

DOOMSDAY RESCUE MISSION: SAVE PATIENTS AND PROTECT MEDICAL WORKERS!

- Utilizing 100% stainless steel construction
- Utilizing 100% fresh air with no recycled air
- Every room is individually equipped with a fresh air machine that doesn't use recycled air
- Utilizing precision concentrated ozone to disinfect air
- Factory prefabricated modular hospital rooms can be stacked and shipped as containers
- A state-of-the-art hospital built in days—in a race against time to save more lives



NPI Rooms protect heroic doctors, nurses and hospital staff from infection, allowing them to survive and fight on the battlefield



ADOPTED STANDARD

- 2017 Chinese standard: *Requirements of Environmental Control for Hospital Negative Pressure Isolation Ward*
- 2020 Chinese standard: *The Design Standard of Infectious Disease Emergency Medical Facilities for Novel Coronavirus(2019-nCoV), Infected Pneumonia*

FUNCTIONS

- Treating patients with infectious diseases
- Protecting medical staff from infections
- Protecting communities from contamination
- Can be used as regular wards in normal times

APPLICABLE PLACES

- Urban or rural areas, better to be established in existing hospitals
- On cruise ships or barges
- Can be used as temporary hospital or permanent hospital
- Can be dismantled, relocated and reinstalled at a low cost

BUILDING SCALE

- 264~2120 beds
- Land occupation around 1,500~4,000 m²
- 8~20 floors, floor height 3 m

LEAD TIME

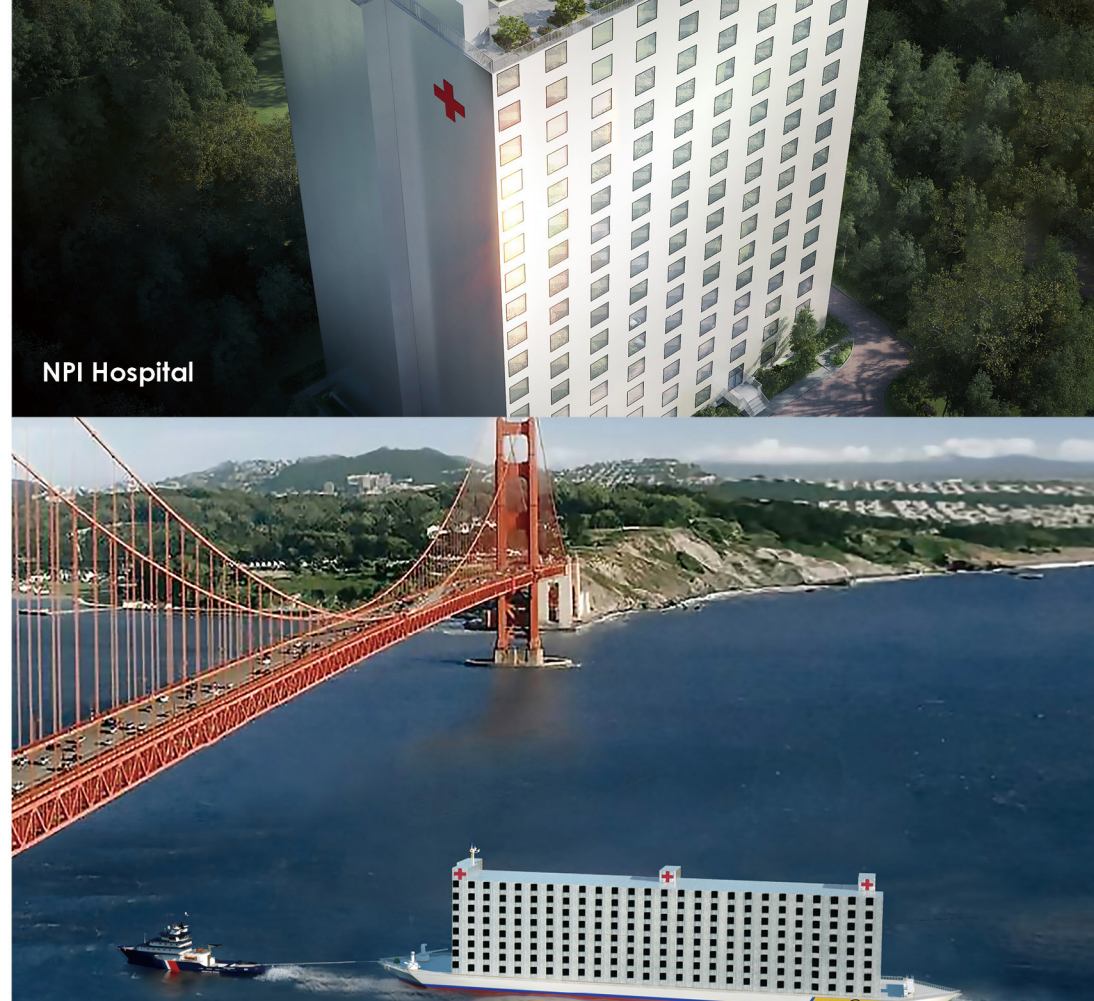
30~100 days (includes shipping)

