๐ ซอยรามคำแหง ๓๙ แขวงวังทองหลาง เขตวังทองหลาง กรุงเทพมหานคร ๑๐๓๑๐

573/40 SOI RAMKHAMHEANG 39, WANGTHONGLANG, BANGKOK 10310

Tel: 66 2 559 2621-2

Fax: 66 2 559 2049

Website: [www.psmc2006.com](http://www.psmc2006.com)

Email: [info@psmc2006.com](mailto:info@psmc2006.com)



CLEANROOM CATALOGUE  
COLDROOM CATALOGUE

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# NPK ANALYT



## COMPANY PROFILE

**NPK Engineering & Service Co.,Ltd** an affiliated company of Thai Tele-Containers Co.,Ltd. and TTC Technology & Construction Co.,Ltd. has its office and factory located on 302 Moo 5 Tambon Bansong, Amphur Phanomsarakarm, Chachoengsao Province 24120 Tel +66 (0) 38520655-9, +66 (0) 38520748-9 founded by Mr.Narin Sinlaparak, an Executive President, on May 9, 1993. The company with its registered capital of 80 million Baht has an objective to produce watt-hour meter, tele container, tele tower and insulation panels of industrial coldroom and cleanroom.

**Thai Tele-Containers Co.,Ltd.** was established on July 26, 1994 with a registered capital 100 million Baht. The company produce and distributes quality mobile container and watt-hour meter. In 1999, due to the great success of the telecommunication containers. Thai Tele-Containers Co.,Ltd over its five years in production. We have supplied meter of government electricity authority of Thailand and CESC (India) with our expansion into oversea market and the development of our static meter production line. Our future in the meter market is looking as good as the quality and service we provide.

**TTC Technology & Construction Co.,Ltd.** was established on 22nd January 2002, with a registered capital of 50 million Baht. The company produce and distribute quality telecom tower and service offering.

### OUR MISSION

We working under a company Improvisation of dynamic team work, quality and integrity. We seek to confirm our market position as a company synonymous with professional, pragmatic, cost effective, solution in all our products.

### QUALITY POLICY

Committed to be the leading producer of mobile container, watt-hour meter, panels and to continuously improving their production efficiency.





## NPK PANEL



### Polyurethane Panel

- Low cost
- High effective in heat insulation
- Longer than other panel
- Self - Extinction panel
- Ceiling can walk-able
- Build in possible



### Rock Wool Panel

- High effective in heat insulation
- High effective in sound proof
- Fire resistant
- Ceiling can walk-able



### Aluminium Honey Comb Panel

- Light weight
- Fire resistant
- Very strong
- Ensure easy construction
- Ceiling can walk-able

## AVAILABLE PANEL THICKNESS

25, 42, 75, 100, 125 mm.

