## Folded Homes FAQs

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FOLDED HOMES FAQs

The Folded Homes® Frequently Asked Questions data base contains information about our shelters and our company. It is organized into a set of seven subject areas:

- Shelter Characteristics (SC)
- Assembly (A)
- Maintenance (M)
- Performance, Materials & Testing (PMT)
- Purchasing & Delivery (PD)
- Folded Homes LLC (FH)
- Production, Sales, & Distribution (PSD)

In each of these subject areas, the question titles are organized alphabetically.

- Access individual FAQs by clicking on their title listed under the subject areas in the Customer Support Web page.
- Or print out the entire FAQ data base by clicking on the print out link on the Client Support page of the website.
- You can get to the FAQ data base from anywhere on the website by clicking on the question icon.

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- FAQ FORMAT

Each FAQ title starts with the subject area abbreviation SC, A, M, PD, PMT, FH, or PSD showing where it is located followed by the topic that it addresses. For example

SC: WINDOW DIMENSIONS (TEKYURTS)

This FAQ title indicates that it regards a topic appropriate to Shelter Characteristics, and that specifically it answers the question “What are the window dimensions of a TekYurt?”

Our FAQs are updated from time to time. We only guarantee that a specific FAQ is accurate at the time it was created or updated. If you are using the PDF-file version of the FAQ data base, ensure that the version and date on the front page of the FAQ file is the same as the one available as a download from the website.

Each FAQ may include one or more bracketed “See” sections which link to other FAQs providing related information. Here is an example of a FAQ data base question with two such links.

WINDOW DIMENSIONS (TEKYURTS)
Folded Homes FAQs

TekYurt windows have dimensions identical to the openings of Dutch-door uppers. The window openings are 15.25" (38.74 cm) tall, by 17.75 inches (45.1 cm) wide. [See SC: DOOR DIMENSIONS (FH YURTS) and SC: DUTCH DOORS – WHAT ARE THEY?]

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- FAQ ACCURACY

Our FAQ data base grows as people ask Folded Homes® questions. If you have a question that is not answered in our FAQ data base or you need a clarification, submit your question by sending us an email at info@foldedhomes.com or use our web page Contact interface accessible by clicking on the Contact icon. We'll answer your question pronto and add your question to the FAQ data base.

Some FAQs relate to specific Folded Homes® shelters or families of shelters and are therefore shelter-specific. For example FAQs specific to TekYurts have the word ‘TekYurt’ in the title. Questions that apply to the entire family of Folded Homes® yurt shelters (i.e. both TekYurts and UtiYurts) have ‘FH Yurts’ in the title.

We learn from your experience with our shelters. It is essential to improving them. Please send us testimonials about our shelters, photos where possible, and suggestions for improvements. Thank you!

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SHELTER CHARACTERISTICS (SC)

10 QUESTIONS TO ASK ABOUT SHELTERS

There are a lot of shelter solutions out there. How do you go about choosing which one is right for your needs? What issues need to be considered? Some, like seasonal weather conditions are pretty obvious. But some are not so obvious. For instance, psychological issues are frequently ignored when considering the quality of temporary shelter. Factors like the quality of the local transportation infrastructure, equipment necessary for assembly, and long term shelter maintenance, all have a bearing on what shelter is most appropriate.

Here are a set of useful questions with linked answers.

1. Is it a true four-season shelter?
   - How does the shelter keep the interior warm in cold weather?
     [See SC: KEEPING WARM - WOOD-BURNING STOVES IN FH YURTS]
   - How does it keep the interior cool in hot weather?
     [See SC: KEEPING COOL - PASSIVE VENTILATION IN TEKYURTS & UTIYURTS]
   - Can the shelter be effectively insulated?
     [See A: INSULATING DOUBLE-WALLED FH YURTS]
   - Will the shelter keep you dry?
     [See SC: KEEPING DRY - ROOF DESIGN (FH YURTS)]
   - Will the shelter support a heavy snow load?
     [See PMT: SNOW-LOADING (FH YURTS)]
   - How will the shelter perform in extreme weather conditions?
     [See A: ANCHORING TO THE GROUND (FH YURTS), A: EXTREME WIND GUY-LINES (FH YURTS), M: ROOF LEAK REPAIR (FH YURTS)]

2. How is the shelter kept warm?
   - When local infrastructure has been disrupted, the chances are fire will be used to keep the shelter warm. Does the shelter easily and safely support the installation of a wood-burning stove or equivalent?
     [See A: CHIMNEY INSTALLATION (FH YURTS), and PMT: FIRE DANGER (FH YURTS)]
   - Can electric wiring be installed safely?
     [See A: WIRING FOR ELECTRICITY (FH YURTS)]

3. How configurable is the shelter?
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- Small rooms are easier to heat and generally support snow-loads better. How big is big enough?
  [See SC: AREA & VOLUME – HOW BIG IS A FH YURT?]
- Long term human habitation requires privacy. It requires a sense of security.
  [See SC: PRIVACY (FH YURTS), SC: LOCKING (TEKYURTS)]
- How can the shelter be organized to support different functions? Does the shelter need to support communal activities or services like clinics? Can you create multi-room structures?
  [See SC: MULTI-ROOM FH YURT STRUCTURES]
- Can the shelters be clustered in ways that make the shelter compound easily controllable? Can groups of shelters be used to help pen in animals?
  [See A: BUILDING ENCLOSED COMPOUNDS (FH YURTS)]
- Is the shelter configurable? Can you easily add additional units, windows, and doors?
  [See PD: FH YURT DUTCH-DOOR KIT, PD: FH YURT LONG-DOOR KIT, PD: FH YURT WINDOW KIT, and PD: FH YURT CONNECTOR KIT]

4. How easy is it to set up this shelter?
- Does this shelter require specialized tools, cranes, ladders, and equipment to install? Will electric power be required for assembly?
  [See FH: ORIGAMI ARCHITECTURE – WHAT THAT?, and A: ASSEMBLY – WHAT TOOLS ARE REQUIRED? (FH YURTS)]
- Will assembly require specialized knowledge or can anyone do it? Are assembly coordinators available if you need them?
  [See: A: TRAINING & DEPLOYMENT TEAM LEADS]
- How many people will it take to set up?
  [See A: ASSEMBLY TEAM (FH YURTS)]
- How long will it take to assemble it?
  [See A: ASSEMBLY TIME (FH YURTS), and A: DISASSEMBLY TIME (FH YURTS)]
- How must the assembly site be prepared? Will you have to create a level area or build a foundation?
  [See A: TERRAIN PREPARATION (FH YURTS)]
- How easy is it to move the shelter once it’s been assembled?
  [See A: MOVING THE ASSEMBLED SHELTER (FH YURTS)]

5. Will language be a barrier to setting up the shelter?
Folded Homes FAQs

- If the assembly manual is in English and the people putting up the shelter only speak Urdu, will there be a problem? Can a team lead demonstrate assembly without speaking the local language?
  [See A: ASSEMBLY MANUAL (LITEYURT INTERNATIONAL VERSION)]

6. How fault-tolerant is the shelter?

- People rarely read the assembly manual. They frequently assemble things imperfectly. Does the success of the shelter depend upon it being perfectly assembled, or does it have a high tolerance of assembly errors?
  [See PMT: FAULT TOLERANT DESIGN (FH YURTS)]

7. Can the shelters be manufactured quickly?

- What raw materials are required for production and how quickly can they be procured?
  [See PMT: EXTRUDED PLASTIC – WHAT’S THAT?]

- How quickly can the shelter be manufactured? If it’s complicated, it will take longer.
  [See PD: DELIVERY TIME – LARGE ORDERS (FH YURTS)]

8. How easy is it to deliver the shelter where it needs to go?

- In humanitarian crises, shelter frequently has to be delivered to remote locations with poor or non-existent roads. How heavy is the shelter?
  [See SC: WEIGHT (FH YURTS)]

- How efficiently can many shelters be packed together for long distance shipment by plane, boat or truck? Can people carry the shelter into a remote location, or pack it in by animal?
  [See PD: SHIPPING & STORAGE SIZE (FH YURTS)]

- Frequently delivery costs dwarf the cost of the actual shelter. When considering costs, consider ALL the costs of getting a shelter to the people that need it.
  [See PD: SHIPPING CONTAINER CAPACITY (FH YURTS)] [See PD: TRANSPORT REQUIREMENTS – GETTING IT THERE (FH YURTS)]

9. How long can you expect the shelter to last?

- The disruptions of humanitarian crises have a way of lasting longer than anticipated. How long will the shelter need to perform? Is this a short-term or a long-term shelter solution?
  [See PMT: LIFE EXPECTANCY (FH YURTS)]

- What are the degradation mechanisms that cause the shelter to fail over time?
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[See PMT: EXTRUDED PLASTIC – WHAT’S THAT?]

- Are there ways to control those failure mechanisms?

[See M: EXTENDING THE LIFE OF YOUR SHELTER (FH YURTS)]

10. What are the real costs associated with the shelter?

- Finally, your shelter selection decision has to make trade-offs between shelter requirements and shelter costs. You determine which shelter solution most effectively meets your requirements by balancing those requirements against the true costs of the shelter all the way from acquisition, through delivery, site preparation, assembly, and on-going maintenance of the shelters you are deploying.

[See PD: VALUE EQUATION – WHAT IS SHELTER PROVISION’S REAL COST?]

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3-D PROMOTIONAL BILLBOARDS & EVENT KIOSKS

The flat surfaces of FH Yurts can be decorated both inside and out with text, images, and designs. [See SC: DECORATION, CAMOUFLAGE, & PATTERNING (FH YURTS)] This coupled with their simple assembly and disassembly makes them attractive candidates for reusable interior or exterior convention and event kiosks.

A FH Yurt’s rectangular wall and triangular roof segments simplify the graphic design process. Contact Folded Homes® for further details.

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AREA & VOLUME – HOW BIG IS A FH YURT?

There are three members of the FH family of yurts; the LiteYurt, the UtiYurt, and the TekYurt. The twenty-sided TekYurt and UtiYurt have identical area and volume, while the ten-sided LiteYurt has different dimensions.

TekYurts and UtiYurts are double-walled circular shelters with a cone roof comprised of twenty wall and door panels and twenty roof panels. They have an inside diameter of 9 feet 5.5 inches (2.9 m), an interior area of 69.7 square feet (6.5 square meters), and an interior volume of 408 cubic feet (11.56 cubic meters.)

The widest outside diameter of the TekYurts and UtiYurts is 10 feet (3.05 m). Inside, the ceiling rises from 5 feet (1.5 m) above the ground at the walls, to 7 feet 4.5 inches (2.25 m) at the center of the ceiling.

DETAILS: The TekYurt and UtiYurt wall panels are each 5 feet (1.5 m) tall and 3 inches (7.62 cm) thick. They are 17.75 inches (45 cm) wide on the inside and 19 inches (48.3 cm) wide on the outside. Ground flaps extend out 9 inches (23 cm) from the outside edge of the TekYurt and UtiYurt walls. So, the outside diameter of the TekYurt and UtiYurt measured to the outside edge of each ground flap is 11 feet 6 inches (3.5 m). The outside diameter of the TekYurt and UtiYurt measured to the outside edge of
the walls is 10 feet (3.05 m).

The **LiteYurt** is a single-walled circular shelter with a cone roof comprised of ten 3’ (0.9144m) wide wall and door panels and ten roof panels. Both the walls and roof are supported by 4” deep (0.1016m) ribs that lend the structure rigidity. Measured to their outside seams **LiteYurts** have a **diameter** of 9' 8" (2.9464m) [9' 2" (2.794m) diameter at the middle of the flat panels] and a diameter of 9’ (2.7432m) between the interior ribs, The LiteYurt walls are 5’ (1.524m) tall, while the cone roof rises to 8’ 9" (2.667m) on the outside and 8’ 5" (2.54m) on the inside below the ribs. LiteYurts have an **interior area** of 69.25 square feet (6.4335 square meters), and an **interior volume** of 438 cubic feet (12.4028 cubic meters.)

**Ground flaps** extend out 8 inches (20.32 cm) from the outside edge of the **LiteYurt** walls. So, the **outside diameter** of the **LiteYurt** measured to the outside edge of each ground flap is 11 feet (3.3528 m).