PRICE

\$98,000~126,000/bed

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ARCHITECTURAL APPEARANCE



MODULAR BUILDING CONTAINER TRANSPORTATION MODE



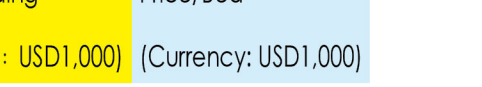
The size and hoisting points of the building modules are the same as international standard containers, which spares containers for low-cost and highly-efficient road transportation, rail transportation and marine transportation. After installed on site, the modular room width doubles that of a container



FLOOR PLAN



CONFIGURATION, LEAD TIME AND PRICING



6	26C8	344	5	8	1404	11,072	61.3x24.7x24	214	16	10	38,616	112
6	26C12	516	5	12	1484	17,808	61.3x24.7x36	318	20	12	56,424	109
7	26C16	688	6	16	1484	23,744	61.3x24.7x48	422	24	14	74,232	108
8	26C20	860	7	20	1484	29,680	61.3x24.7x60	526	28	16	92,040	107
9	30C8	424	5	8	1706	13,648	70.3x24.7x24	246	20	10	43,944	104
10	30C12	636	6	12	1706	20,472	70.3x24.7x36	366	24	12	64,416	101
11	30C16	848	7	16	1706	27,296	70.3x24.7x48	486	28	14	84,888	100
12	30C20	1060	7	20	1706	34,120	70.3x24.7x60	606	32	16	105,360	99
13	60C8	848	10	8	3400	27,200	137.8x24.7x24	492	24	10	84,600	100
14	60C12	1272	12	12	3400	40,800	137.8x24.7x36	732	28	12	125,400	99
15	60C16	1696	14	16	3400	54,400	137.8x24.7x48	972	32	14	166,200	98
16	60C20	2120	14	20	3400	68,000	137.8x24.7x60	1212	36	16	207,000	98

NOTES:

- The numbers of beds are calculated based on the standard floor beds, while during actual applications, the first floor may have fewer beds.
- Construction scope: BROAD is responsible for construction, mechanical, and electrical work. Customers are responsible for foundation and outdoor engineering work.
- The fastest lead time is estimated on the condition that there is no other order being produced in BROAD's production line.
- Transportation within China: 3~6 days; International transportation: 4~45 days (depending on the distance).
- The price includes on-site installation but not transportation. The transportation units meet the size and other requirements of a standard (heightened) 40 feet container.
- Pricing valid until December 31, 2020.
- As indicated by 7 Keys to 'Highest Value, Lowest Cost' for Healthcare Construction in www.bdcnetwork.com, and How Much Does It Cost to Build A Hospital in www.cost-finder.com, the cost for traditional hospital is \$ 850,000~1,500,000/bed.

