

**Better
Shelter
.org**

Better Shelter 1.2
Product Information



About Better Shelter RHU AB

Better Shelter is a social enterprise that develops and provides temporary post-emergency shelters for people displaced from their homes due to armed conflicts and natural disasters. Through design, innovation and modern technology, Better Shelter works to create safer, more dignified temporary homes for millions of people worldwide. Better Shelter is a strategic partner of the IKEA Foundation and UNHCR, the UN refugee agency.

Introduction

The Better Shelter is a 17.5 m² modular post-emergency shelter for up to five persons, developed according to Sphere standards for humanitarian use. The structure's steel frame is securely anchored to the ground and clad with tough yet lightweight roof and wall panels. It includes four windows, four ventilation openings and a lockable door. A solar panel on the roof generates power to illuminate a built-in lamp, as well as power for the charging of electronic devices. The shelter is delivered in two flat packs including all components and necessary tools, and can be assembled by four people in five to six hours without the need for

electricity. The shelter can be adapted to suit specific contexts and applications. Modular design means sections can be added and removed to create different structures. Within a phased response context, the unit can be upgraded using local materials. It is easily maintained, and components can easily be replaced in the event of damage. It can be dismantled, moved and remounted. Better Shelter is a solution to large scale displacement in situations where only temporary structures are permitted and locally sourced solutions are not available. It offers the following benefits:

Durable



Three-year life span with a high strength steel frame.

Cost effective



Low cost structure flat packed for optimized transportation.

Safe and dignified



Achieves higher level of safety, security, dignity and privacy for displaced persons.

Flexible



Enables seamless planning, budgeting and implementation without unexpected costs.

Scalable



Straightforward delivery and installation. Requires no additional tools or machines and can be installed by unskilled labor.

The Product Specifications of the Better Shelter were developed by Better Shelter RHU AB in partnership with UNHCR and the IKEA Foundation to guarantee a modular shelter fit for human use in moderate climates, with appropriate outdoor life span, at a minimal cost.

The Product Specifications of the Better Shelter version 1.2 are generic and performance-based in order to ensure that detail solutions and material compositions can be developed and improved by manufacturers over time while still meeting the requirements.



Better Shelter 1.2

Weight and volume

Net weight (excluding packaging)	144kg +/-5%
Gross weight (including packaging)	160kg +/-5%*
Gross volume	1.14m ³ +/-5%*

*excl. pallet

Units per container

Shipping	
Container size	Number of units
1 twenty feet container DC (palletized)	17
1 forty feet container DC (palletized)	36
1 forty feet container HC (palletized)	48

Shelf-life

The shelter has a shelf life of three years when stored under normal dry, clean, ventilated warehousing conditions. The PV system battery has a shelf life of 6 months from pickup at the Better Shelter warehouse. The shelter packaging must be stored off the ground, on pallets and pallet racks.

Packaging

The shelter is delivered in two packages: A and B, designed to be opened in the order of assembly.

Package A contains the tools and ground template, foundation, roof frame and roof panels.

Package B contains wall pipes, wall panels, floor, and openings.

Package weight and dimensions*			
Name	Outer dimensions (LxWxH) [mm]	Weight [kg]	Volume [m ³]
Box A	2020x1090x230	87	0.51
Box B	2000x1090x290	73	0.63
Total	2020x1090x520	160	1.14

*Note that weight and dimension may vary +/- 3%.

Assembly instructions and content list

A set of graphic assembly instruction manuals (incl. content list) showing step-by-step set-up information drawings are supplied with every unit.