[See SC: **HEADROOM (FH YURTS)**, SC: **DOOR DIMENSIONS (FH YURTS)**, and SC:]

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**YURT FEATURE COMPARISON ( LITEYURT, UTIYURT, TEKYURT)**

The following table compares the specification of the members of the Folded Homes Yurt family; **LiteYurts**, **UtiYurts**, and **TekYurts**.
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## Folded Homes (FH) Yurt Specifications & Comparison

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<th>UtilYurt</th>
<th>LiteYurt</th>
</tr>
</thead>
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<tr>
<td><strong>Wall &amp; Roof Construction</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single Panel</td>
<td>Not Applicable</td>
<td>Standard</td>
<td></td>
</tr>
<tr>
<td>Dutch Panel</td>
<td>Standard</td>
<td>Not Applicable</td>
<td></td>
</tr>
<tr>
<td>Wall Thickness (in.)</td>
<td>3&quot; (7.62 cm)</td>
<td>4 mil</td>
<td></td>
</tr>
<tr>
<td>Roof Thickness (in.)</td>
<td>3&quot; (7.62 cm)</td>
<td>4 mil</td>
<td></td>
</tr>
<tr>
<td>Number of Wall Panels</td>
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<td>Number of Roof Panels</td>
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<td><strong>Exterior Doors</strong></td>
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<td>Single Panel</td>
<td>Optional</td>
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<tr>
<td>Dutch Door</td>
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<td>Optional</td>
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<td><strong>Interior Doors (between rooms)</strong></td>
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<td>Optional Cut-outs</td>
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<td><strong>Insulation</strong></td>
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<td></td>
<td>Pack Wall &amp; Roof Cavities with Biomass</td>
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<td><strong>Multi-Room Capability</strong></td>
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<tr>
<td></td>
<td>Connect to 5 neighboring TekYurts and/or UtilYurts</td>
<td>Connect to 5 neighboring LiteYurts</td>
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<tr>
<td><strong>Overall Dimensions</strong></td>
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<td>Interior Area (sq ft)</td>
<td>69.7</td>
<td>69.26</td>
<td>66.45</td>
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<td>Interior Volume (cu ft)</td>
<td>408.2</td>
<td>393.6</td>
<td>343.2</td>
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<tr>
<td><strong>Diameter</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall (including Ground Flaps)</td>
<td>11' 6&quot; (3.5m)</td>
<td>11' 6&quot; (3.5m)</td>
<td></td>
</tr>
<tr>
<td>Wall Exterior Face (in.)</td>
<td>1'10&quot; (3.55m)</td>
<td>1'8&quot; (2.79m)</td>
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</tr>
<tr>
<td>Wall Interior Face (in.)</td>
<td>7'5.5&quot; (2.29m)</td>
<td>7'8&quot; (2.34m)</td>
<td></td>
</tr>
<tr>
<td>Inside Diameter (inside rib)</td>
<td>Not Applicable</td>
<td>7' (2.14m)</td>
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</tr>
<tr>
<td><strong>Height (not including metal roof vents)</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Top of Walls</td>
<td>6' (1.5m)</td>
<td>6' (1.83m)</td>
<td></td>
</tr>
<tr>
<td>Top of Roof Center (exterior)</td>
<td>7'4.5&quot; (2.26m)</td>
<td>7'9&quot; (2.367m)</td>
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<tr>
<td>Top of Ceiling Center (interior)</td>
<td>Not Applicable</td>
<td>7'5&quot; (2.29m)</td>
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</tr>
<tr>
<td>Top of Ceiling Center (below ribs)</td>
<td>7'5&quot; (2.29m)</td>
<td>7'5&quot; (2.29m)</td>
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</tr>
<tr>
<td><strong>Wall Panels</strong></td>
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<td></td>
</tr>
<tr>
<td>Height</td>
<td>6' (1.83m)</td>
<td>6' (1.83m)</td>
<td></td>
</tr>
<tr>
<td>Exterior Width (in.)</td>
<td>10' (3.05m)</td>
<td>10' (3.05m)</td>
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</tr>
<tr>
<td>Interior Width (in.)</td>
<td>17'7.5&quot; (5.365m)</td>
<td>16'7&quot; (5.07m)</td>
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</tr>
<tr>
<td>Thickness (in.)</td>
<td>3&quot; (7.62 cm)</td>
<td>4 mil</td>
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<tr>
<td><strong>Exterior Door Openings</strong></td>
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</tr>
<tr>
<td>Height</td>
<td>8'6&quot; (2.59m)</td>
<td>8'6&quot; (2.59m)</td>
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</tr>
<tr>
<td>Width</td>
<td>8'6&quot; (2.59m)</td>
<td>8'6&quot; (2.59m)</td>
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</tr>
<tr>
<td><strong>Interior Door Openings</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>75.25&quot; (191.1cm)</td>
<td>66&quot; (167.6cm)</td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td>17.25&quot; (43.8cm)</td>
<td>16&quot; (40.6cm)</td>
<td></td>
</tr>
<tr>
<td><strong>Windows</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>15.25&quot; (38.74cm)</td>
<td>15.25&quot; (38.74cm)</td>
<td>optionally hand-cut</td>
</tr>
<tr>
<td>Width</td>
<td>17&quot; (43.2cm)</td>
<td>17&quot; (43.2cm)</td>
<td>(custom dimensions)</td>
</tr>
<tr>
<td><strong>Ground Flaps</strong></td>
<td>9&quot; x 19&quot; (228cm x 48.3cm)</td>
<td>9&quot; x 19&quot; (228cm x 48.3cm)</td>
<td></td>
</tr>
<tr>
<td><strong>Weight (including shipping box)</strong></td>
<td>169 lbs. (76.6kg)</td>
<td>90 lbs. (40.9kg)</td>
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</tr>
<tr>
<td><strong>Shipping Dimensions</strong></td>
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</tr>
<tr>
<td>Number of Boxes</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Box Dimensions</td>
<td>78&quot; (198.1 cm) x 50&quot; (127 cm) x 7.5&quot; (19 cm)</td>
<td>Panel Box: 75.34&quot; (196.3 cm) x 51&quot; (129.5 cm) x 4&quot; (10.2 cm)</td>
<td>Chimney hardware Box</td>
</tr>
<tr>
<td><strong>Yurts per Shipping Container</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40' (12.2m) Shipping Container</td>
<td></td>
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<tr>
<td>Palleted (max 6/pallet)</td>
<td>55</td>
<td>199</td>
<td></td>
</tr>
<tr>
<td>Unpalleted</td>
<td>100</td>
<td>207</td>
<td></td>
</tr>
<tr>
<td>20' (6.1m) Shipping Container</td>
<td></td>
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<tr>
<td>Palleted (max 6/pallet)</td>
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<td>84</td>
<td></td>
</tr>
<tr>
<td>Unpalleted</td>
<td>48</td>
<td>52</td>
<td></td>
</tr>
</tbody>
</table>
CUSTOMIZING TEKYURTS & UTIYURTS

You can customize your TekYurt or UtiYurt by purchasing additional doors and windows and by connecting FH Yurts together to create multi-room structures using FH Yurt connectors. Each accessory kit comes complete with all the equipment you require for a single door or window customization, or to connect two TekYurts and/or UtiYurts together.

Considered clockwise from the upper left, the six yurt design examples shown are:

- The standard UtiYurt with a single Long-door and no window.
- The standard TekYurt with a single Dutch-door and one window.
- A TekYurt customized with two opening windows placed three panels to each side of the door. (This configuration requires one FH YURT WINDOW KIT.)

Windows shown as blue wall panels, doors shown in red and yellow.
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- A TekYurt with two doors placed across from each other, and two windows centered in the walls between them. (This configuration requires one FH YURT WINDOW KIT and a FH YURT DUTCH-DOOR KIT or a FH YURT LONG-DOOR KIT.)

- Two TekYurts connected together using a Connector Kit. Both TekYurts have four windows arranged around them. For safety, both TekYurts have a separate entrance to the outside. Folded Homes recommends that all FH Yurts that will be used for human habitation have a direct exit door from each room to the outside. [See SC: EMERGENCY EXITS (FH YURTS)] (This configuration requires a FH YURT CONNECTOR KIT, six FH YURT WINDOW KITS and a FH YURT DUTCH-DOOR KIT or a FH YURT LONG-DOOR KIT.)

- A TekYurt with a single door and five windows arranged around its circumference. (This configuration requires four FH YURT WINDOW KITS.)

The installation of each FH Yurt door or window requires installing a header (and in the case of doors a footer) part that connects the wall panels on each side of the door or window together. These header and footer parts maintain the integrity of the FH Yurt’s tension ring. So if, for instance, you want to put a door next to a window, or two doors or two windows next to each other, you must allow at least two wall panels between those openings. Since each FH Yurt is comprised of twenty wall segments, you can insert at most six doors and windows into any one FH Yurt. Since your TekYurt comes complete with one door and one window, you can add up to four more doors and windows. Since UtiYurts only include a single door they can be customized with up to five more doors and windows.

(DAMPNESS & HUMIDITY (FH YURTS))

The Extruded plastic walls of a FH Yurt are not porous. Humidity cannot pass through the plastic sheeting.

In cold conditions, if a FH Yurt is very tightly sealed and well insulated, water can condensate on the ceiling and walls simply from the presence of human body heat. Such condensation is not usually a problem because the FH Yurt, comprised of overlapping wall and roof segments, has small gaps through which air (but not water) can circulate. The 6” (15.24 cm) vent in the center of the roof provides adequate air circulation when that vent is not being used to vent smoke from the chimney of a wood burning stove. Where a wood burning stove has been installed, doors and windows can be cracked for additional ventilation if necessary. In fact they probably will need to be cracked because a little heat goes a very long way in an insulated FH Yurt.
So if you experience problems of condensation on the walls or roof of your FH Yurt, first experiment with proper ventilation before concluding that you have a leak.

[See SC: VENTILATING (FH YURTS), M: ROOF LEAK REPAIR (FH YURTS)]

DOOR DIMENSIONS (FH YURTS)

For simplicity of design, LiteYurt doors are folded out of the standard LiteYurt wall panel. Therefore they have a overall dimension of 3’ (0.9144m) wide by 5’ (1.5m) tall. LiteYurts are wheelchair accessible.

Folded Homes® intentionally designed TekYurt and UtiYurt doors to be relatively small since there is less heat loss from opening a smaller door.

A FH Yurt has one or more doors to the outside (external doors), and from zero to five inside doors connecting it to other FH Yurts (internal doors). UtiYurts are equipped with a single Long-door to the outside. [See PD: FH YURT LONG-DOOR KIT] Each TekYurt comes with a single Dutch-door to the outside as standard equipment. [See SC: DUTCH DOORS – WHAT ARE THEY?] Dutch doors and Long doors have the same overall size and are interchangeable.

TekYurt and UtiYurt external door openings are 17.75 inches (45.1 cm) wide by 60 inches (152.4 cm) tall. TekYurt and UtiYurt internal door openings are 17.25 inches (43.8 cm) wide by 59.25 inches (150.5 cm) tall. Unless fitted with custom double doors, TekYurt and UtiYurt are not wheelchair accessible. [See SC: WHEELCHAIR ACCESSIBILITY (FH YURTS)]

All FH Yurt doors open inwards.

DUTCH DOORS – WHAT ARE THEY?

Dutch Doors are comprised of a lower door part and an upper door part which can be opened either together or independent of each other. This allows the upper part of the door to be opened like a window while the lower portion of the door remains closed. TekYurt Dutch Doors come with a bolt which can be used to connect the upper and lower door parts together so that the door functions like a single solid door if preferred. Dutch Doors will not fit into the door frames of internal FH Yurt door openings. [See SC: WINDOW DIMENSIONS (TEKYURTS)]

Dutch Doors are intended as exterior TekYurt and UtiYurt doors and come complete with a heavy sliding latch and an interior dead-bolt that allows you to lock the door from the inside. [See SC: DOOR DIMENSIONS (FH YURTS), PD: FH YURT DUTCH-DOOR KIT, and SC: LOCKING (TEKYURTS)]
TekYurts can be assembled with single panel Long doors instead of Dutch doors. The two varieties are interchangeable. [See SC: FH YURT LONG-DOOR KIT]

EMERGENCY EXITS (FH YURTS)

FH Yurt walls are quite robust and not easily torn open. In the event of an emergency, the only way to get out fast is through one of the FH Yurts external doors or a TekYurt window, though the latter are 44 3/4” (114 cm) off the ground. Where multiple FH Yurts have been connected together to form a multi-room structure, Folded Homes® always recommends that each room in the structure has at least one external door so that in an emergency it is possible to exit the structure without being obliged to pass through another room.

[See PMT: BEAR ATTACK – HOW TOUGH IS EXTRUDED PLASTIC?, and SC: MULTI-ROOM FH YURT STRUCTURES]

DECORATION, CAMOUFLAGE, & PATTERNING (FH YURTS)

FH Yurt wall and roof surfaces are all flat panels. During the manufacturing process it is easy to print patterns and images on the outside faces of these extruded plastic panels. Alternately, ‘stick-on’ images can be affixed to a portion or the entire interior or exterior surface of a FH Yurt turning it into an objet d’art,
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a 3-dimensional billboard, a camouflaged hunting blind, or an otherwise decorated structure.

Contact Folded Homes® regarding your custom surface imaging requirements.
[See PMT: EXTRUDED PLASTIC – WHAT’S THAT?]