TECHNICAL STANDARDS



BUILDING PARAMETER TABLE

No.	Item	Parameters	Note
1	Module transportation dimension	12192x2438x3000 mm	Per international container standard
2	Module installation dimension	12488x4500x3000 mm	The length includes 150mm of insulation wall
3	Indoor clear height	2850 mm	Top floor 2675 mm
4	Building live load	200 kg/m ²	Building dead load 150 kg/m ²
5	Roof load	500 kg/m ²	Snow load included
6	Structural material	Stainless Steel	50 times more resistant to corrosion than carbon steel
7	Exterior wall insulation K value	0.4 W/m ² ·°C	Equivalent to 3m thick concrete
8	Window K value	1.6 W/m ² ·°C	Triple-paneled glass window
9	A/C System	Every ward is individually equipped with an air conditioner	The same for medical staff areas
10	Fresh Air System	Every ward is individually equipped with a fresh air machine	
11	Indoor temp.	23±1°C	The indoor temp. is adjustable independently for each room
12	Fresh air volume	≥40 m ³ /person·h	Or 4.5 m ³ /m ² ·h
13	Air freshness	100 % fresh air	With no recycled air
14	Fresh air filtration efficiency rate	99.9 %	Filter PM 0.3~2.5
15	Building Energy consumption	≤100 kWh/m ² ·a	Including A/C & fresh air supply

NEGATIVE PRESSURE ISOLATION ROOM PARAMETERS

No.	Room Name	Room Static Pressure	Ventilation Frequency	Area	Ozone Concentration
1	Ward Toilet	-20 Pa	12 times/h	Heavily Contaminated Area	0.2~0.4 ppm
2	Ward	-15 Pa	12 times/h	Contaminated Area	
3	Patient Corridor	-10 Pa	6 times/h	Semi-Contaminated Area	
4	Ward Buffer Room	-10 Pa	6 times/h		
5	Medical Staff Corridor, Nurse Station	-5 Pa	6 times/h	Semi-Clean Area	0.08~0.12 ppm
6	Medical Staff Office, Dressing Room	-5 Pa	6 times/h		
7	Rest Area	0 Pa	2 times/h	Clean Area	0.04~0.08 ppm

UNIQUE "ANTI-VIRUS" SOLUTIONS OF THIS BUILDING

- Every ward or medical staff area is individually equipped with a fresh air machine and an air conditioner to eliminate mixed air.
- The fresh air machine is equipped with electrostatic cleaner for disinfection and sterilization, with a PM0.3 ~ 2.5 filtration rate of 99.9%.
- Each room is equipped with an electrostatic air purifier, which releases about 6000V high-voltage static electricity to kill virus instantly.
- Mild concentration of ozone is precisely used for safe and reliable disinfection and sterilization for air in the wards and medical staff areas.
- The building structural parts and envelope enclosure are made of stainless steel that is hard to collect dirt and breed bacteria.
- The whole building has no suspension ceilings, no mezzanines, no hidden dirt, no sanitary dead corners.
- 15 cm rock wool insulation and triple-paneled glass windows are used to ensure no condensation and zero bacteria bred therefrom, and super energy efficiency.
- The interior surface layer is made of non-absorbent, scrub-resistant, leakproof decorative materials, which do not breed microbes.
- Double-door interlock pass box is used for deliveries between medical staff corridor and ward.
- High-concentrated ozone is applied to completely disinfect the building exhaust air to protect the surrounding environment.

