UNIQUE TECHNOLOGIES

- Utilizing 100% stainless steel construction which produces no hidden dirt
- Utilizing 100% fresh air with no recycled air
- Every room is individually equipped with a fresh air machine to avoid cross-ventilation between rooms
- Utilizing precision concentrated ozone to disinfect air
- Factory-made modular hospital rooms can be stacked and shipped as containers
- Installation speed: 1 floor/day

BROAD NPI ROOM

Negative Pressure Isolation

May 09, 2020 English

ADOPTED STANDARDS

- 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
- American negative pressure ward standard can be adopted if clients request
- Building structure and fire protection standards in accordance with local standards of clients' countries

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

- 288~1840 beds
- Land occupation around 1,500~4,000 m^2
- 8~20 floors, floor height 3 m

ARCHITECTURAL VISUALS


NPI Hospital

ARCHITECTURAL VISUALS


NPI Hospital

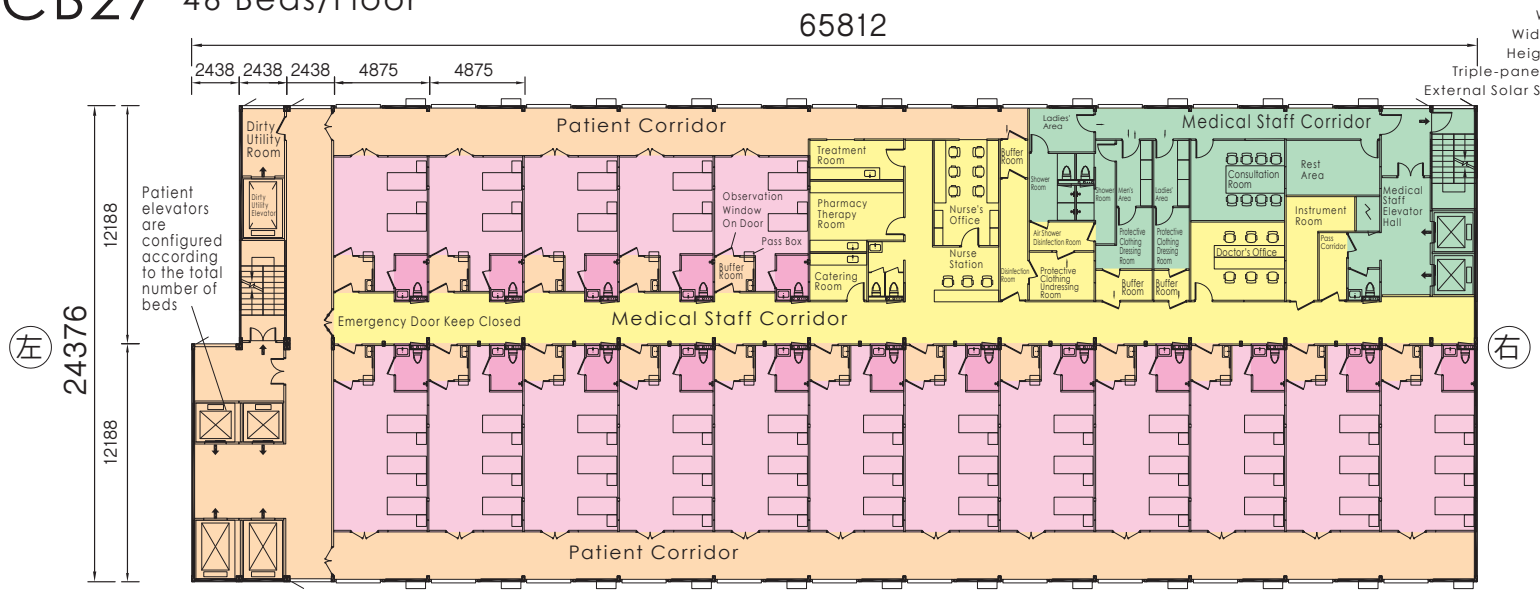

NPI Hospital Ship

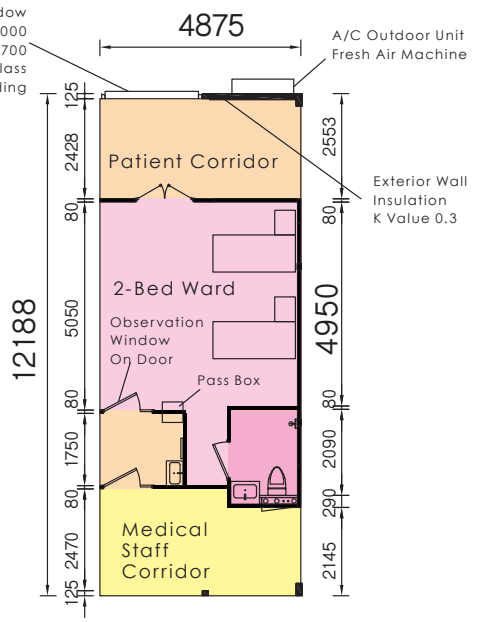
MODULAR BUILDING CONTAINER TRANSPORTATION MODE

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

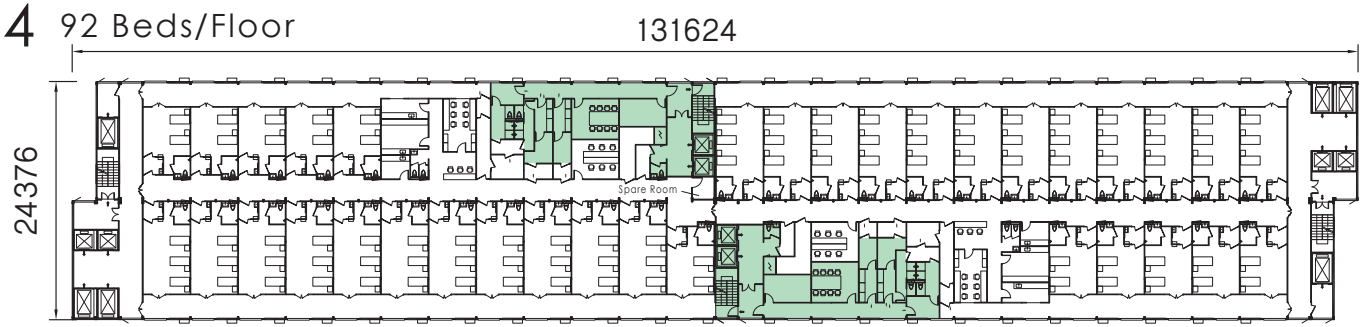
FLOOR PLAN

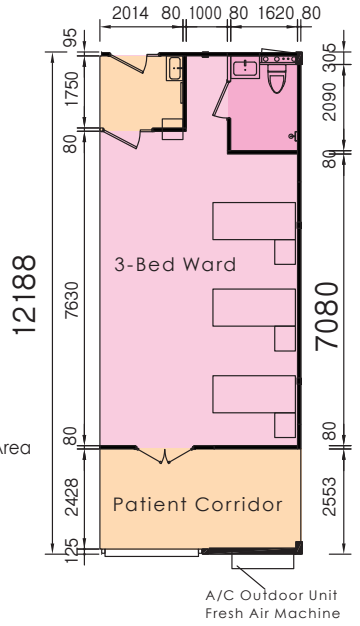
CB27 46 Beds/Floor



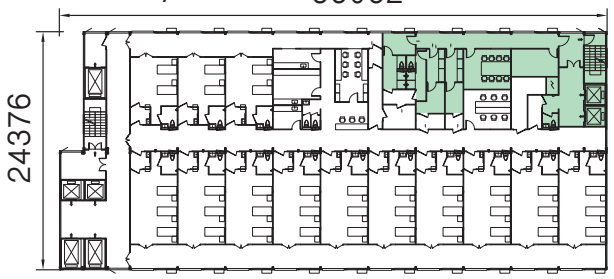


CB54 92 Beds/Floor

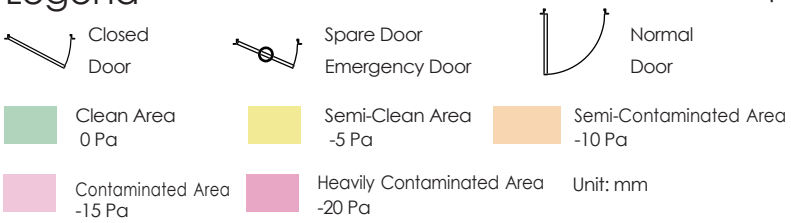




CB23 36 Beds/Floor



Legend



Note: the drawings are for standard floors, the layout for the first floor or a few other floors can be customized as needed

CONFIGURATION AND LEAD TIME