FH YURTS – FOLDED HOMES YURTS

‘FH YURTS’ refers to the family of Folded Homes® shelters that includes the TekYurt and the UtiYurt. FAQ question titles that include ‘(FH YURTS)’ are FAQs that answer questions that are relevant to the entire family of the high-tech yurt shelters. Questions that are specific to one member of the family, for example the TekYurt have titles that include ‘(TEKYURTS)’.
[See PD: TEKYURTS & UTIYURTS – WHAT’S THE DIFFERENCE?]

FOUR-SEASON PERFORMANCE (TEKYURTS & UTIYURTS)

Unlike the single-walled LiteYurt, the double-walled TekYurts and UtiYurts are true four-season structures designed to perform well in extreme conditions of heat, cold, wind, rain, and snow. Folded Homes® has intentionally kept the size of the TekYurts and UtiYurts small because it is easier to heat a small space. If you need more room, add another room or two by adding another FH Yurt and connecting the two with a connector kit. [See SC: AREA & VOLUME – HOW BIG IS A FH YURT, SC: MULTI-ROOM FH YURT STRUCTURES, and PD: FH YURT CONNECTOR KIT]

Passive ventilation in their double-walled shells keeps TekYurts and UtiYurts cool in the desert. [See SC: KEEPING COOL – PASSIVE VENTILATION IN FH YURTS, and SC: VENTILATING (FH YURTS)]

Insulating the TekYurt and UtiYurt 3-inch-thick (7.62 cm) walls and roof will keep the heat in when it’s cold. [See SC: KEEPING WARM – WOODBURNING STOVES IN FH YURTS, and A: INSULATING DOUBLE-WALLED FH YURTS]

The insulated chimney flue at the center of their roofs (standard-equipment with each FH Yurt) makes it easy to fit a FH Yurt with a wood-burning stove. [See A: CHIMNEY INSTALLATION (FH YURTS)]

The FH Yurt’s ground flap design is sufficient to keep the shelter solidly on the ground in all but the heaviest winds [See SC: HEAVY-WIND PERFORMANCE (FH YURTS), and A: ANCHORING TO THE GROUND (FH YURTS)], and where that is not sufficient the FH Yurt can be additionally tied to the ground from attachment points under the roof eaves or at the end of the gutters. [See A: EXTREME WIND GUY-LINES (FH YURTS)]
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FH Yurts will not collapse under snow-loads [See PMT: SNOW-LOADING (FH YURTS)], and an ingenious system of interior gutters wicks rain water off the roof and away from the walls. [See SC: KEEPING DRY - ROOF DESIGN (FH YURTS), and SC: DAMPNESS & HUMIDITY (FH YURTS)]

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HEADROOM (FH YURTS)

The conic ceiling of all FH Yurts sit atop the circular wall. At its lowest edge, it is 5 feet (1.5 m) from the floor. In TekYurts and UtiYurts, it rises to its peak 7 feet 4.5 inches (2.25 m) from the floor. In LiteYurts, the ceiling rises to its peak 8 feet 9 inches (2.67 m) from the floor. These configurations provide substantial headroom throughout the shelters. Here, 6’ 4” (193.4 cm) Larry Rutstrom, the FH Yurt family principal designer, stands in front of a TekYurt/UtiYurt connector passage, demonstrating the height of the FH Yurt. Larry does need to duck down to go through the exterior doors and through the FH Yurt connector passage to the next FH Yurt.

[See SC: AREA & VOLUME – HOW BIG IS A FH YURT?]

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HEAVY-WIND PERFORMANCE (FH YURTS)

FH Yurts are typically anchored to the ground via the ground flaps attached to each wall segment. The ground flap can be buried underneath an earthen berm, weighed down with heavy stones, or staked through to a lawn below. [See A: ANCHORING TO THE GROUND (FH YURTS)].

Normally, this is sufficient. FH Yurts anchored in this way and subjected to high wind conditions performed satisfactorily during our two-year test program. A FH Yurt weighted to the ground using large rocks survived winter winds exceeded 75 mph at our 8,600’ (2,620 m) altitude Sierra mountains test site.
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Where even greater security is required it is possible to attach the FH Yurt with guy lines. [See A: EXTREME WIND GUY-LINES (FH YURTS)] At our Forks, Washington test site, "hurricane-like winds" in the middle of December 2006 could not uproot the FH Yurt that had been additionally attached to the ground using five such lines.

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INSECT & PEST CONTROL (FH YURTS)

Unless screened or otherwise blocked, all FH Yurt vent/chimney flues have a 4” (10.16cm) diameter opening through which airborne pests can enter. This opening can be easily blocked with netting or attachment to a wood-burning stove.

The ground flaps extending out from the bottom of the FH Yurt walls make it difficult for animals to burrow under the walls.

The wall and roof panels of the LiteYurt interlock in a way that prevents pests from entering through these joints. However the very basic LiteYurt door does not seal tightly unless additionally sealed by screens. Similarly, windows manually cut in the LiteYurt walls could be screened to prevent pest entry.

Assuming you keep your windows and doors closed, our double-walled UtiYurts and TekYurts do a good job of keeping insects and pest out. Such a good job that the large bear that attacked the FH Yurt at our 8,600’ (2,620 m) altitude test site in the Sierra Mountains couldn’t get in. [See PMT: BEAR ATTACK – HOW TOUGH IS EXTRUDED PLASTIC?] The robust latch closing TekYurt external doors cannot be easily broken through. [See SC: LOCKING (TEKYURTS)]

Folded Homes® does not offer screen doors at this time, so if you want a screened opening in your FH Yurt, the best thing to do is to add one or more windows to your FH Yurt. [See PD: FH YURT WINDOW KIT] TekYurt and UtiYurt windows open inward. So, if you want to keep a window open in a buggy environment you will need to rig some sort of bug screen to the wall framing that window. Bug screen and tape should do the job nicely. [See A: INSECT-BORNE DISEASE PREVENTION (FH YURTS)]

If you have packed the walls of your TekYurt or UtiYurt with convenient local bio mass, it is possible that you’ve introduced some pests into the lining of your wall. They can’t eat plastic though, and hopefully they will leave you alone. [See A: INSULATING DOUBLE-WALLED FH YURTS]

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KEEPING COOL - PASSIVE VENTILATION IN TEKYURTS & UTIYURTS

The TekYurt and UtiYurt double-wall and double-roof design takes advantage of passive ventilation to keep the interior of the yurt cool in hot environments. [See}
PMT: **PASSIVE VENTILATION – WHAT’S THAT?** It is remarkably effective and will keep a white TekYurt or UtiYurt interior tolerable even in the hottest desert conditions. In order to maximize the effectiveness of passive ventilation as a cooling mechanism, all the round access tabs in the walls and ceiling should be closed except the row of access tabs closest to the bottom of the TekYurt or UtiYurt. This will draw cool air into the walls from near the ground and circulate it up through the walls and ceiling.

Passive ventilation is less effective if the walls of the TekYurt or UtiYurt have been packed with an insulating material that blocks the free flow of air.

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**KEEPING DRY - ROOF DESIGN (FH YURTS)**

A simple but effective system of deep interlocking ‘V’-gutters between the roof panels of FH Yurts keeps the water out. (left image) These gutters extend out beyond the roof and side walls of the single-walled LiteYurt to carry the water away from the structure. (right image) Since the wall panels of the LiteYurt are connected together in the same fashion it they too are completely watertight.

In the double-walled TekYurts and UtiYurts, these deep interlocking ‘V’-gutters lie between the outer and inner surfaces of the 3” (7.62cm) thick roof but extend out into the overhanging eaves of the roof to ensure that water draining off the roof does not run down the wall.
KEEPPING WARM - WOOD-BURNING STOVES IN FH YURTS

*FH Yurts* are constructed of extruded plastic. Extruded plastic will burn. Under NO CIRCUMSTANCES should a *FH Yurt* come in direct contact with flame. Under no circumstances should open flames (fires, candles, etc.) be permitted inside a *FH Yurt*. [See PMT: FIRE DANGER (FH YURTS)]

*FH Yurts* are designed to support wood burning stoves that use a 3" (7.62 cm) chimney flue as long as those stoves are installed according to manufacturer specifications, and as long as the stove chimney passes through the insulated passes through the insulated vent in the center of the *FH Yurt* roof. [See A: CHIMNEY INSTALLATION (FH YURTS), and

A: INSULATING DOUBLE-WALLED FH YURTS]
LIGHTING (FH YURTS)

**FH Yurts** are manufactured from extruded polypropylene plastic sheets that allow considerable natural light into the structure even when the doors and windows are completely closed (see image of grass growing inside a **FH Yurt** a year after it was erected.) Additionally, natural light will enter the structure through the upper section of the Dutch-door or the entire door itself if left open. Adding additional windows and doors to your **FH Yurt** also increases the amount of light that will naturally enter the structure. [See PMT: EXTRUDED PLASTIC – WHAT’S THAT?], and SC: CUSTOMIZING TEKYURTS & UTIYURTS

If the **FH Yurt** has been painted with a surface material designed to block the sun’s UV, then the extruded plastic no longer lets in light and you must rely on artificial lighting or natural light that enters through the **FH Yurt**’s windows, doors, and unpainted panels. The image to the right of a prototype fiberboard **UtYurt** with only four extruded plastic wall panels was nonetheless very bright when the sun came up in the morning.) [See PMT: EXTRUDED PLASTIC DEGRADATION MECHANISMS, and M: EXTENDING THE LIFE OF YOUR SHELTER (FH YURTS)]
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Under no circumstances, should you ever use an open candle or other unprotected flame to light the inside of your FH Yurt. [See PMT: FIRE DANGER (FH YURTS)]

(LITEYURTS – WHAT ARE THEY?)

LiteYurts are true semi-permanent shelters that can be easily combined into multi-room structures and enclosed compounds. [See SC: MULTI-ROOM FH YURT STRUCTURES and A: BUILDING ENCLOSED COMPOUNDS (FH YURTS)] Capable of being assembled by a single-person in about four hours without the use of any specialized tools or ladders, LiteYurts are rigid-walled structures that are more than tent replacements, they are house substitutes.

The LiteYurt is the simplest member of the Folded Homes Yurt family. Ten identical roof panels and ten identical wall/door panels form the shell.

Assembly is so easy that it can have a pictures-only instruction manual facilitating international deployments. The LiteYurt is designed to be assembled by persons in need of shelter without any outside instruction or help.

The LiteYurt's rigid, 4-mil-thick walls and roof provide a degree of physical and psychological shelter that considerably surpasses that offered by non-rigid structures like tents. [See SC: PRIVACY (FH YURTS)] While the LiteYurt's walls and roof cannot be packed with insulating biomass like the TekYurt or UtiYurt, LiteYurts can be heated with a wood burning stove.
vented through the double-insulated roof vent. If the inhabitants want closing windows, these can be cut into the tough polypropylene shell.

At 90 lbs. (40.82kg), a LiteYurt is light enough to be packed to its final destination on a donkey or a strong man’s back. Price-competitive with refugee tents, LiteYurts are designed for deployment worldwide to serve as a better alternative for refugees requiring a long-term shelter solution.

(See PD: WARRANTY (FH YURTS), SC: 10 QUESTIONS TO ASK ABOUT SHELTERS, FH: ORIGAMI ARCHITECTURE – WHAT’S THAT?, and FH: MONGOLIAN YURT – THE FH YURT PROGENITOR, SC:)

LOCKING (TEKYURTS)

TekYurt doors come with a large rugged latch that cannot be forced without destroying the TekYurt doorframe itself. This latch can be operated from both inside and outside of the TekYurt. It can be locked from the inside.

All Dutch door kits and Long door kits come with an internal deadbolt that allows them to be locked from the inside by the simple expedient of inserting the deadbolt into the large plastic door latch. This deadbolt is inserted when the door latch is fully extended into the door frame and prevents the latch from being opened from the outside.

It is currently not possible to lock the door from the outside although it can be easily latched shut. Please note that standard UtYurts are delivered with a long
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door that does not have a latch and is therefore not lockable. If you want to be able to lock your UtiYurt, you need to install one of the door kits.

[See SC: Door Dimensions (FH Yurts), SC: Dutch Doors – What Are They? and SC: Emergency Exits (FH Yurts)]

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MULTI-ROOM FH YURT STRUCTURES

FH Yurts are relatively small structures. This makes it easy to heat them. To get more room in your shelter, FH Yurts can be combined together to make multi-room structures. Any TekYurt or UtiYurt can be connected to as many as five other TekYurts or UtiYurts. Any LiteYurt can be connected to as many as five other LiteYurts. What is more, those structures can be organized to also create enclosed external spaces or compounds which allow you to control access to the internal compound. Ten TekYurts and/or UtiYurts strung together in a circle surround an interior compound 24’ 3” (7.4 m) in diameter. Such configurations can be useful when it is necessary to control access by either individuals or animals. [See SC: Area & Volume – How Big is a FH Yurt?]

