

# REFUGEE HOUSING UNIT

CREATING BETTER HOMES FOR EMERGENCY RELIEF AND BEYOND

*The Refugee Housing Unit RHU is an innovative shelter resulting from a partnership between UNHCR, the IKEA Foundation and the Refugee Housing Unit, designed to improve the living conditions of people displaced by natural disasters and conflicts.*



REFUGEE  
HOUSING  
UNIT

 **UNHCR**  
The UN Refugee Agency

IKEA Foundation  


## THE REFUGEE HOUSING UNIT



The Refugee Housing Unit (RHU) is composed of three individual parts – RHU Frame, Panels and PV System. All RHU components can be assembled on site without additional tools and equipment.

Prototypes have been tested and evaluated by UNHCR with respect to the personal, social and cultural expectations of the people that it aspires to rehabilitate, the environment that it is designed for, and the critical logistical and financial aspects of a large scale production and deployment, so as to deliver a dignified and viable end user experience.

Currently the design and engineering is finished and will be made ready for production.



FRAME



PANELS



PV-SYSTEM

### Modular Design

The Refugee Housing Unit is composed of a modular design to make it a viable solution in the most shifting contexts. The RHU Frame is filled with pre-manufactured panels to create a temporary home. An included Photo Voltaic system can be attached to provide energy for the supplied light or to charge a mobile phone. Moreover, many Refugee Housing Unit• can be connected together to create bigger structures suitable for larger families or other functions. Additional winter and hot climate kit• are under development to make the Refugee Housing Unit even more suitable for different climate types.

### Better Living Comfort

The design of the RHU was derived using the regulated European building codes. As a consequence, it provides a high standard of living comfort and safety. The spacious volume offers good ergonomics with full standing height, which also provides useful storage space.

### Logistic Friendly

The RHU is optimised to meet high volume production conditions and flat pack logistic demands required to be cost efficient in the long run. Due to the materials and processes used, manufacturing and packaging of the RHU is suitable for global production.

## SPECIFICATIONS



Floor area	17,5m <sup>2</sup>
Windows	4 pieces (620cm <sup>2</sup> each)
Ventilation openings	2 pieces (800cm <sup>2</sup> each)
Door	1 piece (740x1690mm)
Sphere compliant	Yes
Minimum ceiling height	1840mm
Expected lifespan*	3 years
UV	2700 UVA – 100% functionality
Wind speed (frame)	18 m/s (EC1)
Snow loads	10 kg/m <sup>2</sup> (EC1)
Modular	Yes
PV system	4h light/day and USB power
Package Weight	140 kg
Package Volume	1.04 m <sup>3</sup>
Package A	1960x1100x240mm (70kg)
Package B	1960x1100x240mm (70kg)
Pallet dimensions	1960x1100x140mm
Container 40 feet	36 RHU shelters
Container 40 feet HC	48 RHU shelters

*\*Expected lifetime without maintenance 1,5 years, with maintenance 3 years*



## REFUGEE HOUSING UNIT – A SOCIAL BUSINESS

The RHU is a groundbreaking example of collaboration, technical innovation and practical application. Tested by some of the worlds most vulnerable families, putting their experience and needs at the heart of the development process.

The RHU is marketed by Refugee Housing Unit RHU AB. Our mission is to develop and provide innovative housing solutions for the millions of people who lose their homes during conflicts and natural disasters – at prices so low that as many people as possible will benefit from them.

Refugee Housing Unit RHU AB is a social business. Every dollar we generate in profit is reinvested within our company or distributed to our philanthropic owner the Housing for All Foundation.



Above: Kobe Refugee Camp, Dollo Ado, Ethiopia

Below: Kawergosk Refugee Camp, Erbil, Iraq

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Refugee Housing Unit

Prototype Research & Development



The above illustration shows the RHU Frame, RHU Panels, RHU PV System and RHU Shade Net, and their respective packages


A Better Home

For Emergency

Relief and

Beyond

The Refugee Housing Unit (RHU) is an **innovative concept prototype** designed to improve the living conditions of people displaced by natural disasters and conflicts. It is composed of four individual parts – RHU Frame, RHU Panels, RHU PV System and RHU Shade Net. All RHU components can be easily assembled on site. The goal of the prototype is to evaluate it's performance with respect to the personal, social and cultural expectations of the people that it aspires to rehabilitate, the environment that it is designed for, and the critical logistical and financial aspects of a large scale production and deployment, so as to deliver a dignified and viable end product experience.

