



ARK Modular Construction

Technical Specification 2016

www.arkprefab.com

EMAIL:info@arkprefab.com

Add: Room 701, No.581, Block A, Xiuchuan Rd., Pudong New Area, Shanghai, China

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1 General information

The following description relates to the finish/design and equipment of new office and sanitary cabins.

Our cabins match the ISO-norm dimensions and have therefore many advantages of that system. They consist of a robust frame construction and interchangeable wall panels.

The design of the Ark standard office cabin is marked with 1, the design of the standard sanitary unit with 2.

All design options not marked with 1 or 2 only will be delivered after these have been mentioned in the written agreement.

1.1 Dimensions

Type	External			Internal		
	Length(mm)	Width(mm)	Height(mm)	Length(mm)	Width(mm)	Height(mm)
10'	2,989	2,435	2610 2810	2,795	2,240	2300 2500
16'	4,885	2,435	2610 2810	4,710	2,240	2300 2500
20'	6,055	2,435	2610 2810 3000	5,860	2,240	2300 2500 2700
24'	7,296	2,435	2610 2810	7,140	2,240	2300 2500
30'	9,120	2,435	2610 2810	8,925	2,240	2300 2500

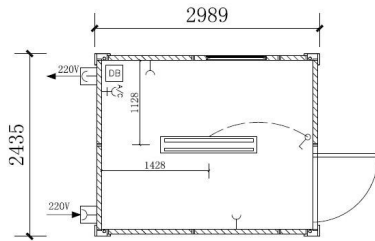
1.2 Abbreviations

The following abbreviations are used in the document:

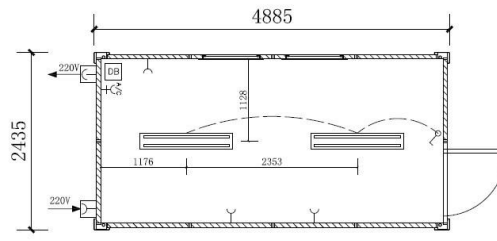
Office cabin with mineral wool insulation	BM
Mineral wool	MW
Glass wool	GW
Polyurethane foam	PU
External cabin height	CAH
Transpack (BM in a package)	TP

1.3 Standard configuration

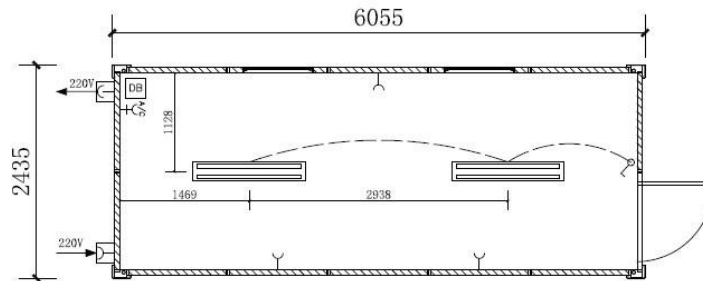
Office cabin 10'



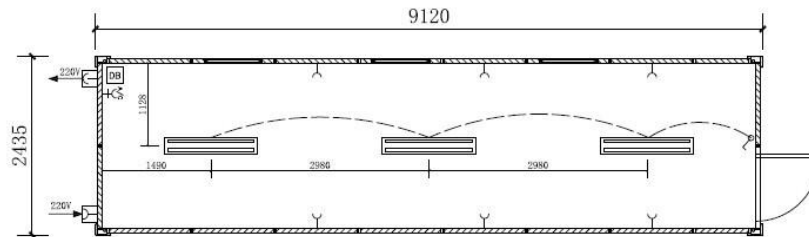
Office cabin 16'



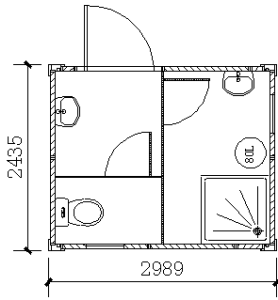
Office cabin 20'