Multi-Room structure options are endless. Mix and match TekYurt Kits, UtiYurt Kits, Connector Kits, Window Kits, and Full & Dutch-Door Kits (Door placement is arbitrary as long as at least two wall segments separate each door)

There is an infinite variety of multi-room structures that can be built.

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TekYurts and UtIYurts are connected together with short 8" (20 cm) connecting passageways that come with a single full-length internal door that closes off either one of the two ends of the passageway. You use a FH YURT CONNECTOR KIT to connect two TekYurts or UtIYurts together.

The passage between two TekYurts and/or UtIYurts is completely enclosed (top, bottom, and sides.) Dutch Doors will not fit in these passageways.

LiteYurts connect directly to each other without the need for a passageway.

FH Yurts do not require floors, so you have wide latitude to arrange plumbing as necessary. In addition, the 3 inch (7.62 cm) thick hollow walls and roof of the TekYurt and UtIYurt provide considerable space for running plumbing lines if appropriate. It is easy to cut through the extruded plastic panels with a sharp knife to run plumbing lines.
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(PRIVACY (FH YURTS)

**Visual Privacy:** Structurally, extruded plastic sheets are made up of two parallel layers of flat plastic separated by fluting that runs perpendicularly between the two layers. Even the single layer of these plastic sheets that form the walls and roof of the *LiteYurt* provide complete privacy.

The walls and roof of a *TekYurt* or an *UtiYurt* are 3” (7.62 cm) thick with each of the sides of this thick wall formed from these extruded plastic sheets. The extruded plastic itself is opaque. So it lets light through, but that light is highly defused as it passes through the four distinct layers of plastic. As a result, while a *FH Yurt* lit from the inside will radiate a warm glow, it is not possible to make out shapes or figures inside. [See PMT:*EXTRUDED PLASTIC – WHAT’S THAT?, and SC:*TEKYURTS – WHAT ARE THEY?]

**Access Privacy:** It is not easy to rip through a *FH Yurt* wall. Each segment of the wall and roof is bolted to its neighbors and the double layers of extruded plastic require significant effort to cut even with a sharp knife. The latches that bolt *TekYurt* doors closed are quite robust and the doors themselves can be locked from the inside. [See SC:*LOCKING (TEKYURTS)*, and PMT:*BEAR ATTACK – HOW TOUGH IS EXTRUDED PLASTIC?]

*REFUGEE HOUSING CAPACITY (FH YURTS)*

UNHCR (United Nations High Commissioner for Refugees) Refugee Shelter Guidelines specify that required shelter space per person is 3.5 m² (7 m² for two adults.) Folded Homes yurts provide 6.5 m² (*TekYurts & UtiYurts*) and 6.43m² (*LiteYurts*) respectively. Although a single *FH Yurt* provides slightly less area than this requirement specifies for two adults, these structures provide complete
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headroom throughout and are amply large in real-world situations. When connected together to form multi-room dwellings they will meet any capacity requirement.

[See SC: AREA & VOLUME – HOW BIG IS A FH YURT?, and SC: MULTI-ROOM FH YURT STRUCTURES]

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REUSABILITY (FH YURTS)

**FH Yurts** are house substitutes, not tent substitutes. They are designed for long life and require a number of hours to assemble. However they are easily disassembled, and can be efficiently stored because the panels can be unfolded for flat storage. Because the **FH Yurts** bolt together, you do not require any new materials to reassemble your shelter.

[See A: DISASSEMBLY TIME (FH YURTS)]

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TEKYURTS – WHAT ARE THEY?

TekYurt’s are true semi-permanent, four-season shelters that can be easily combined into multi-room structures. Capable of being assembled by a single-person in less than a day without the use of any specialized tools or ladders, TekYurts are rigid-walled structures that are more than tent replacements, they are house substitutes.

The TekYurt’s 3-inch (7.62 cm) thick double walls and roof (see panel cross sections photo) provide a degree of

physical and psychological shelter that considerably surpasses that offered by other rigid single-wall shelters or tents. [See SC: PRIVACY (FH YURTS)] They take advantage of passive ventilation to keep the shelter cool in hot environments and can be insulated for cold environments using any locally available biomass. [See PMT: PASSIVE VENTILATION – WHAT’S THAT?, and A: INSULATING DOUBLE-WALLED FH YURTS] TekYurts can also be heated with a wood burning stove vented through the double-insulated roof vent.

TekYurts are manufactured with an anti-UV additive blended into the polypropylene to slow the process of UV degradation.
**TekYurts** come with a locking Dutch door and window as standard equipment. They can be customized with additional doors and windows and connected to other **TekYurts** or **UtiYurts**.

Light enough to be packed to their final destination on the backs of two men (or one donkey), **TekYurts** are designed for deployment worldwide both to serve as a better alternative for refugees requiring a long-term, four-season shelter solution, and as field clinics, schools, and relief organization base camps.

Compared to the **UtiYurt**, the **TekYurt's** more robust plastic and added features make them attractive candidates for relief personnel base camps and personal use shelters.

UTIYURTS – WHAT ARE THEY?

*UtiYurt’s* are true semi-permanent, four-season shelters that can be easily combined into multi-room structures. Capable of being assembled by a single-person in less than a day without the use of any specialized tools or ladders, *UtiYurts* are rigid-walled structures that are more than tent replacements, they are house substitutes.

The *UtiYurt’s* 3-inch (7.62 cm) thick double walls and roof (see panel cross sections photo) provide a degree of physical and psychological shelter that considerably surpasses that offered by other rigid single-wall shelters or tents. [See SC: *PRIVACY (FH YURTS)*] They take advantage of passive
ventilation to keep the shelter cool in hot environments and can be insulated for cold environments using any locally available biomass. [See PMT: PASSIVE VENTILATION – WHAT’S THAT? and A: INSULATING DOUBLE-WALLED FH YURTS]

_UtiYurts_ can be heated with a wood burning stove vented through the double-insulated roof vent.

_UtiYurts_ are manufactured from standard polypropylene and come with a latching but not locking long door as standard equipment. They do not come with a window. However _UtiYurts_ can be customized with additional doors and windows and connected to other _TekYurts_ or _UtiYurts_.

Simple enough to be pushed out of the back of a helicopter to untrained users below, or packed to their final destination on the backs of two men (or one donkey), _UtiYurts_ are designed for deployment worldwide both to serve as a better alternative for refugees requiring a long-term, four-season shelter solution, and as field clinics, schools, and relief organization base camps.

While more complicated than _LiteYurts_, _UtiYurts_ are simpler to assemble than _TekYurts_ because they have fewer and less complicated parts.


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VENTILATING (FH YURTS)

**FH Yurts** come with a 6" (15.24 cm) diameter covered roof vent that encloses a 3" (7.62 cm) diameter ventilation aperture which doubles as the chimney aperture when a wood burning stove is installed. This central roof vent is protected by an all-season wind and rain proof vent cover.

In warm environments TekYurts & UtiYurts are cooled by passive ventilation that travels up the inside of the yurt walls and roof. [See PMT: PASSIVE VENTILATION – WHAT’S THAT?]

TekYurt windows and the opening Dutch-door upper section are protected by an overhanging roof eave that keeps all but wind-blown rain out of them when they are open.

LiteYurts can be additionally ventilated by cutting windows or other ventilation apertures into the walls of the yurt. [See A: CHIMNEY INSTALLATION (FH YURTS)]

WEIGHT (FH YURTS)

A TekYurt or UtiYurt boxed for shipment weighs 160 pounds (72.6 kg.) A LiteYurt boxed for shipment weighs 90 pounds (40.82 kg.) [See PD: SHIPPING & STORAGE SIZE (FH YURTS)]

WHEELCHAIR ACCESSIBILITY (FH YURTS)

Wheelchair accessible doors must be at least 32" (81.9 cm) wide making the 36" (91.44 cm) wide LiteYurt door wheelchair accessible. At 17.75" (45.1 cm) wide, the standard TekYurt and UtiYurt door is not wide enough to accommodate wheelchairs. However using a custom designed double-door and door headers and footers it is possible to install a 35.5" (90 cm) wheel-chair accessible door in one of these yurts. [See SC: DOOR DIMENSIONS (FH YURTS)]
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If you require custom wheelchair accessible doors, contact Folded Homes® for a special quote.

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WINDOW DIMENSIONS
(TEKYURTS)

TekYurt windows have dimensions identical to the openings of Dutch-door uppers. The window openings are 15.25” (38.74 cm) tall, by 17.75 inches (45.1 cm) wide. [See SC: DOOR DIMENSIONS (FH YURTS), and SC: DUTCH DOORS – WHAT ARE THEY?]

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ASSEMBLY (A)

ASSEMBLY – WHAT TOOLS ARE REQUIRED? (FH YURTS)

No tools or ladders whatsoever are required to assemble a FH Yurt.

But if you want to be nice to your hands, you’ll want to wear a pair of gloves. This is origami architecture and you will be doing a lot of folding. The edges of the cut-out extruded plastic sheets are unforgiving when bare skin rubs up against the edge of the plastic. And it is helpful to wear a pair of tight-fitting gloves when inserting bolts into the plastic sheets and screwing the nuts onto them.

While all the bolts, washers, and wingnuts are ‘outside’ the single-layer plastic walls of a LiteYurt, they are mostly between the inner and outer walls of the TekYurts and UtiYurts. So to assemble these yurts you must insert your hands into round holes cut in the extruded plastic. Rubbing against the edges of those access holes in the plastic panels is hard on bare skin especially when you have several hundred nuts and bolts that need to be inserted. [See A: ASSEMBLY TECHNOLOGY (FH YURTS), and FH: ORIGAMI ARCHITECTURE – WHAT’S THAT?]
You want to choose a pair of gloves that give you good tactile control so that you can identify bolt holes in the plastic with your finger tips and easily hold and manipulate nuts, bolts, and washers. It also helps to wear gloves when prefolding extruded plastic panels although those gloves don’t need to be as tactiley sensitive.  

[See A: PREFOLDING EXTRUDED PLASTIC PARTS]

ASSEMBLY MANUAL (LITEYURT INTERNATIONAL VERSION)

The ideal assembly manual for international applications is one that is language neutral. That means no words, and if possible also no assembly training.

Folded Homes® is committed to delivering shelter solutions that are simple to erect and, to the greatest extent possible, language neutral. LiteYurts are so simple and easy to assemble that it is possible to provide an all-pictures assembly manual to facilitate international deployments. TekYurts and UtiYurts require manuals with some text but like the LiteYurt can be erected without additional supervision. These manuals combined with our comprehensive on-line FAQ data base to present more complicated concepts related to shelter provision, facilitate deployment worldwide.
ASSEMBLY TEAM (FH YURTS)

One person can put up a FH Yurt all by themselves, but it is a lot easier with two or more people. The most difficult challenge for a single person is getting the fully assembled FH Yurt roof up onto the walls without help. It can be done alone, but you need to use props to do it. Two people can assemble a FH Yurt without any problem; it takes half the time, and you have a lot more fun. At the limit, with twenty wall panels and twenty roof panels, twenty people can put up a FH Yurt in just a few minutes, and they wouldn’t even really get in each other’s ways. [See A: ASSEMBLY TIME (FH YURTS)]

The assembly process is quite simple and it lends itself to “assembly-line” production if your group has a lot of shelters to set up. One team can be pre folding parts, another team can be folding wall parts, a third team can be folding roof parts, and a fourth team can be folding the small volume but slightly more involved parts like window and door kits. A team can be assembling FH Yurt walls, another team could be assembling FH Yurt roofs, while yet another team is bolting the assembled roofs onto the assembled walls. And a final small team might be inserting doors and windows.

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ASSEMBLY TECHNOLOGY (FH YURTS)

You create most of the FH Yurt parts by folding them out of two-dimensional sheets into three-dimensional parts. Typically tabs pushed through slots in the parts hold them together. [See A: PREFOLDING EXTRUDED PLASTIC PARTS]

Sets of bolts, washers, and wing-nuts connect the various parts together to form the walls, roof, windows and doors of the FH Yurt. The bolts are hand-tightened and easily retightened if necessary.

[See A: ASSEMBLY – WHAT TOOLS ARE REQUIRED? (FH YURTS)]
ASSEMBLY TIME (FH YURTS)
It takes about 14 person-hours to set up a basic TekYurt or UtYurt the first time. It takes 4-5 hours to set up a LiteYurt. If there are two of you, it will take half that long.

[See A: ASSEMBLY TEAM (FH YURTS), and A: DISASSEMBLY TIME (FH YURTS)]
ANCHORING TO THE GROUND (FH YURTS)

*Folded Homes® FH Yurts* are very stable in high winds when properly attached to the ground. Each wall and connector kit panel of your *FH Yurt* includes a ground flap that extends out 9 inches (23 cm) from the outside wall of a *TekYurt* or *UtiYurt* and 8” (20.3 cm) from a *LiteYurt*. Depending upon the characteristics of the ground where you are placing your *FH Yurt*, this ground flap is either staked down (bottom image), weighed down with heavy rocks (center image), or buried with an earthen berm (top image).