	
Dimensions	<b>5,14 m × 3,15 m × 2,74 m</b>
Area	<b>17,5 m²</b>
Height	<b>3,14 m</b>
5 people/unit	<b>3,5 m²/person (sphere standard)</b>

Modular design

A modular design makes the RHU a viable solution in the most variable contexts. The basic RHU Frame together with plastic sheeting creates a temporary shelter with the option to upgrade with local building materials or pre-manufactured RHU Panels, RHU Photovoltaic and/or an RHU Shade Net.

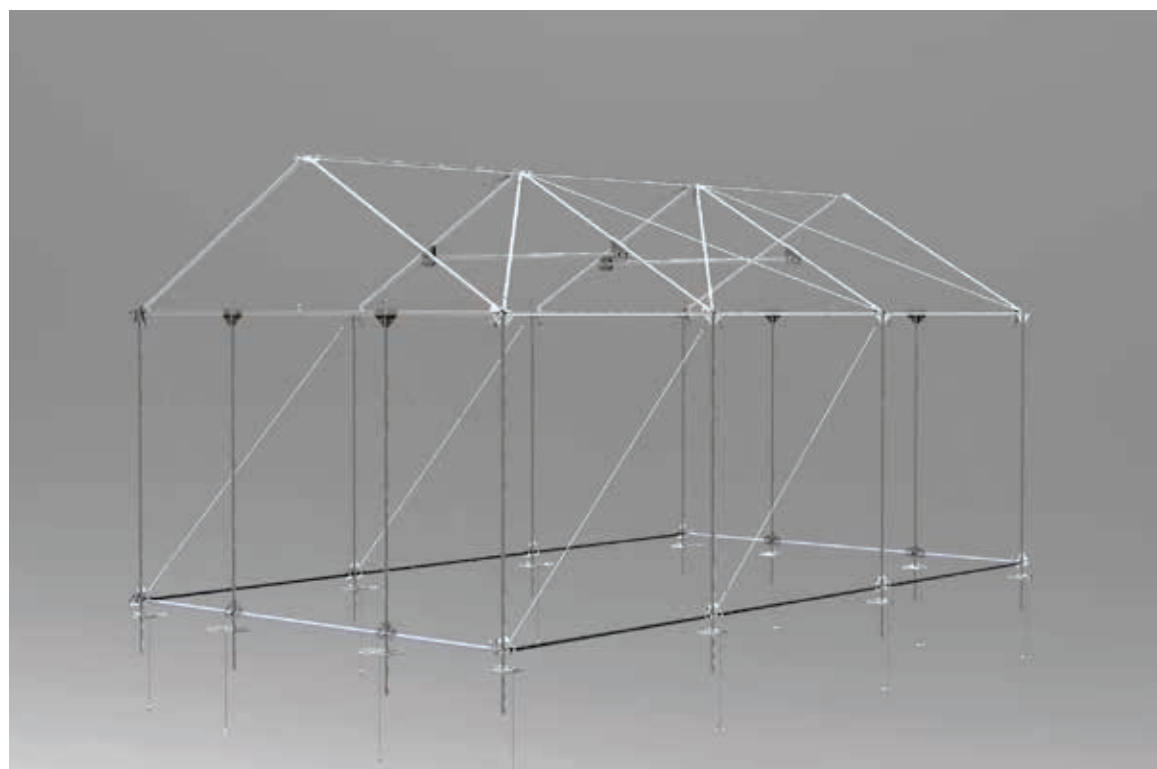
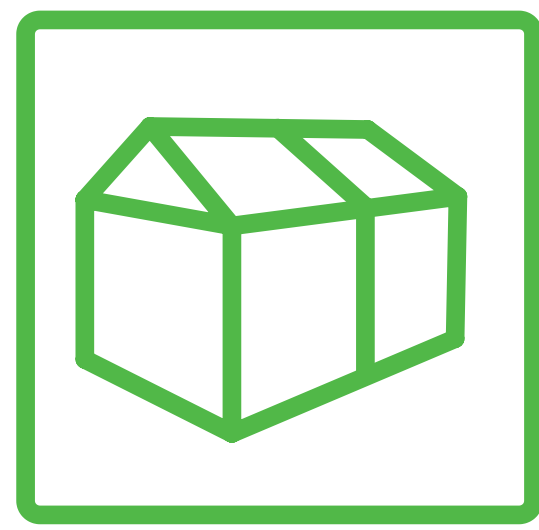
Better living comfort