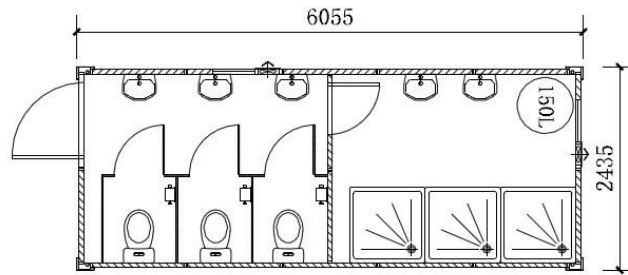
Office cabin 30'



Sanitary cabin 10'



Sanitary cabin 20'



1.4 Insulation

Component	Insulation type	Thickness(mm)
Roof	MW/GW	100
Wall element	MW	60
	MW	70
	MW	100
Floor	MW	50
	MW	100

1.5 Load bearing capacity

floor load:

ground floor: max. load capacity 2.0 kN/m²
 top floors: max. load capacity 1.5 kN/m²

snow load: max. load capacity 1.0 kN/m²

(equates to a typical snow load on the ground of $s_k 1.25 \text{ kN/m}^2$ (125 kg/m²) according to EN1991-1-3 with the national application document B1991-1-3)

wind load: 90 km/h [25 m/s] - terrain category III

When wind speeds are higher than 90 km/h (25m/s) additional safety measures on the cabins need to be carried out (anchoring, screwing). Such measurements are to be calculated by approved specialists taking into consideration local standards and conditions.

Higher load capacity upon request

1.6 Sound insulation

33-44dB

2 Container design

2.1 Floor

frame construction:

- made of cold rolled, welded steel profiles, square tube, Q235B, thickness 4mm
- 4 corner casts, welded
- two fork lift pockets on the long side (apart from type 30')

- inside clearance of fork lift pockets: 256 x 82 mm
- fork lift pocket distance in centre: 2,050 mm^{1/2}
optional: 1,200 mm or without fork lift pockets

- steel cross members with omega profiles, thickness = 2 mm, 7 pcs

insulation:

- MW_{1/2}, density: 120kg/m³
- GL, density : 22kg/m³
- PU, density: 40kg/m³
- insulation thickness: 100 mm

- subfloor: 0.5 mm thick, galvanized steel sheets (subject to differing steel finish)

floor:

- fiber cement board :thickness 18mm
- floor cover: PVC flooring , grey or wooden color , thickness 1.8 mm

2.2 Roof

frame construction:

- made of hot rolled, welded steel profiles, Q235B thickness 3 mm
- 4 corner casts, welded
- roof cross members made of steel, 11 pcs for office cabin

roof cover :

- galvanized steel plate , thickness 0.5 mm

insulation type:

- MW_{1/2}, density: 120kg/m³
- GL, density : 22kg/m³
- PU, density: 40kg/m³
- insulation thickness: 100 mm

ceiling sheeting (Modular ceiling):

- 9mm thick Plaster board glazed with 0.5mm thick galvanized steel sheet)

2.3 Corner posts

- cold rolled steel profiles, thickness 4mm
- steel quality Q345B
- screwed to the roof and floor frame with triangular plate

2.4 Wall panels

wall thickness 60₂ / 70₁ / 100 mm_{1/2} (depending on insulation type)

available items: - full

- door
- window
- air conditioning
- sanitary window
- fixed glazing

external cladding: -corrugated, galvanised and coated steel sheet,
- thickness 0.5 mm,RAL9002

insulation type: MW_{1/2}

PU_{1/2}

insulation thickness: 59mm₁ / 69mm_{1/2} / 90 mm₂

internal cladding:- **AO type**, single-sided coated chipboard₁, thickness 9 mm, white(RAL9002).

AS type - galvanised steel sheet₂, thickness0.5 mm,RAL9002

Wall panels - design combinations:

insulation type	panel thickness	external cladding	insulation thickness	internal cladding
MW	60 / 70 / 100	steel sheet	59 / 90	9mm single-sided coated chipboard or 0.5mm steel sheet
PU	60 / 100		59 / 99	0.5mm steel sheet

2.5 Partition walls

available items: - full panel

- door panel
- window panel
- half panel

wooden construction₁ :**AO Type** :