## COLOR

- 1 White
- 2 Ivory

## APPLICATION



CLEANROOM



COLDROOM

## TECHNICAL DATA

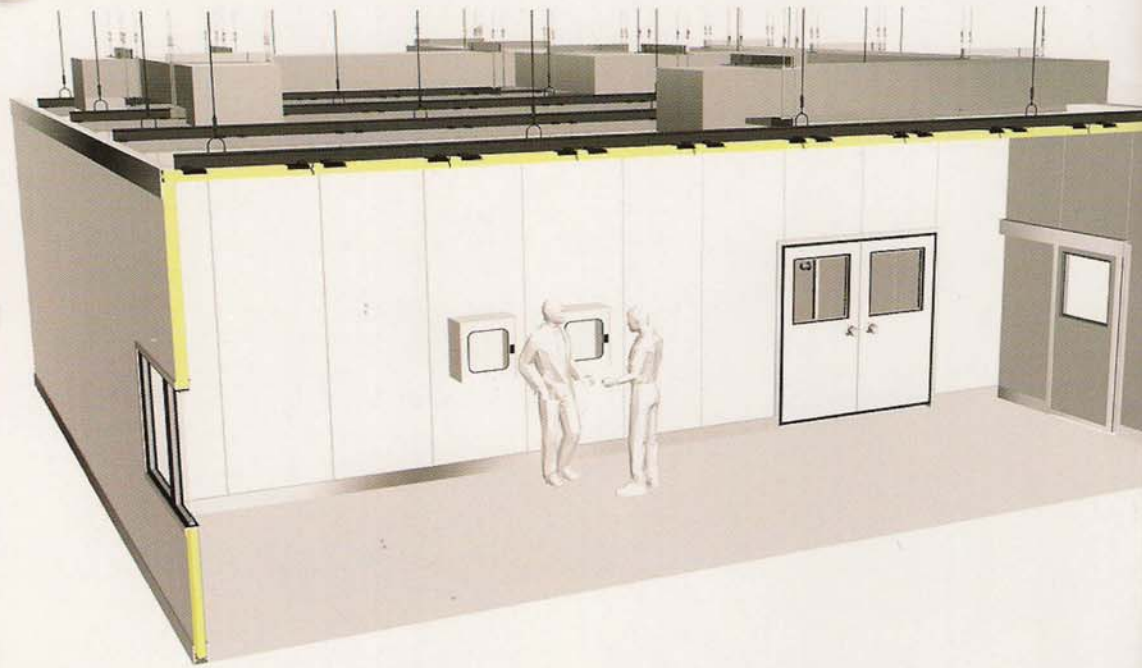
### Polyurethane Sandwich Panel

Panel Type	: Integral Type
Density	: 38-40 kg/m <sup>3</sup>
Panel Length	: Max 7800 mm
Width	: 900, 1200 mm
Surface Material	: PPGI (0.5) with 70 micron PE protective film
Paint Coating Type	: Regular modified polyester / Epoxy primer
Top Coating	: 20 micron
Back Coating	: Foam grey
Fire Rate	: Self Extinguish grade with fire retardants
Thermal Conductivity	: 0.0176 Kcal/m.hr.C
Close Cells Content	: >92%
Compressive Strength	: >1.3 Kg/Sq.m.
Blowing Agent	: HCFC141B



# NPK ANEL

## CLEANROOM STRUCTURE



### TARGET INDUSTRIES

**Cleanroom** Cleanliness level is classified under specific condition and need measured by the size and number of dust particle in given volume of the air. The rating and classification by the number of particles in a given volume of air under specification is call cleanliness level class. The regulations vary country to country, but in most place, the nation rule is established by referring to US Federal standard 209E, in Japan JIS B9920. The cleanliness class are define in 209E by the number of particle diameter 0.5 micron or larger contain in one cubic foot is used.

**Industrial Cleanroom** An industrial cleanroom ICR controls non-biological particles such as airborne dust particles. ICR are mainly utilized in the production lines for the semi-conductor, electronic equipment and precision machine industries.

**Biological Cleanroom** A Biological cleanroom BCR is control biological particles such as bacteria and microbes (fungi spores) BCR are extensively used in field where a controlled aseptic state is required, such as food-related industries, medicine and pharmaceuticals.

**Biohazard Facilities** Biohazard facilities are required in medicine, genetic engineering and other such field where pathogens, microorganism and genes are studies. A biohazard facility prevents the spread of biological organism, infection within an contamination outside the experimenting room, protecting both researchers and the environmental.

### KEY OF SUCCESS

- ✓ High quality noncombustible and combustion-resistant core materials make the panels durable. Operator comforts are built-in with the use of special window frame airtight doors and others features.
- ✓ Our panel system maximizes efficient utilization of the space. Pressure chamber application are also possible.
- ✓ A wide variety of special surfacing material that are durable and corrosion resistant makes maintenance easy.
- ✓ The short construction time and assembly by untrained personnel allow dismantling ,additions ,and other changes to the installation.
- ✓ The availability of numerous panel variation allows easy accommodation to change in layout or equipment configuration.
- ✓ Excellent heat insulation enables fine adjustment and control of the temperature.
- ✓ All joints are fully to form a completely airtight structure.