No.	Building Type	Beds	Elevators	Floors	Building Area/ Floor (m^2)	Total Building Area (m^2)	Building LxWxH (m)	Modules	Fastest Lead Time (days)	
									Prefabrication	Installation
1	CB23-8	288	4	8	1307	10,456	53.6x24.4x24	176	16	10
2	CB23-12	432	6	12	1337	16,044	56.1x24.4x36	276	20	12
3	CB23-16	576	6	16	1337	21,392	56.1x24.4x48	368	24	14
4	CB23-20	720	7	20	1337	26,740	56.1x24.4x60	460	28	16
5	CB27-8	368	4	8	1545	12,360	63.4x24.4x24	208	20	10
6	CB27-12	552	6	12	1575	18,900	65.8x24.4x36	324	24	12
7	CB27-16	736	7	16	1575	25,200	65.8x24.4x48	432	28	14
8	CB27-20	920	8	20	1604	32,080	68.3x24.4x60	540	32	16
9	CB54-8	736	8	8	3090	24,720	126.8x24.4x24	416	24	10
10	CB54-12	1104	12	12	3150	37,800	131.6x24.4x36	648	28	12
11	CB54-16	1472	14	16	3150	50,400	131.6x24.4x48	864	32	14
12	CB54-20	1840	16	20	3208	64,160	136.6x24.4x60	1080	36	16

NOTES:

1. The numbers of beds are calculated based on standard floors while during actual applications, the first floor may have fewer beds
2. Construction scope: BROAD is responsible for construction, mechanical, and electrical work. Customers are responsible for foundation and outdoor engineering work
3. The fastest lead time is estimated on the condition that there is no other order being produced in BROAD's production line
4. Transportation within China: 3~6 days. International transportation: 4~45 days (depending on the distance)

TECHNICAL STANDARDS

BUILDING PARAMETER TABLE

No.	Item	Parameters	Note
1	Module transportation dimension	12188×2438×3000 mm	Per international container standard