- total thickness 60 mm
- frame: wooden frame, thickness 40 mm
- cladding on one side: single-sided coated chipboard
- 9 mm thick, white

steel version₂ **AS Type**:- total thickness 60 mm

- insulation: MW 60mm thick, density:120kg/m³
- PU 60mm thick, density:40kg/m³

cladding on both sides: laminated steel plate, thickness 0.5 mm

colour: white (similar RAL 9002)

2.6 Doors

- right or left hand hinged
- inward or outward opening
- steel frame with triangular wrap-around sealing
- door blade with galvanised steel sheets on both sides
- insulated with honeycomb

Dimensions:

nominal dimension	clear opening
Aluminum Door	625x2,040
	870x2,040
	1500x2,040
Steel Door	870x1,995
	1,400x1,995

2.7 Window

design office window:

- pvc frame with insulated glazing and integrated Aluminum roller shutters
- colour:white
- roller shutter housing with belt take-up reel and forced ventilations:
- one hand tilt & turn mechanism

nominal dimension	clear opening
Sliding window, double glazed glass, 4/9/4	800x1,100

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Tilt/swing window,double glazed glass, 4/9/4	900*1200
Top hinged window	652x714

Window parapet :(vertical distance between floor level and the upper edge of the lower profile of the window frame)

office window (CAH 2,610 mm)	800mm
office window (CAH 2,810 mm)	950mm
sanitary window	1400mm

3 Electrical installation

Specification: concealed cabling

IP20¹ /IP44²

plug insert according to country standards

country specific design / variations possible

Technical data:

	basis VDE (= OEVE, SKAN, CZ/SK)	F	GB	CH, DK
connection:	recessed CEE external plug and socket connections			
voltage:	230V/3 poles/ 32 A ^{1/2}			
	400V/5 poles/ 32 A ^{1/2}			
frequency	50HZ			
protection	residual current operated device 40 A/0,03 A , 4 poles (400 V)			
	residual current operated device 40 A/0,03 A, 2 poles (230 V)			
distribution board	distribution box, surface mounted type, single row			
	distribution box, surface mounted type			
electrical circuits	light	circuit breaker 10A, 1p+N poles (3x1.5mm ²) ^{1/2}		
	heating	circuit breaker 16A, 1p+N poles (3x2.5mm ²) ^{1/2}		
	socket	circuit breaker 16A, 1p+N poles (3x2.5mm ²) ^{1/2}		
socket	4 single sockets			
lighting	light switch ^{1/2}			
	2 twin batten fluorescent light tubes with plastic covering 2x36w ¹			

Electrical Regulations:

- CE regulation
- EN61000-6-3:2007
- EN61000-6-1:2007
- UL1581
- AS/NZS5000.2:2006
- VDZ0295/IEC228

earthing: - universally usable grounding terminal:

- On both short sides in the floor frame of each corner a drill hole with a diameter of 10 mm is prepared for the fixture of the grounding terminal.
- The fitting of the grounding terminal is undertaken with a screw M10 with a self-cutting screw thread. The positioning of the screw is carried out in the factory on a suitable spot of the cabin.
- A grounding terminal and a four-wire connector are delivered with the container and need to be fitted by the customer on site.
- The protective earthing installation on site must be carried out by the buyer/hirer.

Wiring: - Fixed cabling depending on the panel configuration and the user^{1/2}

- Flexible cable system with plug contact and cables in full length^{1/2}

Safety advice: The cabins can be linked electrically at the external CEE plugs and sockets. For the decision how many units to connect electrically the expected constant current in the link circuits has to be considered. The commissioning has to be carried out by an approved electrician.

The manual for the assembly, start up, utilisation and maintenance of the electrical installations is delivered in the fuse box and needs to be followed!

Before connecting the cabin to the supplying low voltage grid all appliances (consumer loads) need to be switched off and earthing needs to be ensured (earthing feed cable and earthing connecting lines between the cabins need to be checked on potential equity and low Ohm level).

Attention : The supply- and connection cables are made for an operating voltage of max. 32 Ampere. These aren't secured with a overcurrent protection device. The connection of the cabins to the external electrical power supply only may be undertaken by an authorised specialist company.

Before using the cabin (modular building) for the first time the effectiveness of the protection measures for the fault protection need to be checked by an authorized specialist company.