The design of the RHU was derived using the regulated European building codes. As a consequence, it provides a high standard of living comfort and safety. The spatial volume is more than double that of the UNHCR family tent. The combination of the RHU Panels and RHU Shade Net creates a comfortable ambience inside.

Logistics friendly

The RHU is optimised to meet high volume production conditions and flat pack logistic demands required to be cost efficient in the long run. Due to the materials and processes used, manufacturing and packaging of the RHU is suitable for global production.

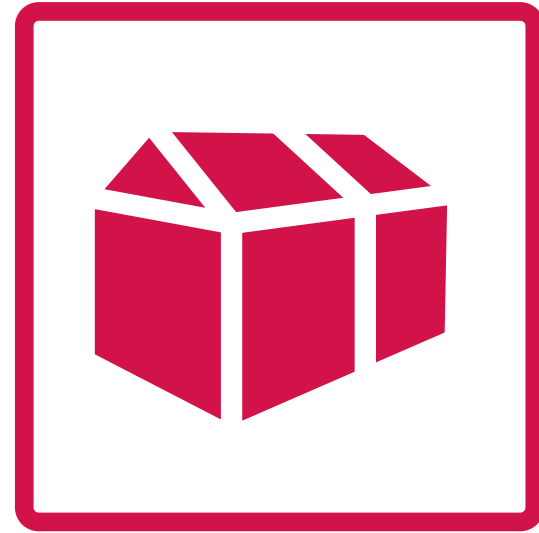
FRAME



The **RHU Frame** is a modular and expandable self-supported frame designed to be used with RHU Panels, plastic sheeting or locally sourced building materials in order to build an adequate shelter.

Weight	<b>30-45 kg</b>
Volume	<b>0,1 m³</b>
Assembly	<b>1 hour / 2 people</b>
Life span	<b>10+ years</b>

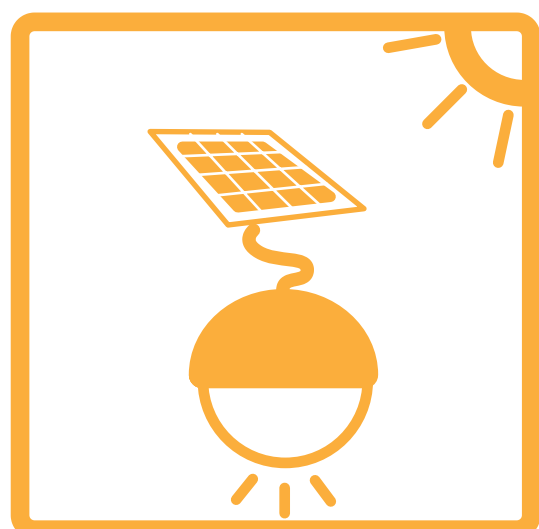
PANELS



The **RHU Panels** are modular wall and ceiling panels to be built on to the RHU Frame in order to quickly achieve a complete, durable shelter intended to last up to three years. The Panels can be fitted onto a RHU Frame in any size and be used to build shelters, warehouses, clinics and schools.

Weight	<b>85 kg</b>
Volume	<b>0,8 m³</b>
Assembly	<b>3 hours / 2 people</b>
Life span	<b>3 years</b>

PV-SYSTEM



The **RHU Photovoltaic (PV) System** consists of a solar panel and a portable LED light including rechargeable batteries and a USB power outlet. The solar panel can be integrated into the RHU Panel or the RHU Shade Net.