2	Module installation dimension	12188×4875×3000 mm	The length includes 150mm of insulation wall
3	Indoor clear height	2830 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	0.3 W/m^2·℃	Equivalent to 3m thick concrete
8	Window K value	1.6 W/m^2·℃	Triple-paned 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℃	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

1. Every ward or medical staff area is individually equipped with a fresh air machine and an air conditioner to avoid cross-ventilation between rooms
2. The fresh air machine is equipped with electrostatic cleaner for disinfection and sterilization, with a PM0.3 ~ 2.5 filtration rate of 99.9%
3. Each room is equipped with an electrostatic air purifier, which releases about 6000V high-voltage static electricity to kill virus instantly
4. Mild concentration of ozone is precisely used for safe and reliable disinfection and sterilization for air in the wards and medical staff areas
5. The building structural parts and envelop enclosure are made of stainless steel that is hard to collect dirt and breed bacteria
6. The whole building has no suspension ceilings, no mezzanines, no hidden dirt, no sanitary dead corners
7. 15 cm rock wool insulation and triple-paned glass windows are used to ensure no-condensation and zero bacteria bred therefrom, and super energy efficiency
8. The interior surface layer is made of non-absorbent, scrub-resistant, leakproof decorative materials, which do not breed microbes
9. Hi- concentrated ozone is applied to completely disinfect the building exhaust air to protect the surrounding environment