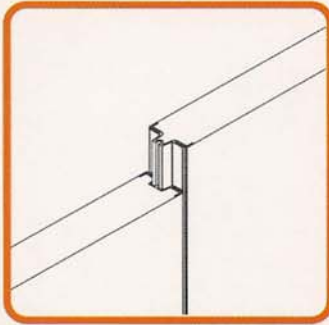


3 Customer is first and satisfaction is our priority

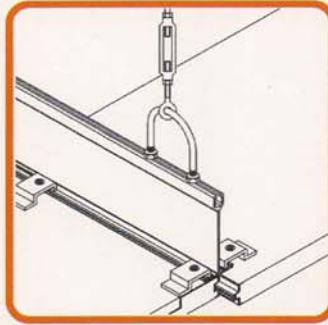
## CLEANROOM PANEL



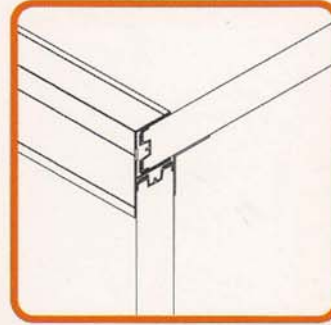
## CLEANROOM DETAIL OF INSTALLATION



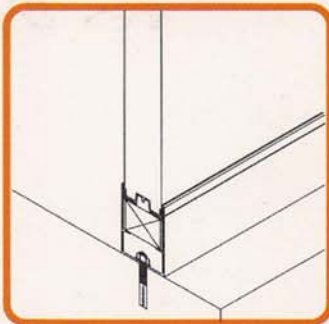
1. Joint detail



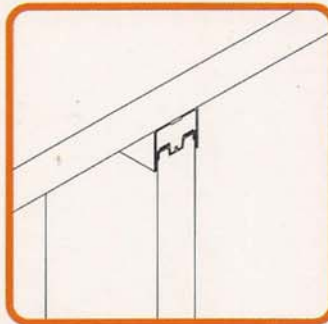
2. Hanging



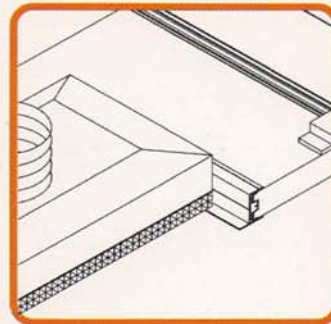
3. Wall / Ceiling



4. Wall / Floor



5. Wall to ceiling



6. HEPA / Lighting

## CLASS SPECIFICATION

Cleanroom class & Industries	Clean room class (>0.5 micron, number/sq.ft.)					
	1	10	100	1K	10K	100K
Wafer process in IC manufacture	●	●				
Assembly and test process in IC				●	●	●
Assembly of semiconductor				●	●	●
Tape and disk manufacture		●	●	●	●	
Magnetic head manufacture				●	●	
Mirror polishing process			●			
Liquid crystal manufacture					●	●
Photo makeup process in liquid			●	●		
Silicon monocrystal				●	●	●
Masking glass manufacture	●	●	●			
Film and print paper				●	●	
Aluminum foil and laminate				●	●	●
Precision electronic parts			●	●		
Precision measuring instrument				●	●	●
Cathode ray tube			●	●		
Miniature bearing			●	●		
Artificial satellite parts			●	●		
Watch and optical parts			●	●	●	●
Printed circuit			●	●	●	●
Computer assembly			●	●	●	●

# NPK ANEL

## CLEANROOM DOOR & WINDOW



### Window

Standard	: window with aluminum frame
Size	: (W) 600 x (H) 900 mm.
Size	: (W) 900 x (H) 1500 mm.
Glass	: Tempered glass: (T) 6 mm.
Available	: wire mesh glass, Acrylic, Poly carbonate sheet



### Single swing door

Standard	: Semi airtight door
Size	: (W) 900 x (H) 2100 x (T) 42 mm.
	with window glass 600 x 600 mm.
	full set of key lock



### Double swing door

Standard	: Semi airtight door
Size	: (W) 1800 x (H) 2100 x (T) 42 mm.
	with window glass 600 x 600 mm.
	full set of key lock



### Single sliding door

Standard	: Manual
Size	: (W) 900 x (H) 2100 x (T) 42 mm.
	with window glass 600 x 600 mm.
	full set of key lock



### Double sliding door

Standard	: Manual
Size	: (W) 1800 x (H) 2100 x (T) 42 mm.
	with window glass 600 x 600 mm.
	full set of key lock

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## COLDROOM PANEL

Coldroom Panels are insulated sandwich panel using non-CFC polyurethane foam material therefore they are friendly environment. The panels offer several advantages polystyrene foam including great thermal resistance and increased efficiency.

This mean consumption for refrigeration unit. All parts are supplied in knock down condition. Newly system make installation works not only easier but also faster.