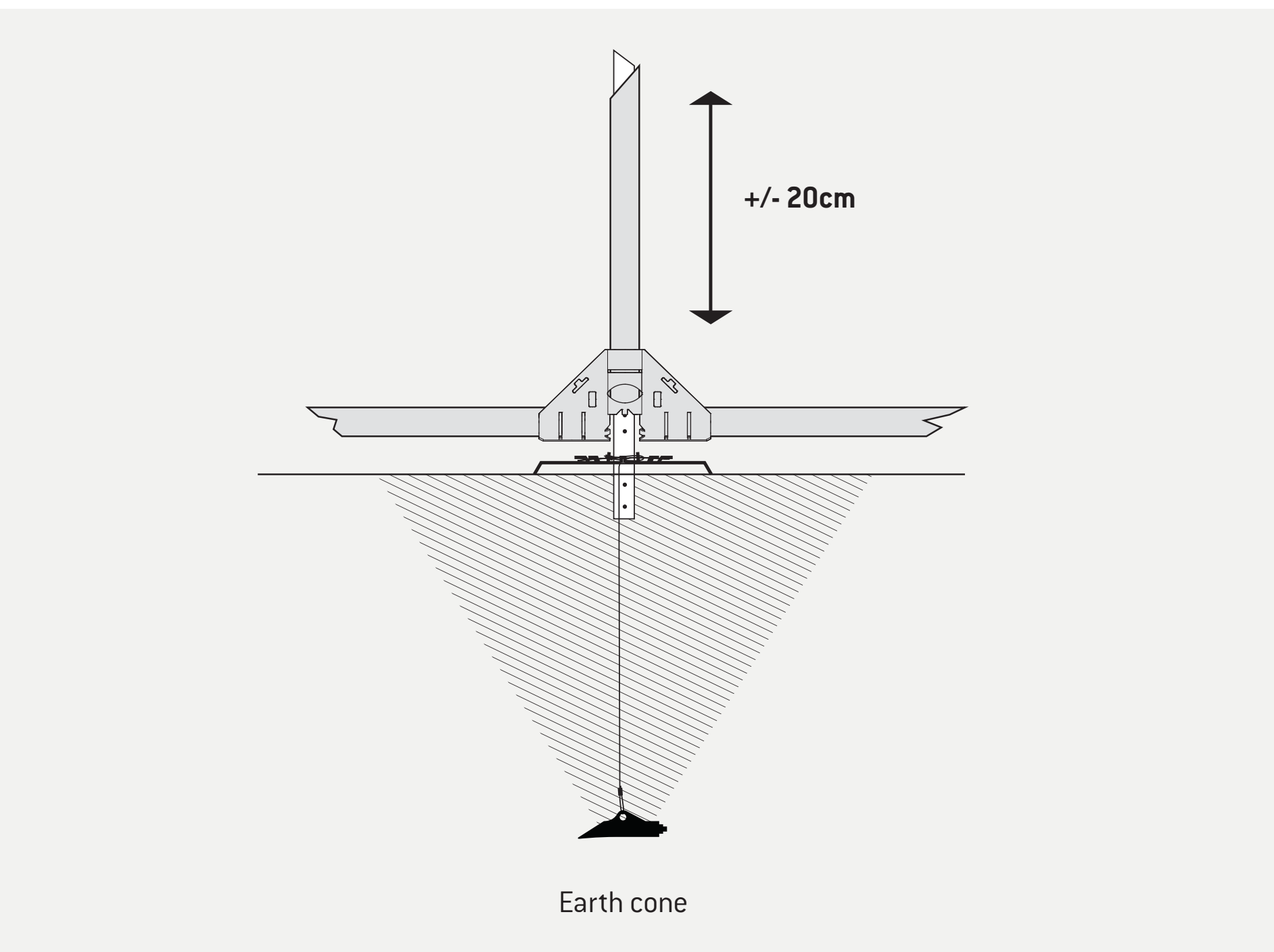
Weight	<b>0,75 kg</b>
Volume	<b>0,01 m³</b>
Assembly	<b>0 hour / 2 people</b>
Life span	<b>3 years</b>