- ③ Cleaning with a high-pressure cleaner is FORBIDDEN.
The electrical equipment of the cabin may not be cleaned by a direct water jet under any circumstances.
- ③ If the containers are delivered into areas with increased lightning activity further measurements have to be taken under account to prevent overvoltage depending on the country specific rules.
- ③ In case machines or appliances with high starting current peaks are used (according to the manual of the respective appliances) adequate RCD/MCB must be used.
- ③ The electric fittings of the cabins are designed for minimal vibration exposure. If the exposure is higher measurements need to be taken depending on country specific rules.
- ③ The cabins are designed for areas with little seismic activity. If the cabins are used in areas with higher seismic activity, the country's national regulations are valid and the equipment needs to be adjusted accordingly
- ③ The choice of the external linking cables of the cabins has to suit the country's national technical regulations.
- ③ The cabins have to be secured against thermal overload with a type gL fuse or gG with max. IN = 32A.

4 Miscellaneous

4.1 Transport height

The office cabins can also be delivered as flat pack. Standard packet height 648mm. Four cabins stacked on top of each other have the same external dimensions as a fully assembled cabin.

TP package height (only for office cabins and depending on equipment):

- 648 mm - standard with CAH 2,591mm 8 pieces / truck

4.2 Construction/Assembly/Statics/Serviceing

General information :

Each individual cabin must be placed on foundations provided on site (e.g. wood, concrete) with at least 4 points of support for 10' cabins, 6 points of support for 16' or 20' cabins (attachment 6.5) and 8 points of support for 30' cabins (attachment 6.6). The dimensions of the foundation has to be adapted to local circumstances, norms and frost line, under consideration of the local soil condition and the maximum possible loads. The levelness of the foundation is a precondition for a smooth assembly and the failure-free standing of the entire construction.

During set up or placement of the cabin (constructions), maximum permitted loads and regional conditions (e.g. snow loads) must be taken into account.

Possible combinations of several cabins:

Individual cabins can be selectively configured next to, behind, or on top of each other, while bearing in mind the structural indications and the max. permitted loads. For one-level (ground level) constructions, the cabins may be placed arbitrarily and without restriction regarding quantity. For two- and three-storey buildings, the combination possibilities presented in appendix 6.1/ 6.2 (10', 16' and 20' cabins) or in 6.3/ 6.4 (24' and 30' cabins) must be followed. In case the cabins are linked in other combinations than presented in appendix 6.1/ 6.2 (10', 16' and 20' cabin) or appendix 6.3 / 6.4 (24' and 30' cabin), we can give no statement about the max. permitted wind load. We categorically recommend keeping a distance from such a practice or to carry out additional anchoring (bolting, supports etc.) with the approval of authorised experts.

The containers must be stacked exactly on top of each other. The special ARK-stacking cones must be used.

The container roof is not suitable for storage of goods and materials.

The ARK assembly manuals need to be followed. These can be obtained as a registered trading partner on www.ArkPrefab.com or can be forwarded on request.

The service notes of ARK need to be respected.

Sanitary fittings:

After connecting with the water supply the entire water circulation should be checked once more on water tightness (possible loosening during transport).

ARK denies any warranty for damages, which may result from placement contrary to the principles.

Liability for consequential damages is excluded on principle.

4.3 Handling

- with fork lift
 - with crane: angle between lifting rope and horizontal line must be at least 60 °
- Due to construction and design, handling with spreader is not allowed.

4.4 Certification

ABS Lloyd 'type test'

4.5 Paint

Paint system with high weather and aging durability, suitable for city and industry atmosphere.

Wall panels: 45 µm coating thickness

frame: 20-40 µm grounding

40-50 µm top coat

The painting of above mentioned parts is carried out with different types of production. These achieve shades similar to RAL. We do not accept liability for colour variations in comparison with the RAL tones.

5 Water installation

supply supply using ½", ¾" or 1" pipe, sideways through cabin wall

internal: - PPR pipework for ingoing water

- PVC pipework for outgoing water

operating pressure max. permitted operating / connection pressure - 4 bar warm
water preparation: by using electric boilers, depending on the cabin type (80, 150 or
300² liters)

ATTENTION:

The boilers with 80/150/300 l capacity are suitable for a max. operating pressure
of 6 bar. A higher water pressure is reduced with an appropriate pressure reducing
valve!

discharge: The waste water is collected via PVC pipes, DN 50, DN 100 (external diameter Ø
50, 110 mm) and discharged sideways through the cabin wall. The discharge of
the waste water into an authorised sewage network has to be undertaken by the
buyer/hirer in compliance with the official regulations for waste and faecal water.