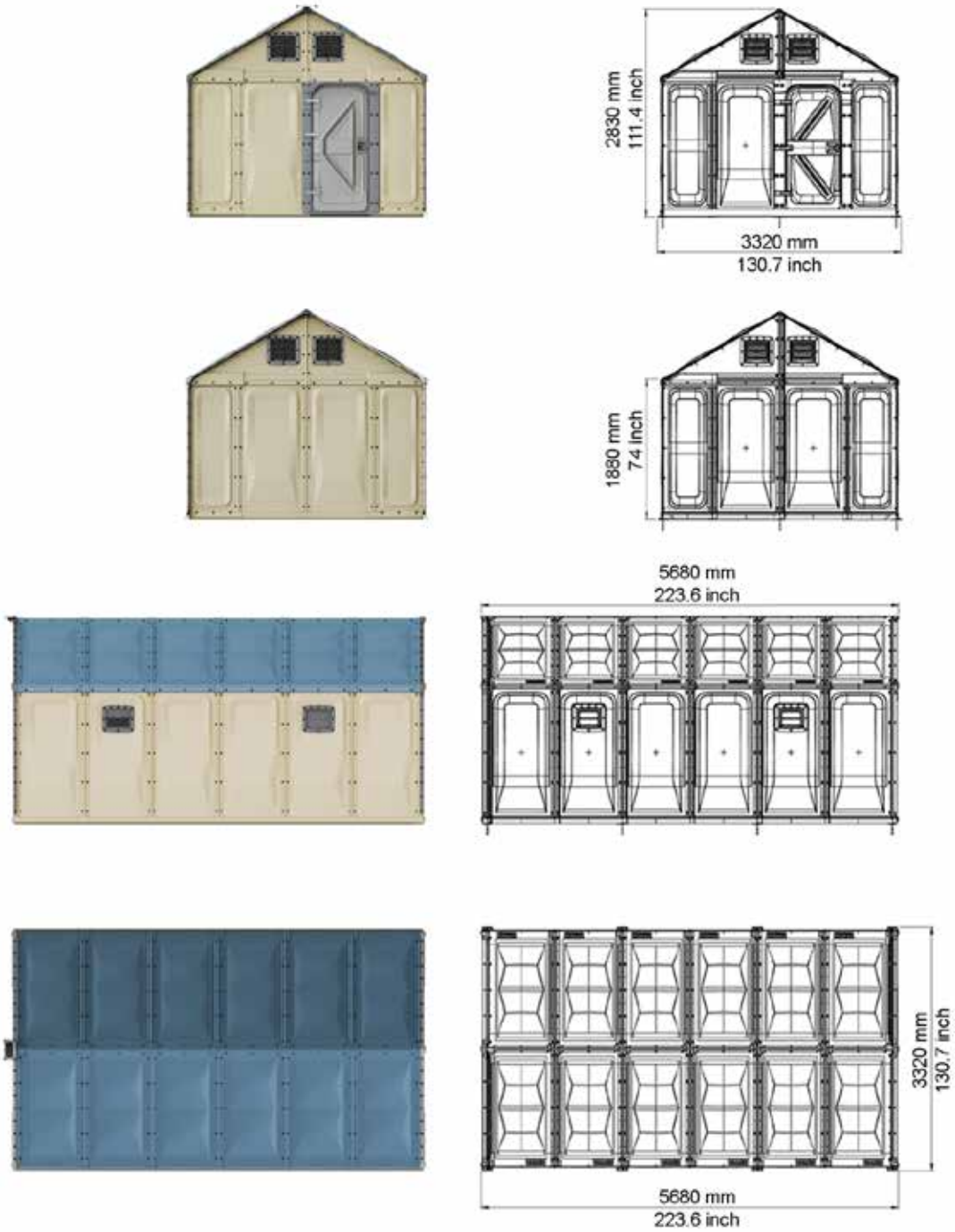
Spare part kit

A spare part kit is supplied with every unit.

General description

Dimensions		
Floor size	17.5 m ²	188 ft ²
Min internal height (eave level)	>1.8 m	>5.9 ft
Max internal height	>2.6 m	>8.5 ft

General description *continued.*



Front, rear, side and top view.

Technical specifications

The specifications of the Better Shelter are described below according to technical requirements split in six parts as follows:

1. General Specifications
2. Frame
3. Envelope
4. Openings
5. PV panel and lamp
6. Accessories

1. General specifications

Safety	
Fire and flammability protection: safe escape time and safe distance between units	
Safe escape time	Minimum 2 minutes escape time.
Safe distance between units	5 m distance between units is recommended at winds of 10m/s.
Overall strength of the structure	
Resistance to wind loads	
Full system	Up to 28m/s or 101km/h. Actual performance depends on building configurations, the quality of the build, the anchoring or other mounting method used, as well as location and terrain.
Resistance to snow loads	
Frame	≤ 10.5 kg/sqm
Resistance to point loads	
Full system	Passes 50 kg point load test on roof panel
Resistance to impact loads	
Full system	Passes 50 kg pendulum test on wall panel
Resistance to solar/UV load	
Panel	Passes accelerated UV weathering test, with adequate strength after 2700 hours of exposure.