Regardless of which technique you use (staking, rocks, or earthen berms), make sure that the ground flaps angle downward away from the edge of the *FH Yurt’s* wall so that water is drawn...
away from the shelter. [See A: **KEEPING WATER AWAY (FH YURTS)**]

Typically guy lines are not required to secure your FH Yurt to the ground, although in extremely windy conditions you can add guy wires which run to stakes in the ground from below the roof eaves of TekYurts and UtiYurts and from the ends of the gutters of LiteYurts. [See A: **EXTREME WIND GUY-LINES (FH YURTS)**]

**BUILDING ENCLOSED COMPOUNDS (FH YURTS)**

FH Yurts can be set up as compounds that enclose an external space. Ten

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Ten-Room Yurt Structure with a 2-exit Controlled Perimeter

24’ 3” (7.4m) Interior courtyard diameter

10 Yurts, 10 Connector Kits, 2 Door Kits
TekYurts and/or UtiYurts and ten FH YURT CONNECTOR KITs is the smallest number required for these yurts. They will create a circular compound with a 24’ 3” (7.4 m) interior diameter. Eight LiteYurts create the smallest possible LiteYurt compound with an inside quadrangle that measures 8’ by 14’ 6” (2.44 x 4.42m).

Other shapes and configurations are possible as long as you pay attention to how the sides of the twenty-sided TekYurts and UtiYurts and ten-sided LiteYurts line up with each other. It is not possible to connect LiteYurts to TekYurts and UtiYurts.

8-Room LiteYurt Compound

For TekYurts and UtiYurts you must choose configurations that will have two FH Yurt wall panels line up about 8” (20.3 cm) apart from and parallel to each other. The FH YURT CONNECTOR KITs will link between them. LiteYurts connect directly to each other without the need for connector kits.
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Contact Folded Homes® if you are unsure whether the configuration you are considering will work. [See SC: MULTI-ROOM FH YURT STRUCTURES, and PD: FH YURT CONNECTOR KIT] Make sure to always provide at least two ways to get out of an enclosed compound. [See SC: EMERGENCY EXITS (FH YURTS)]

(Updated 9/24/2008)

CHIMNEY INSTALLATION (FH YURTS)

The FH Yurt chimney vent is designed for the insertion of a 3” (7.62 cm) double-walled chimney pipe that is not included with the FH Yurt Kit. The storm collar inside the roof vent that creates that 3” (7.62 cm) diameter opening should not be removed to install a larger chimney pipe because the collar provides the heat sink that keeps the heated chimney pipe from damaging the plastic roof of the
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**FH Yurt.** [See PMT: FIRE DANGER (FH YURTS)]

To mitigate the danger of fire, the installation of any wood-burning furnace or stove must be done in strict compliance with the manufacturer’s installation instructions.

Furnaces or stoves should be set up in the center of the **FH Yurt** as far from the walls as possible. Ideally, the apparatus’ chimney pipe should rise directly up to the center vent in the ceiling of the **FH Yurt**.  
[See SC: VENTILATING (FH YURTS)]

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**CLIMBING ON THE ROOF (FH YURTS)**

**FH Yurt** roofs are tough; if you must climb on it the roof will support you. If possible use a long ladder or plank to create a ramp that lies flat along the slope of the **FH Yurt** roof to climb up on. This will distribute your weight across the roof and reduce the possibility that it will be distorted.

Climbing on the roof of the **FH Yurt** is not recommended for several reasons. First, polypropylene plastic is fairly slippery and there really aren’t any handholds on a **FH Yurt** roof. If you don’t climb on, you can’t fall off. Second, the 4mm (0.16”) thick polypropylene plastic sheets that a **FH Yurt** is made of will not tear, and you can’t easily punch a hole through them. But they can be crushed by a heavy weight that is not properly distributed across their surface. (Snow load is distributed evenly and therefore does not deform the roof.) [See PMT: SNOW-LOADING (FH YURTS)]

Roof distortion is what could cause the roof to leak. Carelessly climbing on the roof can cause some distortion in the plastic panels and this can result in damaged seams leaking. The fix is really easy however, and is done from the inside of the shelter. [See M: ROOF LEAK REPAIR (FH YURTS)]

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DISASSEMBLY TIME (FH YURTS)

A FH Yurt can be easily and rapidly disassembled by simply unbolting and unfolding the various component parts. Below, Mary demonstrated that one person can disassemble a TekYurt or UtiYurt in 3 hours and 15 minutes. LiteYurts can be disassembled in less than an hour. Because of the ‘memory’ characteristic of the plastic material, both the wall and roof components nest nicely for efficient storage. The two main piles of materials (triangular roof components on the left and rectangular wall and door components on the right) are light enough that a single person can carry each pile. [See A: PREFOLDING EXTRUDED PLASTIC PARTS]

DISPOSAL (FH YURTS)

FH Yurts are manufactured from fully inert, safe, and non-toxic materials. They can be fully recycled. If burned, the polypropylene plastic burns cleaner than cardboard. But in most places where FH Yurts will be used for humanitarian applications, the materials used to construct a FH Yurt will be recycled by the FH Yurt's users into other applications such as flooring, water catchment materials and other shelter applications.

[See PMT: HOW GREEN IS EXTRUDED PLASTIC?, PMT: EXTRUDED PLASTIC – WHAT'S THAT?, and SC: REUSABILITY (FH YURTS)]
GROUND COVERS & FLOORS (FH YURTS)

FH Yurts do not require any sort of platform or floor for assembly. It helps to have a flat surface (or at least a planar one) but the structure will adjust to modest curves in the surface it is built on. [See A: TERRAIN PREPARATION (FH YURTS)]

The ground cover or floor that you choose to install in the FH Yurt has more to do with creating a comfortable environment for the FH Yurt’s users and with keeping ground-based critters out.

In dry environments using heavy rosin paper (available in most paint departments) or thick permeable landscape fabric (see image) will keep the dust and dirt away.

In wet environments consider first laying down a large plastic sheet and taping it up the insides of the FH Yurt walls several inches to block out both humidity and ground-based insects. You will probably want to cover the plastic sheet with some material which is less slippery like landscape fabric or heavy rosin paper.

You can of course erect your FH Yurt on top of some sort of raised platform. Or if you are considering a raised platform inside the FH Yurt to keep groundwater away from the inhabitants remember that the FH Yurt door opens inward and your design must not block the opening door. [See SC: DOOR DIMENSIONS (FH YURTS)]

The platform need not be physically connected to the FH Yurt. [See SC: AREA & VOLUME – HOW BIG IS A FH YURT?]
EXTREME WIND GUY-LINES (FH YURTS)

Under all but the most extreme conditions, you don’t need to attach your FH Yurt to the ground with guy-lines. It is sufficient to attach it using the ground flaps extending out from the bottom of the FH Yurt walls. [See A: ANCHORING FH YURTS TO THE GROUND]

However, in extremely winding conditions, you may need to additionally attach your FH Yurt to the ground with guy-lines. In the Washington state Olympic Peninsula where we experienced 75 mph winds we found that using five guy lines was sufficient.

In the upper image of a prototype fiberboard UtiYurt, the guy-lines are attached to the tops of the wall panels just below the roof eaves. Attach the guy-lines to the TekYurt or UtiYurt by looping the end of the guy-line through the upper-most access holes on the inside of the wall panel (see left image), and then up and out of the center hole in the top of the wall panel (see right image). It is easiest (but not essential) to do this before the roof is attached. Then run the line out and down to a stake in the ground.
For an even stronger connection to the ground, use five cables twice as long and attach the middles of each cable to the top of a wall panel and run each end down to two ground stakes attaching the TekYurt or UtiYurt to the earth with ten cables. LiteYurt guy-lines are attached to the ends of any of the ten LiteYurt roof gutters.

INSECT-BORNE DISEASE PREVENTION (FH YURTS)

Mosquito nets are used as a first line of defense world-wide wherever malaria, West Nile virus, and other insect-borne diseases are prevalent.

Biting insects are a particularly active during twilight, at night, and when humans are immobile sleeping targets. The many round access holes on the interior face of your FH Yurt wall and ceiling offer convenient locations for attaching a personal sleeping net over sleeping areas.

There are also several steps you can take to reduce the likelihood of a disease carrying insect getting into your FH Yurt.

- Attach a Mosquito net cover to the outside face of all the windows in your FH Yurt. Because all FH Yurt windows and doors open inward, netting can be permanently taped to the outside wall of the yurt surrounding each window.

- Hang a large piece of Mosquito netting or heavy cloth over the outside of all door ways into your FH Yurt. Loosen the six bolts connecting the roof to the door header and the two wall panels on each side of each door and work the top edge of the netting or clothe up between the top of the wall and the roof. Then retighten the bolts to clamp the cloth or net in place. We recommend the clothe or net extend some distance to each side of the door to create a more effective barrier.

- If your roof vent is not connected to a chimney flue, tape a piece of mosquito netting over the inside aperture.
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- Carefully examine the bolted connecting interface between the walls and roof of your FH Yurt and plug any small openings under the eaves between the roof and ceiling with tape, crushed paper or cloth or some other locally available material.

[See SC: INSECT & PEST CONTROL (FH YURTS)]

INSULATING DOUBLE-WALLED FH YURTS

In hot environments your TekYurt or UtiYurt probably doesn’t need any additional insulation and you probably want to take advantage of passive ventilation between the inner and outer layers of the walls and roof to keep your TekYurt or UtiYurt cool. [See PMT: PASSIVE VENTILATION – WHAT’S THAT?, and SC: KEEPING COOL – PASSIVE VENTILATION IN FH YURTS]

But in cold environments you want a wall that really keeps the cold out. There are several ways (both high-tech and low-tech) to insulate your TekYurt or UtiYurt. The walls and roof of your TekYurt or UtiYurt are 3 inches (7.62 cm) thick. The panels are constructed of extruded plastic which is impervious to water damage. You can fill the cavity between the inside and outside walls of the TekYurt or UtiYurt with an insulating material.

During wall panel assembly, you can place insulating fiberglass batts inside each wall and roof panel as you fold them. Or after the TekYurt or UtiYurt is assembled, you can blow in insulation or fill the wall and roof cavities with expanding foam. After assembly, access the wall and roof cavities through the flapped bolt access holes on the inside face of each wall and roof panel.

A unique feature of the TekYurt or UtiYurt is the possibility of insulating them with any locally available biomass so that it is not necessary to deliver insulating material to some remote humanitarian disaster location. The walls and roof of the TekYurt or UtiYurt can be packed with locally growing grasses or other plant life, with old rags or newspaper, or can even be packed with things like dried Yak dung.

When you are done assembling and insulating your TekYurt or UtiYurt, you can take a knife blade, a thin stick, or hooked wire to pull the flaps of the access holes back out to close them.

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KEEPING WATER AWAY (FH YURTS)

Regardless of how you anchor your FH Yurt to the ground, make sure that the ground flaps attached to the bottom of your FH Yurt walls are angled so that water is drawn away from the walls of the FH Yurt. In the image on the left, water falling on the improperly-angled ground flap runs towards the FH Yurt wall. In the image on the right (showing a ground flap that will be buried under an earthen berm) the flap is properly angled so that the water drains away from the FH Yurt wall. [See SC: ANCHORING TO THE GROUND (FH YURTS)]

MOVING THE ASSEMBLED SHELTER (FH YURTS)

You don’t need to attach your FH Yurt to the ground until you have moved it to the final location where you want it to stand.

Once your FH Yurt is completely assembled, three or four people can easily lift up the entire structure and move it so that it is placed exactly where you want it.

Locate it so that the windows and doors are best positioned relative to the prevailing winds. Once the FH Yurt is in the proper location firmly attach it to the ground. [See A: ANCHORING TO THE GROUND (FH YURTS)]
PREFOLDING EXTRUDED PLASTIC PARTS

Extruded plastic sheets have “memory.” This means that if you crease or fold the sheets, the plastic will “remember” those creases and folds. Folded Homes® origami architecture takes advantage of the memory of polypropylene plastic sheets to make it easier to assemble your plastic shelter. The precut parts that you receive in your shelter kit have been stamped with creases where you need to fold them.

Creases that run in the direction of the flutes in the extruded plastic are really easy to fold. Creases that run against the flutes in the extruded plastic are a little more resistant to being folded. Wendy and Kelly are starting to assemble a FH Yurt roof panel by prefolding it. It’s easiest to work at waist level the way they are, so if possible, set up some sort of work table to work on. Here they are working on a table made out of the shipping container that the FH Yurt came in set on two saw horses.

Frequently, especially for long folds, you will find that if you lay a straight piece of wood along the crease, it makes it a lot easier to start the fold.