Further technical information upon request.

Regulatory and legal requirements for the storage, placement and usage of the
containers must be considered by the buyer/hirer.

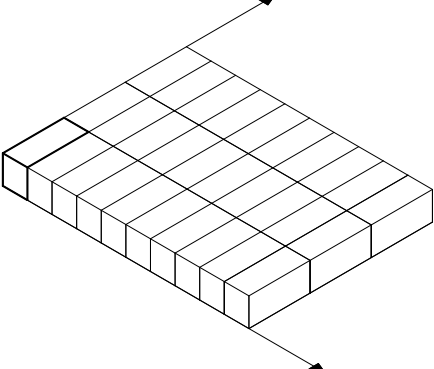
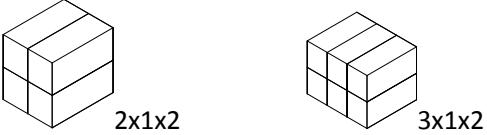
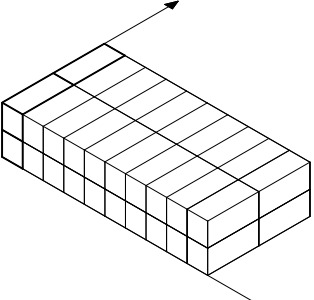
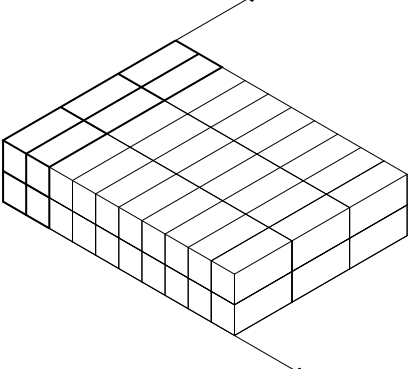
The suitability of the container (modular building) and of the possibly also
supplied options (e.g. stairs, air conditionings etc.) needs to be examined by the
purchaser / hirer for the intended purpose.

Subject to technical alterations.

6 Appendix

6.1 Arrangement options for 10',16',and 20',max.external height 2.810m

Number of cabins (S x L x H):Shorts side(S)x Long side(L)x Height(H)

1-storey		<p>The cabins can be linked at will or positioned individually,without restriction to the size of rooms.</p>
Single line modular buildings(quantity of long sides=1)		
		<p>The illustrated two - storey modular buildings an be linked at will or positioned individually. The bracing outer walls must not be removed(maximum room size therefore 3x1 cabins). Position of the required bracing outer walls(bracing outer walls shoen with dashed lines;inside rooms blank)</p>
Multiple rows modular buildings (quantity of long sides ≥2)		
2-storey		<p>From a minimum size of 2x2x2 cabins an extension of the building in all direction is possible ,without restriction to the size of rooms.</p>
		<p>From a minimum size of 3x3x2 cabins an extension of the building in all direction is possible ,without restriction to the size of rooms.</p>

3-storey	<p style="text-align: center;">3x1x3 3x2x3</p>	<p>The illustrated three - storey modular buildings can be linked at will or positioned individually. The bracing outer walls must not be removed(maximum room size therefore 3x2 cabins).</p> <p>Position of the required bracing outer walls(bracing outer walls shown with dashed lines;inside rooms blank)</p>
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6.2 Standard foundation plan for 10',16',and 20' cabin

Each individual cabin must be placed on foundations provided on site with at least 4 points of support for 10' cabins, 6 points of support for 16' or 20' cabins. The smallest foundation size is 30 x 30 cm, but dimensions of the foundation have to be adapted to local circumstances, norms and frost line, under consideration of the local soil condition and the maximum possible loads. These measures have to be undertaken by the buyer/hirer.