Health and Comfort

Resistance to water and moisture

Resistance to rain

Full System	Passes artificial rain test (no leakage).
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Comfort

Ventilation and air exchange

Full System	4 ventilation and 4 window inlets enable an air exchange of more than 35 m ³ /h/person
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Thermal resistance

Panel	>0.08 m ² K/W
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Insect and vector control

Openings	Mosquito nets on all openings to prevent mosquitos and insects from entering.
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Implementation

Assembly

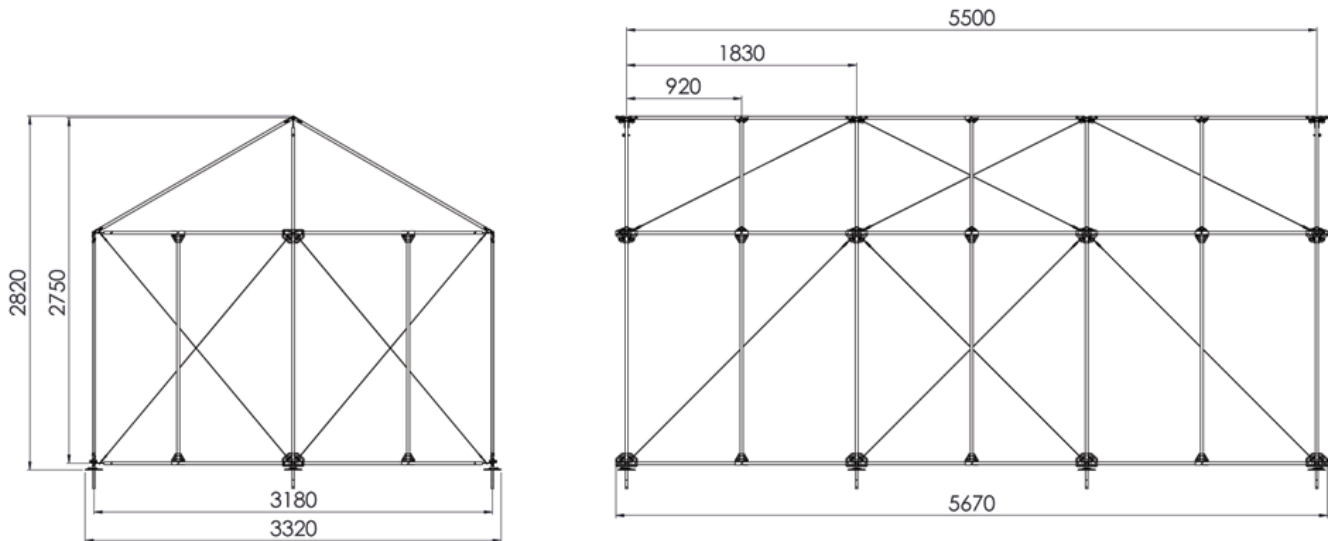
Full system	Assembly takes 5-6 hours by 4 trained people.
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Tools	Hammer, drive steel for ground anchors, drive steel for ground pipe, puncher (all included).
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Frame.

2. Frame



Graphical reference – frame [dimensions in mm].

The frame is the unit's load bearing structure. It is made from galvanised, high-strength steel and is modular, self-supported and intended to be used with the unit's panels. Foundations, frame and columns are fastened together with connectors, enabling a rapidly-assembled yet robust construction reinforced by metal wire bracings.

Foundation and ground anchors



Foot anchor system.

The shelter has a rectangular frame foundation made out of pipes and metal connectors which connects to the ground at a total of 10 points. These connections to the ground consists of;

A **GROUND PIPE** to prevent horizontal movement of the shelter. This pipe will be placed into the soil for approximately 250mm

A **GROUND PLATE** to prevent the shelter from sagging into the earth. This plate is 140x140mm in size.

A **GROUND ANCHOR** to prevent the shelter from uplift. The ground anchor, being hammer into the soil, uses a cone of soil on top of it as counterweight and is fixed to the structure with a 700mm long metal wire.

Due to the combination of these parts the shelter can take forces from wind and for example snow acting on it.

3. Wall and roof panels

Panels

The envelope comprises four types of panels: roof panels, wall panels, top gable panels (left and right) and lower gable panels. The overlapping panels are attached to the frame with plastic brackets, bolts and nuts, and at the gables with gable profiles. The panels are produced from a 5mm thick polyolefin sheet. Please note that the panels have varying thickness along the cross section.

Ground sheet

The shelter is delivered with a tarpaulin sheet serving as a floor. The sheet is 5920x3620mm, and is large enough to allow for it to be fixed to the wall panels.



Ground sheet.

4. Openings

The shelter is fitted with openings to provide easy entry/exit as well to create a safe, healthy and comfortable indoor environment.

Door



Door and frame.