Though polypropylene plastic sheets have memory, their memory isn’t that good… What that means is that until a fold has been made really well, it tends
not to stay in the folded position and initially tends to want to return to its unfolded position. What we have learned at Folded Homes® is that it is really helpful to “prefold” all parts along all of their crease lines before trying to fold them into their final three-dimensional shape. Prefolding means to fold the sheet over a full 180 degrees back onto its self even if the final fold will only be something like 90 degrees. Run your hand along the fully folded crease before opening it back up and moving on to folding along the next crease.

Prefolding makes it much easier to do origami architecture! [See FH: ORIGAMI ARCHITECTURE – WHAT’S THAT?]

(Terrain Preparation (FH Yurts))

You need to clear a circular area of ground 11’ 6 “ (3.5 m) in diameter to set up a TekYurt or UtiYurt and 11’ (3.35m) for a LiteYurt. The areas should be relatively planar, although it does not need to be completely flat. [See SC: AREA & VOLUME – HOW BIG IS A FH YURT?]

If there is loose dirt or sand, the FH Yurt can be fixed to the ground using earthen berms. If there are large stones lying around, these can be used to hold down the FH Yurt. If neither of these materials are available you will need to stake the FH Yurt to the ground some how. [See A: ANCHORING TO THE GROUND (FH YURTS)]

(TRAINING & DEPLOYMENT TEAM LEADS)

FH Yurts are designed to be easy to assemble without prior training or a deployment team. However, Folded Homes® can provide experienced deployment team leads that can help train personnel and organize the deployment of large numbers of FH Yurts. [See A: ASSEMBLY TEAM (FH YURTS)]

Folded Homes® is happy to provide a specific quote for training and deployment services.

(WIRING FOR ELECTRICITY (FH YURTS))

The 3” (7.62 cm) thick hollow walls and roof of a TekYurt or UtiYurt provide considerable space for running electrical lines if necessary. Any wiring of a LiteYurt must run on the surface of the wall or roof. Cut through the extruded plastic panels with a sharp knife to run lines. However, because extruded plastic is a relatively light material, any outlets or fixtures should be properly braced and should not rely structurally on the extruded plastic panels.
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Make sure that all electrical wiring and fixture installation is done by qualified personnel in complete conformity with all applicable building codes.

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MAINTENANCE (M)

EXTENDING THE LIFE OF YOUR SHELTER (FH YURTS)

FH Yurts are manufactured from polypropylene extruded plastic. Unless the polypropylene is protected, over time the sun’s UV rays will cause the plastic to become brittle, crack and fail. [See PMT: EXTRUDED PLASTIC – WHAT’S THAT?, and PMT: EXTRUDED PLASTIC DEGRADATION MECHANISMS]

UtiYurts and LiteYurts are manufactured with standard polypropylene. TekYurts are manufactured with UV-enhanced polypropylene that roughly doubles its resistance to UV-degradation over standard polypropylene. [See PD: UV-ENHANCED PLASTIC (FH YURTS)] UV-enhanced polypropylene does not prevent UV-degradation; it only slows its progression.

To prevent UV-degradation you must cover the outside of your FH Yurt with a material that blocks the sun’s UV rays. If you are interested in transforming your FH Yurt into a permanent structure, you might consider Fiberglassing it. You will not be able to disassemble it easily if you do so however.

Alternately you can "paint" the outside surface of the extruded plastic sheets with any one of the many opaque roofing patch materials available or use a material like Rhino (http://www.rhinolinings.com/reallrhino/index.html). These cover materials can be all be applied with a paint roller, are all quite thick, and provide excellent coverage. These surface materials will also further waterproof your FH Yurt by additionally sealing the wall panel edges and the roof gutters.

You can also use an opaque paint that adheres to plastic although it will not have particularly good water proofing characteristics.

Since the damage from UV is cumulative, Folded Homes® strongly recommends that if you plan to protect your FH Yurt in one of these ways that you do it as quickly as possible.

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DOOR-HANDLE REPAIR (TEKYURTS & UTIYURTS)

TekYurt and UtiYurt doors use a plastic handle both inside and out. Over time, this handle may break. It can be replaced with a new plastic handle or if necessary by a piece of knotted rope. [See PD: FH YURT LONG-DOOR KIT, and SC: DUTCH DOORS – WHAT ARE THEY?]

Installation of a knotted replacement rope requires removing the door from the door frame by unbolting it and partially disassembling the door to open its side so that you have access to the latch mechanism inside.

The image right top shows a TekYurt door latch being placed inside a door. The image left bottom shows how the ends of the plastic handles clip into the latch and extend out to each side of the door. In the image right bottom you see the
plastic handle “T” heads clipped into the inside of the latch. These would be replaced by rope knots if a rope handle was installed.

To install a rope handle you feed each end of the rope through the outer panel of the door and the rope end into the door latch on that side. Then you knot each end on the inside of the door latch so it won’t pull out. Tying a washer or stick into the knot will help keep it from pulling out. When the rope door latch has been installed you rebuild the door and reinstall it on its hinge in the TekYurt wall.
HINGE REPAIR (FH YURTS)

After long and active service it is possible that a FH Yurt door or window hinge will break along the hinge fold. If this happens simply unbolt it and install a replacement. [See PD: FH YURT HINGE KIT]

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REPAIRING EXTRUDED PLASTIC

Extruded plastic is extremely tough. It will flex in the direction tangential to its surface, but it will not stretch or tear. If you’ve got a sharp object or big claws you can puncture it, but it is almost impossible to rip. [See PMT: BEAR ATTACK – HOW TOUGH IS EXTRUDED PLASTIC?, and PMT: EXTRUDED PLASTIC – WHAT’S THAT?]

If the plastic becomes deformed because something falls on it, it can usually simply be popped back into the proper form.

If there is a puncture on the outside of your shelter you can repair it with tape. You may want to consider applying the tape onto the inside face of the shelter’s outside panel so that the tape is less exposed to the elements. Work through the access holes on the inside of the FH Yurt to do so.

We have never been able to pull apart two extruded plastic sheets we’ve bolted together with a single bolt, two washers, and a wing nut. But if by some miracle you do need to re-bolt two panels, simply poke a hole big enough for the bolt shank through the two neighbors and re-bolt near where the old bolt was located.

If one of your TekYurt’s window or door hinges finally breaks from long service, simply unbolt it and replace it with a new extruded plastic hinge.

If there is a leak along one of the seams of your FH Yurt roof, repair it from the inside. [See M: ROOF LEAK REPAIR (FH YURTS)]

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ROOF LEAK REPAIR (FH YURTS)

If there is a leak in your FH Yurt roof because of some distortion in the roof or other damage, the leak will typically show up as a leak along one of the interior rain gutters that radiate out from the center of the FH Yurt roof like the spokes of a wheel. It is usually trivial to fix the problem by applying a strip of tape down the seam between the two sections of the roof where the leak is occurring. The tape is applied on the inside of the roof, so it is not necessary to climb on the roof to affect the repair. Since the tape is not exposed to the sun’s UV, almost any tape will work satisfactorily. By carefully taping along the gutter seam you reestablish the pressure seal between the two panels and close the leak. The water should not even reach the applied tape.

[See SC: KEEPING DRY - ROOF DESIGN (FH YURTS)]
STORING YOUR PLASTIC SHELTER

*Folded Homes*® shelters manufactured from polypropylene plastic have a prolonged shelf-life when not exposed to the sun’s ultra-violet (UV) rays. As long as the unassembled shelter is kept stored in its cardboard shipping box, it will not degrade. If you disassemble your shelter, make sure you store it in a location where it is not subject to the sun’s UV rays.

The various parts of your plastic shelter are scored (pre-creased) to facilitate folding. Until these parts are folded the first time, it is possible for the score lines to gradually fade since the plastic retains memory of its long-term form. So it is important that you assemble or at least pre-fold your shelter at least once within a few months of receiving it. [See A: PREFOLDING EXTRUDED PLASTIC PARTS, and PMT: EXTRUDED PLASTIC – WHAT’S THAT?](#)
PERFORMANCE, MATERIALS & TESTING (PMT)

BEAR ATTACK – HOW TOUGH IS EXTRUDED PLASTIC?

A large curious bear climbed up on his hind legs, jabbed his front paws into the eaves of the UtuYurt being tested in the Sierra Mountain range, and tried to rip open the side of the shelter. All he left were some dirty swipe marks, a few bite holes, and one 3" (7.62 cm) gash in the side of the UtuYurt. There wasn’t any food inside so he probably didn’t try too hard, but nonetheless he didn’t get in.

We’re not saying that the plastic walls of a FH Yurt will keep a determined bear out, but we are saying that these walls are tough! [See M: REPAIRING EXTRUDED PLASTIC, and PMT: EXTRUDED PLASTIC – WHAT’S THAT?]

DEVELOPMENT AND TESTING (FH YURTS)

The Folded Homes® TekYurt and UtuYurt shelters were developed and field tested over a period of two years following the devastating earthquake in Pakistan in the fall of 2005. Engineers at Alliance Packaging and Folded Homes® collaborated in the development and testing of the structures in a
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process that saw nine major engineering revision cycles addressing about 50 different ECOs (Engineering Change Orders.) The yurts were tested at three test sites chosen to stress the yurts in conditions of rain, snow, fire, high wind and intense sunlight.

Rain tests were performed at a test site in the Olympic Peninsula in northwest Washington State where average annual rainfall is 140 inches. Snow load and wind-resistance testing was performed at a location in the Sierra Mountains of California at an altitude of more than 8,600 feet (2,622 m) where annual snowfall averages over 8 feet (2.44m) deep. Desert, wind, and burn tests were performed in the high desert country outside Christmas Valley, Oregon.

The LiteYurt was developed and tested during the first nine months of 2008.

Long-term testing of Folded Homes® shelters is ongoing.

EXTRUDED PLASTIC DEGRADATION MECHANISMS

Polypropylene extruded plastic is impervious to damage from water and humidity. Hot and cold temperatures don’t bother it, and it remains flexible in all but the very coldest weather. It can take a lot of abuse and doesn’t tear easily.

The one thing that over time will hurt polypropylene is the sun’s ultra-violet (UV) light. Science Daily (http://www.sciencedaily.com/articles/u/ultraviolet.htm) reports that “Ultraviolet (UV) radiation is electromagnetic radiation of a wavelength shorter than that of the visible region, but longer than that of soft X-rays. The Sun emits ultraviolet radiation in the UVA, UVB, and UVC bands, but because of absorption in the atmosphere’s ozone layer, 99% of the ultraviolet radiation that reaches the Earth’s surface is UVA.” Over time, this UV radiation causes plastic to become brittle and crack.

These two images show the surface of undamaged (left), and UV-damaged polypropylene (right) when viewed under the microscope. The microscopic cracks on the right are what make the polypropylene brittle. Any polypropylene surface that is directly exposed to the sun will eventually get brittle and crack. Unless that is prevented, it will eventually cause a shelter manufactured from it to fail.

The manufacturers of polypropylene extruded plastic generally claim that opaque sheets of white polypropylene will last about two years in sunny environments. FH Yurts are manufactured from opaque sheets of polypropylene. (Translucent polypropylene sheets last less long and our experiments show that within thirteen months you can begin
experiencing catastrophic failure in them. *FH Yurts* are not manufactured from translucent polypropylene.)

A polypropylene shelter manufactured with UV inhibitors lasts roughly twice as long as a shelter manufactured from standard polypropylene. *Folded Homes*® UtiYurts are manufactured from standard polypropylene. Our TekYurts are manufactured from UV-enhanced polypropylene. [See PD: *UV-ENHANCED PLASTIC (FH YURTS)*]

The easiest way to prevent the UV degradation of your shelter is to cover it with an opaque material that blocks the sun’s UV radiation from reaching the polypropylene. [See M: *EXTENDING THE LIFE OF YOUR SHELTER (FH YURTS)*]

**EXTRUDED PLASTIC – DOES IT SMELL?**

No, polypropylene extruded plastic is entirely odorless. [See PMT: *EXTRUDED PLASTIC – WHAT’S THAT?*]

**EXTRUDED PLASTIC – WHAT’S THAT?**

*Folded Homes*® shelters are typically manufactured from 4mm-thick extruded plastic sheets. These sheets are stamped out and scored with indentations which define the necessary folds to transform the flat two-dimensional sheet into each three-dimensional part. Once assembled, these parts are both strong and remarkably light weight as Wendy is demonstrating.

Extruded plastic has the same basic form as corrugated cardboard. Structurally it has two parallel layers of flat plastic separated by fluting that runs perpendicularly between the two layers. Unlike corrugated cardboard, extruded plastic is formed by extruding molten plastic out of a form to create the entire double-walled sheet in one go. So unlike corrugated cardboard it cannot delaminate.
Folded Homes® uses polypropylene plastic. This plastic has a number of great characteristics going for it.