KEY "NEGATIVE PRESSURE ISOLATION" SOLUTIONS OF THIS BUILDING

1. 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.
2. 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
3. The traffic partition for medical staff and patients are strictly regulated to prevent cross infection
4. Double-door interlock pass box is used for deliveries between medical staff corridor and ward
5. The design of mechanical and electrical facilities as well as sensor placement will match the functions of negative pressure isolation rooms
6. Sealing treatment will be applied for mechanical and electrical pipes and wires passing through floors and partition walls

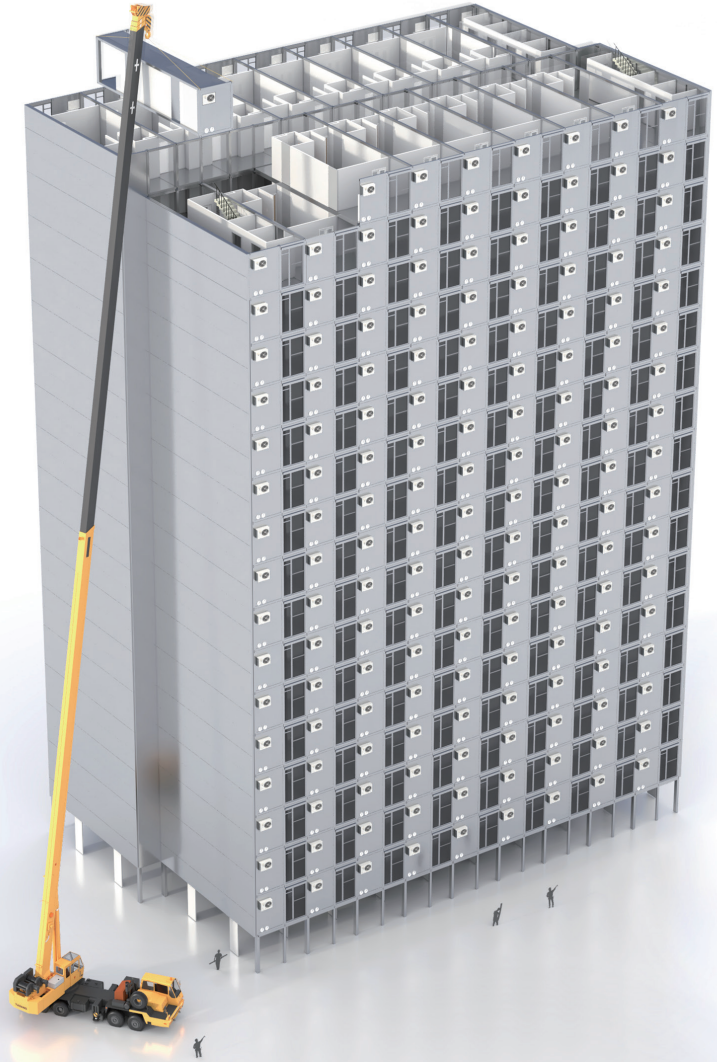
APPLIED STANDARDS

Chinese national standard: Requirements of Environmental Control for Hospital Negative Pressure Isolation Ward GB/T 35428-2017

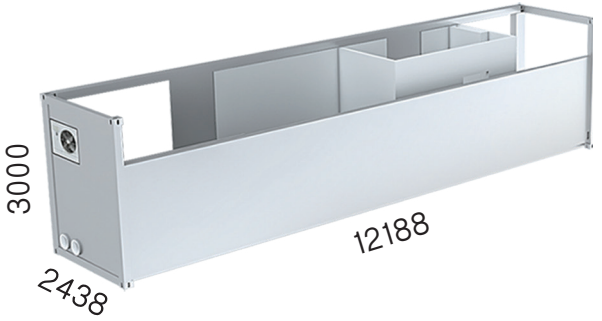
CECS standard: The Design Standard of Infectious Disease Emergency Medical Facilities for Novel Coronavirus (2019-nCOV) Infected Pneumonia T/CECS 661-2020