The door system comprises a doorframe, door canopy, door leaf and hinges to connect the door leaf to the doorframe. The door system is delivered pre-assembled (except the door canopy), and can be mounted onto the frame on any of the walls (except at a corner panel location) with the same fastening methods as the panels. The door can be closed with a sliding bar, accessible on both sides of the door

Door specifications

Dimensions (LxW)	Leaf 1717x744mm / Frame 1888x1056mm
Material composition for door leaf, canopy and frame	UV stabilized polymer
Material composition for hinges	Galvanized steel or equivalent
Mosquito net	Polyester/Polyethylene or similar net. 156 holes / inch ²

Window



Window with hatch.

The shelter has four window systems positioned at the top of the wall panels in pre-cut openings. The windows comprise an outer frame, a hatch that can be tilted and opened, and a mosquito net. To achieve the best airflow, the windows should be placed opposite each other (two on each long side).

Window specifications

Outer dimensions (LxW)	448x381mm
Effective open window area	0.062m ²
Material composition for ventilation frame and hatch	UV resistant polymer
Material composition for mosquito net	Polyester/Polyethylene or similar net. 156 holes / inch ²

Ventilation



Ventilation inlets.

The shelter has four openings positioned on the top gable panels in pre-cut openings. The ventilation comprises an outer frame, a slide-open hatch and one mosquito net. To achieve the best ventilation flow, the openings should be kept open.

Ventilation specifications

Outer dimensions (LxW)	410x446mm
Effective ventilation area	0.064m ²
Material composition for ventilation frame and hatch	UV resistant polymer
Material composition for mosquito net	Polyester/Polyethylene or similar net. 156 holes / inch ²



Window with hatch and mosquito net.

5. PV system



Lamp and solar panel.

The unit includes an LED lamp, a solar panel, adapters for charging of low voltage devices (e.g. mobile phones) and fixation to assemble the solar panel to the shelter. The LED lamp should be charged before first use.

Solar panel specifications

Description	Value
Solar panel type	Poly Crystalline
Operating / storage temperature	-10 to 50°C
Maximum rated power	2.5 Wp
Power cable length	5 m

LED lamp specifications

Description	Value
Light output (when fully charged, light only)	>6hrs at 170lm >12hrs at 85lm >48hrs at 20lm
LED colour temperature	Warm white 5000k typical
Ingress Protection (IP)	IP 65
Operating / storage temperature	-10 to 50°C
Battery type	Lithium Ferro Phosphate
Battery cycle life	>2000 cycles
Battery shelf life*	6 months
Mobile phone charger port	5 V, 400 mA \pm 10 mA

*from pickup at Better Shelter warehouse

6. Accessories



Assembly tools.

The **PLASTIC PUNCHER** can be used during building and maintenance, and if alterations or repair require new or extra holes for connection points in the panels. Two pieces are included.

The **HAMMER** is used for hammering the drive steel and the ground anchor drive steel into the ground.

The **DRIVE STEEL** is used to pre-punch the ground to enable insertion of the ground pipes.

The **GROUND ANCHOR DRIVE STEEL** is used for hammering the ground anchor down into the soil to a sufficient depth.

The **GROUND TEMPLATE** is used to indicate the position of each ground anchor.

REACH and RoHS

The product does not contain any REACH or SVHC substances and is RoHS compliant.

All materials used in the unit should be disposed in accordance with local legislation and as stipulated by the responsible authority. It is the operational organisation's responsibility to follow guidelines and legislation to allow local government to dispose of waste.



Shelter interior.



Packaging.

7. Fire safety guidelines

The Better Shelter is a temporary, one-room post-emergency shelter developed for use in humanitarian response.

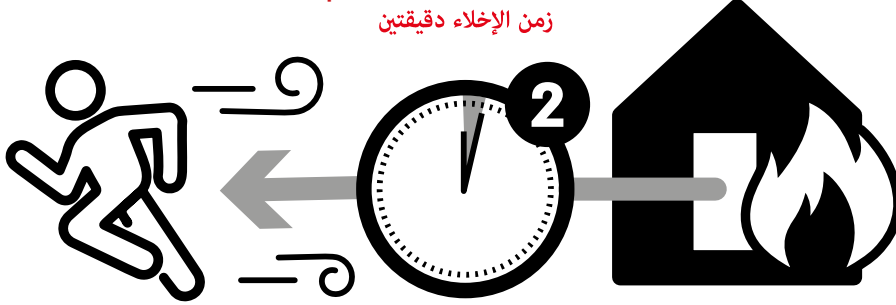
The structure is made of materials with fire retardant properties. However, like any shelter or building construction, this does not make it completely fireproof. Would the shelter be exposed to an intense fire (e.g. a cooking fire placed inside or too close to the unit/ ignitable interiors) over an extended period of time, it is likely to catch fire. Laboratory tests have demonstrated that residents have two minutes to escape the unit in the event of an interior fire. Real-life escape time is subject to the fire source, the amount, layout and occurrence of combustible objects inside and/or outside the unit. The following minimum fire preventions are required:

- Keep all flame- and heat sources away from walls, roof and floor. Carefully assess fire risks when lighting and using stoves, lanterns and heaters. Never refuel a stove, lantern, or heater inside. Do not heat or cook food on an open-flame inside or in close proximity of the unit. Combustion consumes oxygen and can produce carbon monoxide, which could lead to serious injury or death.
- Do not smoke inside the unit.
- Do not store fuels or any highly flammable material inside the unit.
- A minimum distance of 5 meters is required between units. As a safety measure to lower the risk of flames and heat spreading from one shelter to surrounding units in case of a fire. Insufficient distance between units increases the risk of personal injuries and casualties in case of a fire. Note: The safe distance between shelters depends on the source of the fire, the amount of combustible interior items (e.g. mattresses and furniture), wind speed and direction as well as the ignitability of surrounding objects (e.g. other shelters, garbage or dry bushes and trees). Large amounts of combustible interior objects, strong winds or highly combustible surrounding objects will increase the risks of unit-to-unit fire spread.
- Consult local fire safety authorities and their regulations before planning a site or installing the units.

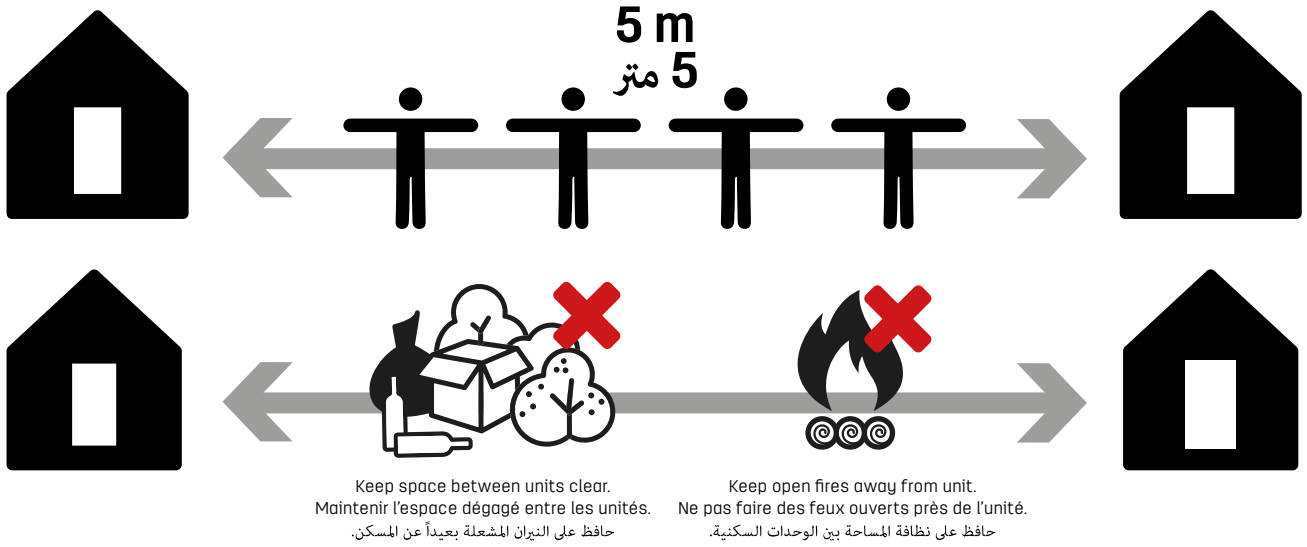
Each shelter is equipped with a graphic manual on fire safety guidelines.