- **Polypropylene is really light:** Light materials are cheaper to transport and can be packed in on men’s backs if necessary. [See PD: TRANSPORT REQUIREMENTS – GETTING IT THERE (FH YURTS)]

- **Polypropylene has memory:** If you score it with an indentation, such as a fold line, that fold line remains in place for a prolonged period. Nonetheless if you do not assemble your Folded Homes® shelter for the first time within a few months, the score lines can become less pronounced. So don’t delay too long to erect your shelter. Once the shelter has been erected and stays in place for some time, the plastic will “remember” the folds forever. [See A: PREFOLDING EXTRUDED PLASTIC PARTS]

- **Polypropylene is foldable:** You can use it for things like hinges since it can be repeatedly bent back and forth along a score line and will not easily break. In fact, we recommend that you pre-fold your structure along all the score lines by folding them back 180 degrees against themselves before creating the three-dimensional part. Such “prefolding” makes it easier to form the shape crisply.

- **Polypropylene won’t tear:** You cannot tear a polypropylene sheet. Neither can a bear; one tried at our mountain test site and all he managed to do was punch some holes in the wall with his claws and teeth. But he gave up and went away.

- **Polypropylene is extremely strong and rigid:** Over short distances it is quite difficult to bend making it ideal for Folded Homes® tab and slot technology. Once you lock a tab into a slot, it is next to impossible to tear that tab out. The tab can be ‘unlocked’ by carefully pushing it back through, but it won’t tear out under tension.

- **Polypropylene performs well in hot and cold environments:** The plastic will not crack or flow in any temperature your shelter is likely to encounter. That said, we do not recommend assembling your yurt in extremely cold conditions since the plastic is harder to fold. And please note that polypropylene will burn. So do not expose it to open flame under any circumstances.
Folded Homes FAQs

- **Polypropylene is impervious to water damage.** You could set your yurt up in a swamp and leave it there, and no harm would come to it. Since it is 100% waterproof, it is an ideal shelter material for wet and humid environments.

- **Polypropylene is non-organic and safe:** Unlike cotton tents, or wood structures, bugs, critters and mold won’t eat it. And even if your baby tries to, it can’t get sick from it because the polypropylene is chemically inert.

- **Polypropylene is completely recyclable:** If you ever need to dispose of your plastic shelter, it can be safely recycled.

- **Polypropylene comes in a variety of colors as well as in a translucent variety:** Folded Homes® shelters manufactured out of translucent polypropylene are wonderfully bright inside. You get the benefits of sunlight while retaining the privacy of opacity.

Coroplast (www.coroplast.com) is one of the major manufacturers of polypropylene extruded plastic sheets. Here’s what they say about the material.

Coroplast™ is a high-quality polypropylene twin-wall profile sheet... Coroplast™ uses a copolymer resin in order to increase impact and low temperature performance. Copolymer resins are also used because they retain the ability to be flexed an unlimited number of times without breaking. We call this unique ability "a living hinge". Chemically, the sheet is inert, with a NIL pH factor. At regular temperatures most oils, solvents and water have no effect, allowing it to perform under adverse weather conditions or as a product component exposed to harsh chemicals. Coroplast™ twin-wall profile sheets can be modified with additives, which are melt-blended into the sheet to meet the specific needs that include: ultra violet protection, anti-static, flame retardancy, and color.

**Health and Safety Aspect of Coroplast Products**

_Technical Bulletin - CSS-033-93_

**General Toxicity**

The name Coroplast applies to a wide range of extruded corrugated plastic sheet products based on polypropylene copolymers. The natural polymer is chemically inert and is generally considered non-toxic and safe for use in contact with food. The base resin meets FDA requirements as listed in Food Additive Regulation Title 21, Section 177.1520(c), Item 1.1, covering food contact uses.

Pigmented or otherwise modified sheets are not considered to constitute any extra health hazard under normal handling and conversion. All additives are melt-blended into the polymer and encapsulated. Colors are available which will meet food contact approvals.

**Effect of Heat / Combustion**

Coroplast is made from a combustible thermoplastic material, polypropylene. While discretion would suggest that observation of precautions consistent with regulatory codes and standards should be followed when working with Coroplast,
it is equally important to note that compared to other plastics on the market Coroplast is very low on a relative hazard scale.

Two areas of flammability hazard must be addressed: rate of combustion and toxicity of combustion products.

**Rate of Combustion**

There are many flammability tests in use for different applications in the various parts of North America. A test valid in one area is not acceptable in another. We will try to offer information which will allow the relative hazard of Coroplast to be evaluated. If a flame retardant sheet is needed, ask about our Firewall FRB Brand Product.

In the United States the most generally accepted Surface Flame Spread Test is the ASTM E-84 Tunnel test. This test involves suspending a test specimen in the ceiling of the tunnel and igniting one end in the presence of a forced air stream. This test is not applicable to thermoplastic material because they will melt out and fall to the floor, prejudicing the result. By this test Coroplast received an unrealistic low 25 (Red Oak is 100).

In Canada, this test has been modified to take thermoplastics into account and samples are tested in the same tunnel but on the floor (ULC-S102.2-78). By this test the 4mm natural sheet exhibited a more realistic Surface Flame Spread of 178 with Smoke Developed of 200 and Fuel Contributed of 100.

One of the factors not visible in the test figure is the length of time to get the fire going.

Until the sheet reaches a temperature of approximately 600 degrees F, it will not release flammable - low molecular weight hydrocarbons.

Should a fire occur, any available fire extinguisher may be used. In a limited fire situation dry chemical powder extinguishers have proven very successful. In a larger scale fire, water sprays/ sprinkler systems are very successful because they quickly cool and damp down the fire.

**Toxicity of Combustion**

In a fire situation the amount of smoke and the toxicity of the smoke is perhaps more serious than the burn rate. Smoke evolution is dependent on the available oxygen present, but polypropylene copolymer normally generates little smoke. This is not true for many other thermoplastics. The compounds of combustion of polyolefin plastics are not highly toxic except for carbon monoxide which will be formed when any organic matter - e.g. paper, wood or gasoline burns. In fact, the carbon monoxide given off by burning Coroplast is less than for cardboard or hardboard.

<table>
<thead>
<tr>
<th>Temp.</th>
<th>% Oxygen</th>
<th>Percentage of Carbon Monoxide &amp; CO W/W</th>
</tr>
</thead>
</table>

% Carbon Monoxide (CO) W/W evolved from Coroplast, cardboard and hardboard.
<table>
<thead>
<tr>
<th>Celsius</th>
<th>v/v</th>
<th>Evolved from</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Coroplast</td>
</tr>
<tr>
<td>500</td>
<td>21</td>
<td>6.2</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>6.6</td>
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<tr>
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<td>21</td>
<td>4.8</td>
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<td>2.5</td>
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**Summary**

While Coroplast will burn, it does not have a flash point or an uncontrollable flame spread rate like some acrylics or styrene. It responds very much like paper. Should a fire start it is easily extinguished by any type of extinguisher. Burning Coroplast generates combustion products with very low toxicity. This is common to polyolefin polymers.

[See A: DISASSEMBLY TIME (FH YURTS), M: STORING YOUR PLASTIC SHELTER]

**FAULT-TOLERANT DESIGN (FH YURTS)**

Human beings rarely do things perfectly. And they often don’t read the assembly manual... For example, shelter designs that rely upon perfect or near perfect assembly to be waterproof tend to leak. If any critical characteristic of a design, like structural integrity or keeping the elements out, depends upon perfect assembly or maintenance, those characteristics will be candidates for failure.

*Folded Homes*® yurt technology has been designed to be fault tolerant. Making the structure waterproof does not depend upon perfect assembly. If you leave out a few bolts, the structure is unlikely to collapse. And if there is a problem, it is generally easy to fix. [See A: ASSEMBLY TECHNOLOGY (FH YURTS), A: ASSEMBLY – WHAT TOOLS ARE REQUIRED? (FH YURTS), and SC: KEEPING DRY - ROOF DESIGN (FH YURTS)]

Keeping it simple is a *Folded Homes*® company mantra. *UtiYurts* in particular are assembled from only six different plastic parts and three pre-assembled metal parts. *TekYurts* with their fancy latching and locking doors and windows, connector kits and so forth have a few more parts.
FIRE DANGER (FH YURTS)

FH Yurts will burn; they are made out of polypropylene plastic. [See PMT: EXTRUDED PLASTIC – WHAT’S THAT?] Open flames should never be permitted near to or inside a FH Yurt.

The good news is that the rate of combustion of polypropylene is not explosive. Even in the presence of direct flame, it takes a while for standard polypropylene to catch fire. Folded Homes® conducted burn tests on the polypropylene used to produce standard FH Yurts. See for yourself.

Fires like chimney-like structures; places where a current of hot air can suck the flame upward, generating heat and expanding the flame. The fluted structure of extruded plastic can be thought of as a host of small chimneys. The wall and roof segments of the FH Yurt can be thought of as a set of twenty large chimneys. These chimneys create ideal conditions for flame propagation.

- Polypropylene Burn Test (Flute ignition)

  This 90-second video clip shows the effect of exposing the flutes of polypropylene plastic to direct flame. It is significant to note that after 90 seconds it was easy to blow out the flame with one breath.

- Polypropylene Burn Test (Flat Surface Ignition)

  It takes longer to ignite a material if it is not a chimney structure. This 180-second video clip demonstrates that it takes twice as long to generate the same flame when the non-fluted surface of the extruded plastic is exposed to flame. The entire exterior surface of a FH Yurt and most of the interior surface of a FH Yurt is not fluted. Note that flame spread is not rapid and explosive.

Here are the technical details.
Folded Homes FAQs

Toxicity of Combustion: “In a fire situation the amount of smoke and the toxicity of the smoke is perhaps more serious than the burn rate. Smoke evolution is dependent on the available oxygen present, but polypropylene copolymer normally generates little smoke. This is not true for many other thermoplastics. The compounds of combustion of polyolefin plastics are not highly toxic except for carbon monoxide which will be formed when any organic matter - e.g. paper, wood or gasoline burns. In fact, the carbon monoxide given off by burning [polypropylene] is less than for cardboard or hardboard.”[1]

Flame Spread: **FH Yurts** are Class C structures from the perspective of flame spread.

“Flame Spread [is] the measure of a material’s relative burning behavior. Both the flame spread and smoke developed are measured in accordance with ASTM E84.” [2]

“The Flame Spread Rating [is] a measure of the relative flame spread, and smoke development, from a material being tested. The flame spread rating is a single number comparing the flame spread of a material with red oak, arbitrarily given the number 100 and asbestos cement board with a flame spread of 0. Building codes require a maximum flame spread of 25 for insulation installed in exposed locations.”[3]

“Flame Spread Classes: the UBC and BOCA codes use the I-II-III designation, and the Standard code uses A-B-C. The flame spread categories are as follows per ASTM E-84/UL 723:

- Class A or I: Flame spread 25 or less (Fire Retardant Treated Wood, some Fire Retardant surface coatings)
- Class B or II: Flame spread 26 to 75 (other Fire Retardant surface coatings)
- Class C or III: Flame spread 76 to 200 (untreated lumber and plywood)[4]

[See PD: EXTRUDED PLASTIC OPTIONS – FIRE RETRADANT]

(Return to Table of Contents)
HOW GREEN IS EXTRUDED PLASTIC?
Although extruded plastic is not biodegradable, it is clean, non-toxic and recyclable. Over the long run, unless it is protected from the sun's UV, sunlight makes it brittle and it disintegrates into a fine powder.

[See A: DISPOSAL (FH YURTS), PMT: EXTRUDED PLASTIC – WHAT’S THAT?, and M: EXTENDING THE LIFE OF YOUR SHELTER (FH YURTS)]

LIFE EXPECTANCY (FH YURTS)

*Folded Homes®* expects that the useful life of a standard *FH Yurt* will substantially exceed the *FH Yurt* warranty period. [See PD: WARRANTY (FH YURTS)] How much longer the *FH Yurt* will perform satisfactorily is dependent upon a number of factors: environmental conditions, plastic composition, and whether additional steps are taken to mitigate the known degradation characteristics of polypropylene plastic. [See PD: UV-ENHANCED PLASTIC (FH YURTS)]

*Folded Homes®* believes that properly cared for *FH Yurt* structures can have a long, multi-year life span.

Environmental Conditions: Since the primary degradation mechanism for polypropylene plastic is UV-degradation, the amount of sun that the *FH Yurt* is exposed to has a direct impact upon the rate of degradation. A *FH Yurt* set up in the middle of the Sahara desert will get more sun than one set up in the woods in northern Canada. [See PMT: EXTRUDED PLASTIC – WHAT’S THAT?]