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

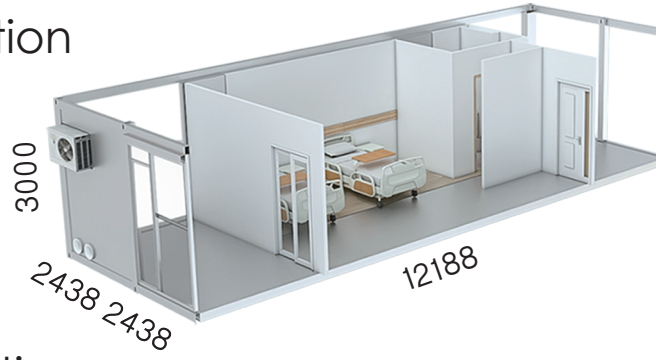
BUILDING MODULE DIMENSIONS



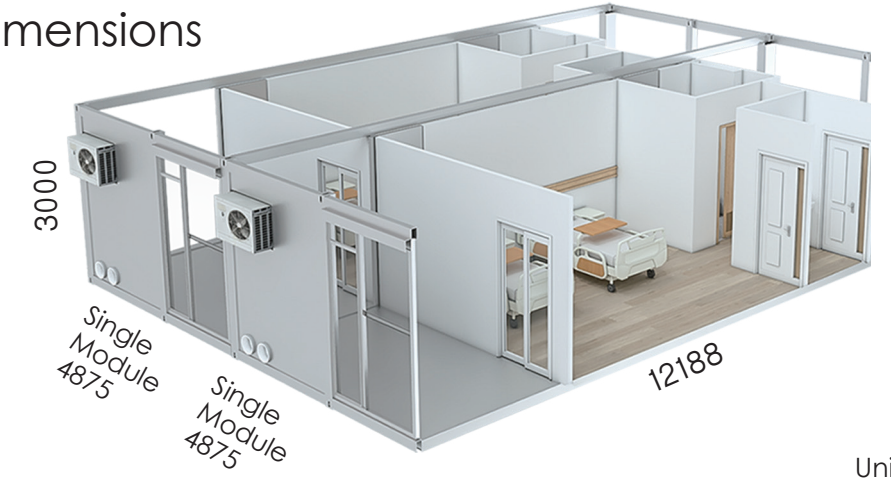
Transportation Dimensions



Pre-Installation Dimensions



Post-Installation Dimensions



Unit: mm

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:

1. Well-equipped municipal supporting facilities
2. Convenient transportation
3. An environmentally friendly isolation zone within a 20 m radius
4. Locate as far as possible from densely populated places and environmentally sensitive areas
5. Mobile hospitals can also be installed on cruise ships

BROAD'S PROFESSIONAL EXPERTISE

1. 11 years of experience in prefabricated buildings. BROAD has built more than 60 buildings in steel or stainless steel structure, and one NPI hospital (in Korea)
2. 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
3. In 2016, BROAD invented stainless steel B-CORE building, which can resist up to a magnitude 9 earthquake and is extremely durable
4. BROAD uses 15 cm rock wool insulation for exterior wall, triple-paned glass window, external solar shading and fresh air heat recovery system to realize super energy efficiency
5. 15 years of experience in air quality management: BROAD invented a fresh air machine which provides 100% fresh air with no recycled 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
6. BROAD has an in-depth expertise in ozone disinfection technology for patient wards, which reduces cross-infection and protects medical staff
7. BROAD invented ozone disinfection technology for hospital wards with a special exhaust air system, eliminating the risk of neighborhood contamination
8. 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
9. BROAD has 29 years of non-electric A/C sales experience in more than 80 countries, and is familiar with international engineering standards and regulations


BSB Factory in Xiangyin

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 km^2, workshop areas 230,000 m^2, employees 1000

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