Fire safety guidelines

2 minute escape time.
Temps d'évacuation de 2 minutes.
زمن الإخلاء دقيقتين



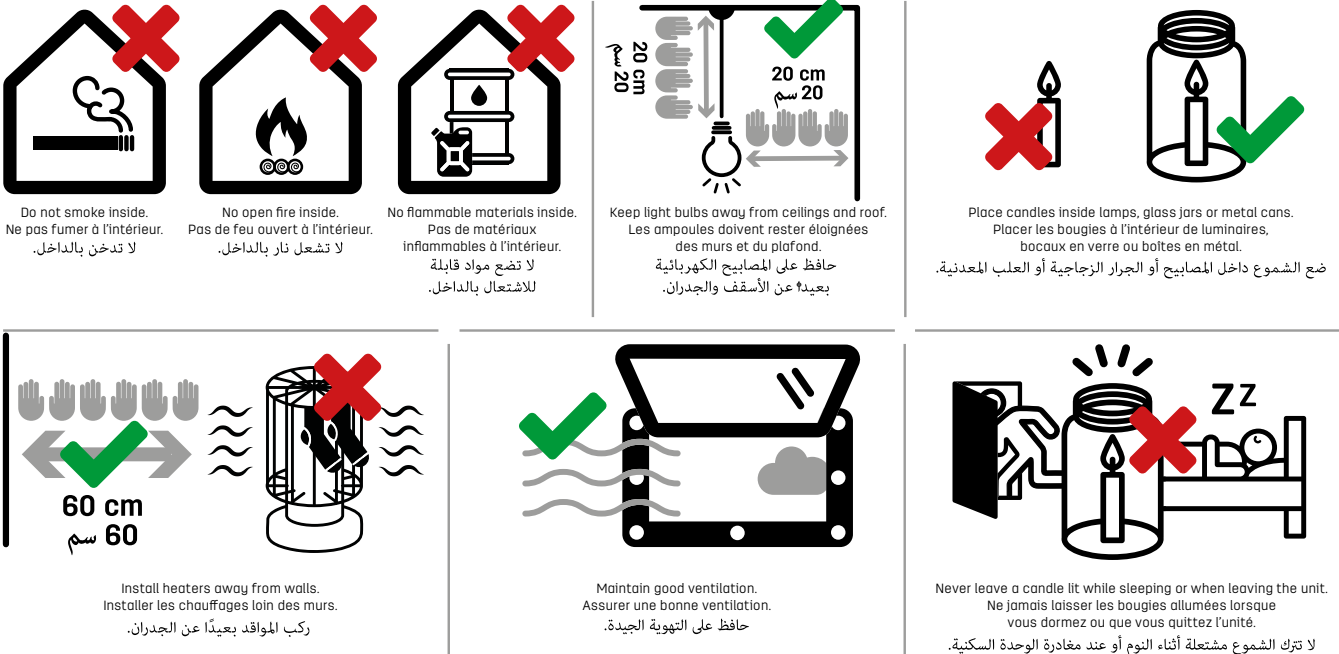
Prevention outside and around unit



Keep space between units clear.
Maintenir l'espace dégagé entre les unités.
حافظ على النيران المشتعلة بعيداً عن المسكن.

Keep open fires away from unit.
Ne pas faire des feux ouverts près de l'unité.
حافظ على نظافة المساحة بين الوحدات السكنية.

Prevention inside unit



Do not smoke inside.
Ne pas fumer à l'intérieur.
لا تدخن بالداخل.

No open fire inside.
Pas de feu ouvert à l'intérieur.
لا تشعل نار بالداخل.

No flammable materials inside.
Pas de matériaux inflammables à l'intérieur.
لا تضع مواد قابلة للاشتعال بالداخل.

Keep light bulbs away from ceilings and roof.
Les ampoules doivent rester éloignées des murs et du plafond.
حافظ على المصابيح الكهربائية بعيداً عن الأسقف والجدران.

Place candles inside lamps, glass jars or metal cans.
Placer les bougies à l'intérieur de luminaires, bocaux en verre ou boîtes en métal.
ضع الشموع داخل المصابيح أو الجرار الزجاجية أو العلب المعدنية.

Install heaters away from walls.
Installer les chauffages loin des murs.
ركب المواقد بعيداً عن الجدران.

Maintain good ventilation.
Assurer une bonne ventilation.
حافظ على التهوية الجيدة.

Never leave a candle lit while sleeping or when leaving the unit.
Ne jamais laisser les bougies allumées lorsque vous dormez ou que vous quittez l'unité.
لا تترك الشموع مشتعلة أثناء النوم أو عند مغادرة الوحدة السكنية.



Assembly manuals.



Door lock.



Components.



Ground anchor.

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Better Shelter is a social enterprise based in Sweden. We develop and provide post-emergency shelters for humanitarian emergency response and contingency planning in collaboration with UNHCR and the IKEA Foundation.



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