### PANEL TYPE

- Wall panel
- Floor panel
- Ceiling panel

### AVAILABLE PANEL THICKNESS

- 42 mm
- 75 mm
- 100 mm
- 125 mm
- 150 mm



### HEAT TRANSFER VALUE

Product thickness (PU Insulation)	K value (Kcal / m · h · °C)	Temperature range	Thickness if replace by PolyStyrene foam
42 mm	0.42	0 °C ~ +5 °C	80 mm
75 mm	0.24	-15 °C ~ -5 °C	150 mm
100 mm	0.18	-25 °C ~ -15 °C	200 mm
125 mm	0.14	-35 °C ~ -25 °C	250 mm
150 mm	0.12	-45 °C ~ -35 °C	300 mm

### PANEL COMPARE

Properties	PU Foam	PS Foam
Thickness	Thinner	2 Times thickness
Flammable	Fire extinguish	Flammable
Thermal conductivity	0.015 (W/m.°C)	0.029 (W/m.°C)
K value	0.235 (Kcal/sq.m.hr.°C)	0.449 (Kcal/sq.m.hr.°C)



# NPK ANNEAL

## COLDROOM STRUCTURE



## TARGET INDUSTRIES



### Industrial application

Ice plant  
Food distribution  
Cold storage facilities  
Blast and Spiral freezer  
Refrigeration warehouse  
Food processing facilities

### Commercial application

Floral  
Bakery  
Catering  
Restaurant  
Supermarket  
Convenience store

## KEY OF SUCCESS

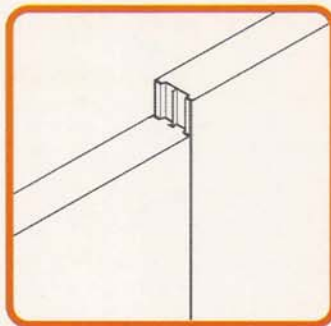
- ✓ Durable colored steel paneling the zinc steel is employed for the surface material of the paneling and this goes through a double baking, double coating process yield not only an esthetic finish but also superior resistance to both corrosion and erosion and to vibration
- ✓ Simple assembly our coldroom panel can be assembled in any size and shape using these standard modular panels. The prefabricated construction allows them to be moved, expanded, or store away for later re assembly
- ✓ Safety door release is safeguard latch ensure that personal inside a coldroom can open a door, even though the door locked from outside in case of emergency.
- ✓ Not allowed condensation at panel joint all panel type such as wall, floor, ceiling shall be specially designed tongue in groove joint of panel to be excellence panel connection.
- ✓ Our standard modular insulation panels and compact refrigeration units are mass-produce under rigorous quality control standard and can be installed quickly and easily
- ✓ Light weight panel are make from polyurethane foam in place with color steel sheet (Thickness 0.45 mm BMT) The panels shall be perfectly designed to ensure strength, durability, corrosion, shorter installation period and safety.

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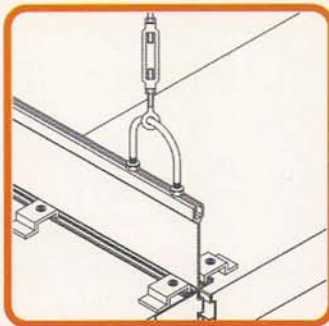
# COLDROOM PANEL