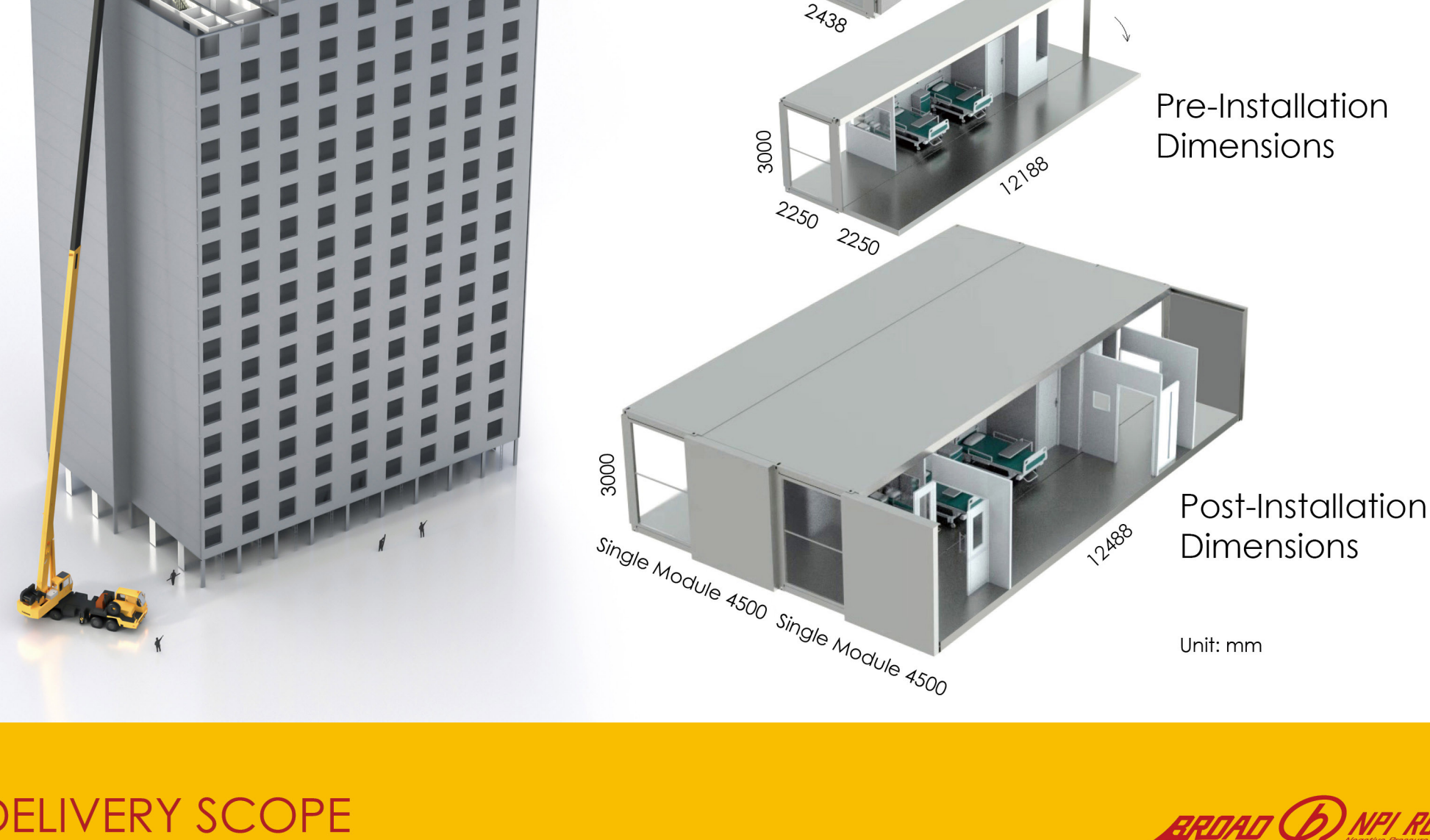
KEY "NEGATIVE PRESSURE ISOLATION" SOLUTIONS OF THIS BUILDING

- The building is laid out according to the medical process of infectious diseases. According to the diagnosis and treatment process of infectious diseases such as the COVID-19, the building is divided into clean area, restricted area (semi-clean area), and isolation areas (semi-contaminated area and contaminated area). Buffer rooms will be set up between adjacent areas.
- The building facilities and components are effectively integrated with the management of air flow, so that the unidirectional flow of air from the restricted area and isolation area to the semi-contaminated area and contaminated area can be realized under the prescribed pressure gradient.
- The traffic partition for medical staff and patients are strictly regulated to prevent cross infection.
- Double-door interlock pass box is used for deliveries between medical staff corridor and ward.
- The design of mechanical and electrical facilities as well as sensor placement will match the functions of negative pressure isolation rooms.
- Sealing treatment will be applied for mechanical and electrical pipes and wires passing through floors and partition walls.

APPLIED STANDARDS

Chinese national standards: Requirements of Environmental Control for Hospital Negative Pressure Isolation Ward GB/T 35428-2017
CECS standard: The Design Standard of Infectious Disease Emergency Medical Facilities for Novel Coronavirus (2019-nCoV) Infected Pneumonia T/CECS 661-2020
Chinese standards are close to European and American standards. Due to the lessons drawn from SARS and the COVID-19, Chinese standards are stricter than European and American standards.