SHADE NET

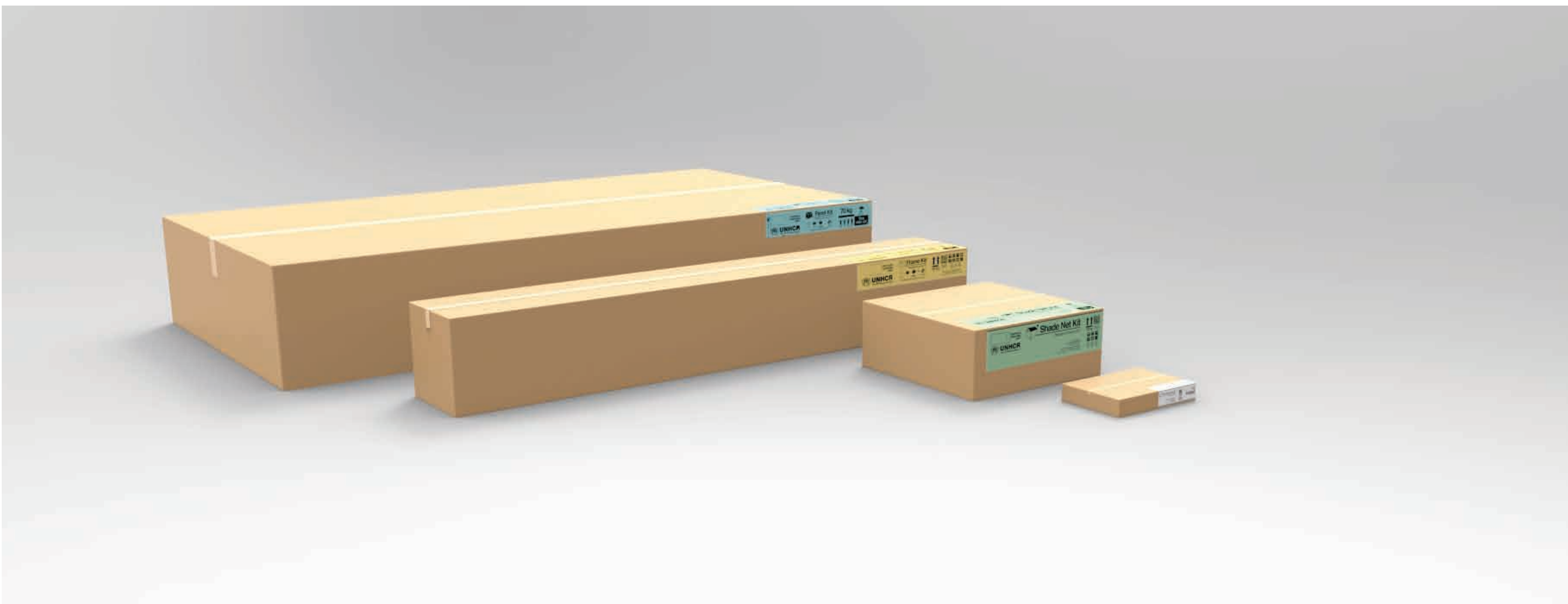


The **RHU Shade Net** is an external screen, which significantly improves indoor thermal comfort. During the day, the Shade Net's open structure provides 70% solar reflection and cooling. At night and in cold climates, the Shade Net helps reduce radiated heat loss.

Weight	<b>8 kg</b>
Volume	<b>0,02 m³</b>
Assembly	<b>1 hours / 2 people</b>
Life span	<b>3 years</b>



The **ground anchoring system** is designed to fit various ground conditions, from grabble and sand and clay to asphalt. The anchor is height adjustable, which allows the shelter to be built on uneven grounds or in slopes of up to 7 degrees. The concept involves a specially designed anchor which is driven and locked into the ground with a driver — no digging is required to lock it into position.



**Packaging** of the RHU is done in four separate packages which can be combined or used independently in order to respond to the shifting needs and budgets of relief operations. The total target weight of the shelter is 98 kg and the packing volume is 1.5 cubic meters.

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