Cabin length(L); Cabin width(B)

For example: single unit		<p>LEGEND:</p> <p> Foundation points for 10' ,16' ,and 20' cabin</p> <p> Foundation points for 16' and 20' cabin</p>
For example: combination with 4 cabins	<p>When combining several cabins higher loads at the inner foundation points have to be considered – as illustrated.</p> <p>The support post must be used at an open long side joint .The support post may be positioned anywhere between the middle foundations on an additional foundation point.</p>	

6.3 Standard foundation plan for 24'and 30' cabin

Each individual cabin must be placed on foundations provided on site with at least 8 points

of support. The smallest foundation size is 30 x 30 cm, but dimensions of the foundation have to be adapted to local circumstances, norms and frost line, under consideration of the local soil condition and the maximum possible loads. These measures have to be undertaken by the buyer/hirer.

Cabin length(L); Cabin width(B)

For example: single unit		<p>LEGEND:</p> <p>■ Foundation points for 24' and 30' cabin</p>
For example: combination with 4 cabins	<p>When combining several cabins higher loads at the inner foundation points have to be considered – as illustrated.</p> <p>The support post must be used at an open long side joint .The support post may be positioned anywhere between the middle foundations on an additional foundation point.</p> <p>Additional foundation point for support post (only necessary with open long sides)</p>	

6.4 Handling instructions for 10',16'and 20' cabin Transpack cabins

1. The packets must only be lifted with a forklift or crane. The ropes need to be fastened to the upper cabin corners. The angle between the rope/chain and the horizontal line must be a minimum of 60° (picture 1).

Due to the construction and design, handling with a spreader is not possible!

2. Only single packets of the Transpack cabins are allowed to be lifted.

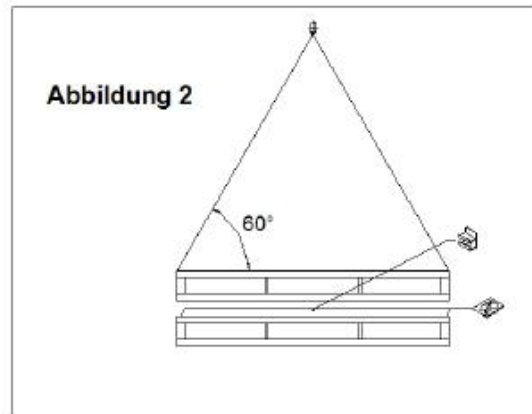
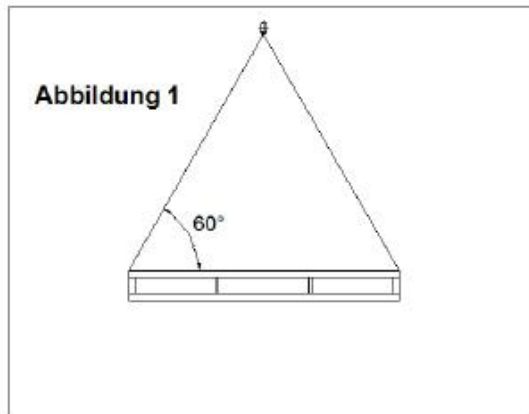
3. 4 pieces of stacking cones (in the corner casts) and 2 pieces of clamping wedges (1 piece on each of the long side roof sections) must be put between the individual packets (picture 2).

4. Do not place any extra weight on the top packet!

5. You must only stack max. 4 packets on top of each other.

Possible packet heights:

- 648mm - Standard with external cabin height 2,610 mm and 2,810 mm



6.5 Handling instructions for 24' and 30' cabin Transpack cabins

1. The packets must only be lifted with a forklift or crane. The ropes/chains must be fastened on the crane hooks screwed to the top frame. The angle between the rope/chain and the horizontal line must be a minimum of 60° (picture 1).

Due to the construction and design, handling with a spreader is not possible.

2. Only single packets of the Transpack cabins are allowed to be lifted.

3. 4 pieces of stacking cones (in the corner casts) and 4 pieces of clamping wedges (2 piece on each of the longside roof sections) must be put between the individual packets (picture 2).

4. Do not place any extra weight on the top packet!

5. You must only stack max. 4 packets on top of each other.

Possible packet heights:

- 648mm - Standard with external cabin height 2,610 mm and 2,810 mm