BUILDING MODULE DIMENSIONS



DELIVERY SCOPE



BUILDING CONSTRUCTION AND DELIVERY SCOPE

No.	Item	Customer's Duty	BROAD's Duty	Lead Time	Note
1	Project site information	✓			Detailed information such as the site plan, planning map and surrounding photos, etc.
2	Functional diagrams, floor plans and elevations	✓			Per customer's confirmation
3	Building foundation size and load diagram	✓			For customers to hire local engineers for foundation workshop drawings
4	Module pre-fabrication	✓			Including all building structural parts, mechanical and electrical parts, and interior decoration
5	Construction of the building foundation and surrounding infrastructure	✓			Building foundation, outdoor stairs and ramp construction
6	Design and construction of the sewage system	✓			See BROAD's drawings for sewage pipe diameter, location and quantity
7	Water and power supply for the construction site	✓			As per BROAD's drawing
8	Fire protection design and construction for building surroundings	✓			As per local codes
9	Vacant areas for temporary storage	✓			Adequate space for prefabricated parts near the construction site
10	Building module lifting equipment in place	✓			16~120 t truck crane, as per the building floors and height
11	Module transportation (factory-customer)	✓			BROAD can help the shipment for customers
12	Construction permit		✓		Including the complete set of government approval documents
13	Building installation and commissioning	✓			The customer should provide accommodation for workers
14	As-built drawings and manuals	✓			Meeting the needs of building operation and maintenance
15	Completion Acceptance	✓			Invite local authorities and medical department for project acceptance
16	Training for operation engineers	✓			Training of customer's operation and management personnel

MEDICAL ENGINEERING CONSTRUCTION AND DELIVERY

No.	Item	Customer's Duty	BROAD's Duty	Lead Time
1	Radiation-proof walls, floor and roof of the X-ray room	✓		
2	Medical gas supply system	✓		
3	Medical communication cables	✓		
4	Ward CCTV and visiting system	✓		
5	Medical intercom system	✓		
6	WLAN	✓		

Note: BROAD will reserve medical system linkage paths according to customer's requirement

TIPS ON HOSPITAL SITE SELECTION

- Open spaces or adjacent lots with existing medical facilities should be considered to meet the following conditions:
- Well-equipped municipal supporting facilities
 - Convenient transportation
 - An environmentally friendly isolation zone within a 20 m radius
 - Locate as far as possible from densely populated places and environmentally sensitive areas
 - Mobile hospitals can also be installed on cruise ships

BROAD'S EXPERTISE ON NEGATIVE PRESSURE ISOLATION ROOM



- 11 years of experience in prefabricated buildings. BROAD has built more than 60 steel structure/stainless steel buildings, and one NPI hospital (in Korea).
- Extremely high prefabrication rate: Onsite installation 3 floors/day. Online videos of previous construction projects, such as building a 57-storey building in 19 days, have amazed the world.
- In 2016, BROAD invented stainless steel B-CORE building, which can resist up to a magnitude 9 earthquake and is extremely durable.
- BROAD uses 15 cm rock wool insulation for exterior wall, triple-paneled glass window, external solar shading and fresh air heat recovery system to realize super energy efficiency.
- 15 years of experience in air quality management: BROAD invented a fresh air machine which provides 100% fresh air with no return air, and a PM2.5 filtration rate of 99.9%. The system also showcases a good command of air flow control technology for negative pressure isolation room.
- BROAD has an in-depth expertise in ozone disinfection technology for patient wards, which reduces cross-infection and protects medical staff.
- BROAD invented ozone disinfection technology for hospital wards with a special exhaust air system, eliminating the risk of neighborhood contamination.
- BROAD invented an Ozone Disinfection Cabin which disinfects personnel, equipment and medical waste in and out of hospitals, reducing the risk of cross-infection between the hospital and the community.



ABOUT US

- BROAD Sustainable Building Co., Ltd is a wholly owned subsidiary of the BROAD Group, with invested capital of approximately RMB 7 billion.
- Established in 2009, factory is located in Xiangyin, Hunan.
- Occupies an area of 1.3 km², workshop areas 230,000 m², employees 1000.



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