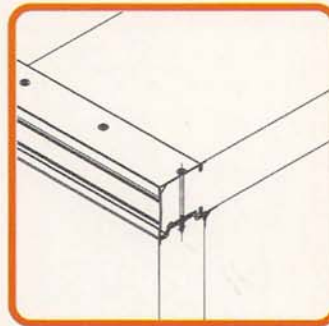
## COLDROOM DETAIL OF INSTALLATION



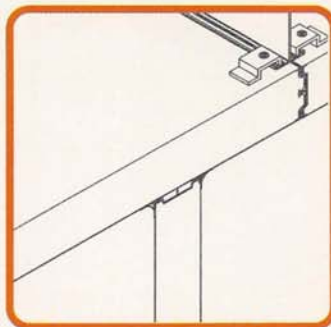
1. Joint Detail



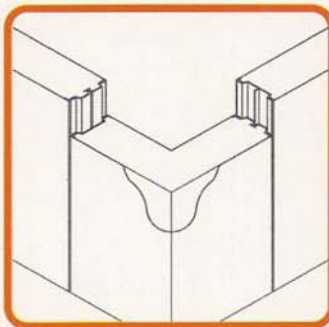
2. Hanging Detail



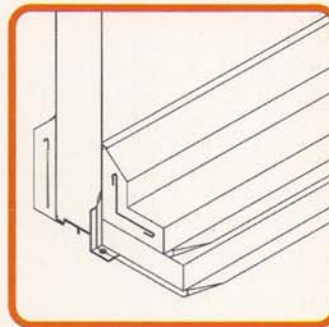
3. Wall / Ceiling



4. Wall to ceiling



5. Wall corner



6. Concrete floor

## SUITABLE TEMPERATURE

Product	Suitable Temperature (C)	Days
Garlic	0	6-7 month
Cabbage	0	3-6 month
Corn	3	3 weeks
Ginger	13	6 month
Kales	0	2-3 weeks
Cucumber	10-13	10-14 days
Long bean	5	4 weeks
White cabbage	0	2-3 month
Lemon	9-10	6-8 weeks
Potato	13-16	4-7 month
Asparagus	0-2	2-3 weeks
Onion	0	1-8 month
Rambutan	13	2-3 weeks
Mango	13	2-3 weeks
Lychee	1.5	3-5 weeks
Pineapple	15-20	1-2 weeks
Bacon	-2.25	15 days
Beef	-1.0	3 weeks
Fish	-18.0	6 month
Ham	-2.0	3 weeks
Lamb	-2.25	2 weeks
Pork	-18.0	10 month
Poultry	-18.0	10 month

**COLDROOM PANEL**

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# NPK ANEL

## INSULATED DOOR



### PVC Strip Curtain

- Type : Standard clear, Superpolar, Transparents yellow
- Dimension : (W) 200 mm. and 2 mm. thick  
(W) 300 mm. and 3 mm. thick
- Overlapping : 200 x 2 mm. overlap 50/75/100 mm.  
300 x 3 mm. overlap 50/75/100/150 mm.



### Single swing door

- Standard : Manual
- Size : (W) 900 x (H) 1800 mm.  
with safety release latch
- Thickness : From 50 mm. to 150 mm.
- Surface : Colorbond, Stainless
- Heater : Available



### Double swing door

- Standard : Manual
- Size : (W) 1800 x (H) 2000 mm.  
with safety release latch
- Thickness : From 50 mm. to 150 mm.
- Surface : Colorbond, Stainless
- Heater : Available



### Single sliding door

- Standard : Manual
- Size : (W) 1200 x (H) 2000 mm.  
with safety release latch
- Thickness : From 50 mm. to 150 mm.
- Surface : Colorbond, Stainless
- Heater : Available



### Double sliding door

- Standard : Manual
- Size : (W) 2000 x (H) 3000 mm.  
with safety release latch
- Thickness : From 50 mm. to 150 mm.
- Surface : Colorbond, Stainless
- Heater : Available

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# COLDROOM PANEL



## PROJECT REFERENCE

- |  |  |
|--|--|
| <p>1. UTL 3<br/>Panel : 8,000 m<sup>2</sup><br/>Cleanroom<br/>Bangkok Thailand</p>   | <p>3. Ekarat<br/>Panel : 1,000 m<sup>2</sup><br/>Cleanroom<br/>Rayong Thailand</p> |
| <p>2. Frito Lay<br/>Panel : 1500 m<sup>2</sup><br/>Coldroom<br/>Lumphun Thailand</p> | <p>4. NHK<br/>Panel : 1 Unit<br/>Machine room<br/>Chachoengsao Thailand</p>        |



1. PROJECT : UTL



2. PROJECT : Frito Lay



3. PROJECT : Ekarat



4. PROJECT : NHK



# NPK

# ANZ

## BY TTC COMPANY GROUP

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Website: [www.psmc2006.com](http://www.psmc2006.com)

Email: [info@psmc2006.com](mailto:info@psmc2006.com)



ISO 9001:2000  
QMS 68131/735



ISO 9001:2000

**SABS**

**KEMA**



ISO 14001:2004 (2004:1)

**CLEANROOM CATALOGUE**  
**COLDROOM CATALOGUE**

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