Plastic Composition: *FH Yurt* plastic material comes in two flavors; with and without UV-additives. Use of the latter roughly doubles life-expectancy by slowing but not preventing the gradual degradation of the plastic. [See PD: UV-ENHANCED PLASTIC (FH YURTS)]

Preventing UV-Degradation: If the sun's UV can't get to the plastic, it can't degrade it. Any steps you can take to block to UV prolong the life of your *FH Yurt*. [See M: EXTENDING THE LIFE OF YOUR SHELTER (FH YURTS)]

PASSIVE VENTILATION – WHAT’S THAT?
Ventilation results from the pressure difference across an opening. The pressure difference can be produced mechanically (e.g. by a fan), by the action of wind, or by temperature differential since warmer air tends to rise and cooler air tends to fall. Mechanical ventilation systems and wind action are said to produce positive airflow.

Passive ventilation is ventilation by other than mechanical means. A key benefit of passive ventilation systems is that they rely upon the ambient energy of the
environment and do not require some additional power source. Passive ventilation systems can be disadvantageous in climatic environments subject to both high heat and humidity together. In the absence of positive airflow such environments can favor mildew growth.

Folded Homes® yurts harness passive ventilation. [See SC:KEEPING COOL – PASSIVE VENTILATION IN FH YURTS]

SNOW-LOADING (FH YURTS)
We tested a FH Yurt at 8,600’ (2,620 m) altitude in the Sierra Mountain range over the 2006/2007 winter. At one point there was an accumulation of 4’ (1.22 m) of snow. The FH Yurt had no trouble supporting that load. The only damage the FH Yurt sustained that season was from a bear attack... [See PMT:BEAR ATTACK – HOW TOUGH IS EXTRUDED PLASTIC?]
PURCHASING & DELIVERY (PD)

CODE COMPLIANCE (FH YURTS)

*FH Yurts* are semi-permanent shelters. Other than that, *Folded Homes*® makes no claims whatsoever regarding the compliance of its structures with any building code regulations, nor regarding the suitability of *FH Yurts* for any purpose. Please carefully read our Warranty and Liability Waiver before choosing to purchase a *Folded Homes*® structure.

[See PD: WARRANTY (FH YURTS)]

DELIVERY TIME – LARGE ORDERS (FH YURTS)

Typically, from the moment *Folded Homes*® receives an order, down-payment or confirmation of payment into an escrow account for large international orders, it takes four weeks to order and receive the polypropylene extruded plastic sheets necessary for manufacture. Thereafter, *Folded Homes*® is able to produce approximately 10,000 *FH Yurts* a week. Thus first shipment of large *FH Yurt* orders typically occurs five weeks from placement of the order.

[See PD: DEPOSITS & PAYMENT (LARGE ORDERS)]

DEPOSITS & PAYMENT (LARGE ORDERS)

*Folded Homes*® reserves the right to require purchase deposits for large volume orders. Typically these deposits cover the cost of materials purchased for manufacture and are not refundable except when *Folded Homes*® is unable to manufacture the shelters. International clients may place their deposits in a mutually acceptable escrow account.

Final payment is due when the shelters have been manufactured and are ready for shipment. The shelters are released for shipment as soon as full payment is received.

Clients can inspect the manufactured shelters at our manufacturing facility if they choose.

[See PD: DEPOSITS & PAYMENT (SMALL ORDERS)]
DEPOSITS & PAYMENT (SMALL ORDERS)

*Folded Homes®* reserves the right to require a deposit for small orders that typically covers the cost of materials required for manufacture. This deposit is non-refundable unless *Folded Homes®* is unable to manufacture your shelter. The reason we may require this deposit is that we are obliged to make a minimum volume order of shelters from our manufacturer in order to be able to offer shelters to our clients at the prices we do. “One-off” production of a single *FH Yurt* cannot take advantage of assembly-line production techniques and would cost *Folded Homes®* roughly twice the cost it charges consumers for a single *FH Yurt*.

Final payment is due when the shelters have been manufactured and are ready for shipment. The shelters are released for shipment as soon as full payment is received.

[See PD: *DEPOSITS & PAYMENT (LARGE ORDERS)*]

DOWNLOADING A WEBSITE PDF-FILE READER

You can download many of the documents available on the *Folded Homes®* website. These are typically PDF-format files. If your computer does not currently have a PDF reader, you can download one for free from Adobe Systems at [http://www.adobe.com/products/acrobat/readstep2.html](http://www.adobe.com/products/acrobat/readstep2.html).

EXTRUDED PLASTIC OPTIONS – FIRE RETARDANT

To maximize the fire-retardant characteristics of your *FH Yurt*, you have the option to select *Folded Homes®* shelters manufactured from polypropylene plastic sheets chemically enhanced with a fire retardant additive. Please check the *Folded Homes®* shelter price list for details.

[See PMT: *FIRE DANGER (FH YURTS)*]

EXTRUDED PLASTIC OPTIONS – FIRE RETARDANT & MAX UV

You have the option to select *Folded Homes®* shelters manufactured from polypropylene plastic sheets chemically enhanced with both fire retardant and UV inhibitor additives. Request a special quote.

[See: *FIRE DANGER (FH YURTS)*, and PD: *UV-ENHANCED PLASTIC (FH YURTS)*]
EXTRUDED PLASTIC OPTIONS – MAX UV

To slow the process of UV degradation of an otherwise untreated FH Yurt, you have the option to select Folded Homes® shelters manufactured from polypropylene plastic sheets chemically enhanced with a UV inhibitor additive. Please check the Folded Homes® shelter price list for details.

[See PD: UV-ENHANCED PLASTIC (FH YURTS), and M: EXTENDING THE LIFE OF YOUR SHELTER (FH YURTS)]

FH YURT CONNECTOR KIT

The FH YURT CONNECTOR KIT provides everything you need to connect any two TekYurts and/or UtiYurts together. Any TekYurt or UtiYurt can be connected to up to five other TekYurts and/or UtiYurts by adding short, completely enclosed, connecting corridors that links each pair of FH Yurts together. [See SC: MULTI-ROOM FH YURT STRUCTURES]

You need one FH YURT CONNECTOR KIT for each pair of FH Yurts you are connecting. Each connector corridor comes complete with a full-length latching door that separates the two FH Yurts.

You can create an endless variety of multi-room structures varying from a simple two-room FH Yurt cluster, to six-room star clusters (one central room surrounded by five peripheral rooms), to chains and rings of FH Yurts. Ten FH Yurts can be connected together to form a ring of rooms which completely surround an enclosed courtyard to which access from the outside can be controlled. Such a courtyard can act as a livestock pen or a controlled access compound. [See A: BUILDING ENCLOSED COMPOUNDS (FH YURTS)]

To install the FH Yurt connector,

1. Place two FH Yurts next to each other so that the edge of the overhanging roof eave of one of the FH Yurt’s triangular
2. You remove a pair of wall panels in each of the two **FH Yurts**. Viewed from the center of each **FH Yurt**, you remove the wall panel where the connecting corridor will go (the wall segment under the touching roof eaves from step one), and you remove the wall panel to its left.

3. You replace the two respective left-side wall panels with a custom wall panel which does not have an overhanging flange. This custom wall panel allows you to install the connecting corridor door in either **FH Yurt**.

4. You install a header and footer that tie the two wall panels on each side of the corridor opening together.

5. You then install the four corridor wall, floor, and roof panels.

6. Finally you install the corridor door on the corridor end of your choice.

The connecting corridor is less than 8 inches (20.3 cm) long. Four folding panels (two side wall panels and identical roof and floor panels) create a rectangular corridor that is completely protected from the elements. The edges of the floor panel rise up several inches inside of the side panels to protect the corridor from outside ground water. Ground flaps attached to the side panels allow the corridor to be attached to the ground with stakes, rocks, or earthen berms.
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Please check the *Folded Homes*® shelter [price list](#) for details.

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**FH YURT DUTCH-DOOR KIT**

*TekYurts* come with a single Dutch-Door as standard equipment. This kit provides everything you need to install a new Dutch door in either a *TekYurt* or a UtiYurt. [See SC: [DUTCH DOORS – WHAT ARE THEY?]](#)

Dutch doors can only be used for external doors. They cannot be used as doorways in connector corridors between *FH Yurts*. [See SC: [MULTI-ROOM FH YURT STRUCTURES]](#)

Dutch doors latch and lock.

Please check the *Folded Homes*® shelter [price list](#) for details.

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**FH YURT HINGE KIT**

Eventually the polypropylene ‘piano’ hinges of your *TekYurt* or *UtIYurt* doors and windows may fail. Replacement hinges are available. [See M: [HINGE REPAIR (FH YURTS)]](#)

Please check the *Folded Homes*® shelter [price list](#) for details.

(Return to Table of Contents)
**FH YURT LONG-DOOR KIT**

Each TekYurt comes with a single Dutch-door to the outside as standard equipment. [See SC: DUTCH DOORS – WHAT ARE THEY?](#)

Each UtiYurt comes with a single latching long door without a lock as standard equipment. Both of these doors can be replaced with this latching and locking long-door version if preferred, or one or more long-doors can be added to a TekYurt or UtiYurt if appropriate. A FH Yurt long-door is shown here inside view on the left and outside view on the right.

Please check the Folded Homes® shelter [price list](#) for details.

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**FH YURT WINDOW KIT**

TekYurts come with a single window as standard equipment. UtiYurts do not have a window as standard equipment. This kit contains all the parts necessary to install an opening window in a TekYurt or UtiYurt. [See SC: WINDOW DIMENSIONS (TEKYURTS)]

Installation involves removing one of the
Folded Homes FAQs

wall panels of a TekYurt or UtiYurt and replacing it with a shorter wall panel. To maintain the yurt’s tension ring you install a header between the two neighboring wall panels. You then install the window above the shorter wall panel and below the header. Windows have a bolt on the inside face with allows them to be locked shut.

Please check the Folded Homes® shelter price list for details.

FIRE-RETARDANT PLASTIC (FH YURTS)

To maximize the fire-retardant characteristics of your FH Yurt, you can select one manufactured with fire-retardant polypropylene extruded plastic. [See PMT: FIRE DANGER (FH YURTS), and PD: EXTRUDED PLASTIC OPTIONS – FIRE RETARDANT]

PRICING – PERSONAL USE SHELTERS & HUMANITARIAN SHELTERS

Folded Homes has adopted a two-tier pricing structure for our shelters. The volume pricing of shelters sold to humanitarian NGOs is partially subsidized by the pricing of our shelters sold to our personal use shelter clients. In this way our personal use shelter clients participate in our mission of delivering humanitarian shelters where they are needed most. [See FH: FOLDED HOMES MISSION]

SEEING FOLDED HOMES SHELTERS (FH YURTS)

You can visit a Folded Homes® FH Yurt at several of our test or manufacturing sites including Renton Washington (just outside of Seattle), Berkeley California, and Tunkhannock Pennsylvania. The locations where you can currently visit a FH Yurt are shown on the website Location Map.

In addition sometimes it is possible to arrange visits to FH Yurts deployed around the world. Contact Folded Homes® if you need to visit one of these locations.

SHIPPING & STORAGE SIZE (FH YURTS)
Folded Homes FAQs

Individual **TekYurts** and **UtiYurts** are efficiently packed with all parts required for a standard installation in a flat rectangular shipping box which can be carried by two people. The box dimensions are 78" (198.1 cm) long, 50" (127 cm) wide, and 7.5" (19 cm) tall. The packed FH Yurt weighs 160 pounds (72.6kg.)

Individual **LiteYurts** are packed in a 79 3/4" (202.6 cm) x 51" (129.5 cm) x 4" (10.2 cm) panel box and a second smaller chimney hardware box. The **LiteYurt** weighs 90 lbs. (40.82kg).

FH Yurt accessory kits are separately packed. [See PD: **SHIPPING CONTAINER CAPACITY (FH YURTS)**]

**SHIPPING CONTAINER CAPACITY (FH YURTS)**

A standard 40' (12.2 m) shipping container can carry a maximum of 108 unpalleted, individually boxed **TekYurts** or **UtiYurts**. A standard 20' (6.1 m) shipping container can carry a maximum of 48 unpalleted, individually boxed **TekYurts** or **UtiYurts**.

Assume that boxed **TekYurts** or **UtiYurts** are stacked eleven high in stacks of two pallets; the lower pallet in the stack holding six **FH Yurts** and the upper pallet in the stack holding five yurts. You can then fit 18 pallets of yurts in a 40' shipping container, for a total of 99 palleted **TekYurts** or **UtiYurts**. On the same basis you can fit 44 palleted **TekYurts** or **UtiYurts** in to a 20' shipping container.

Similarly, a maximum of 207 unpalleted (189 palleted) **LiteYurts** can be packed in a 40' shipping container, while a maximum of 92 unpalleted (84 palleted) **LiteYurts** can be packed in a 20' shipping container.

If **FH Yurt** accessories are being shipped with the order, space for these must be allowed for.

[See PD: **SHIPPING & STORAGE SIZE (FH YURTS)**]

**SHIPPING QUOTES**

*Folded Homes®* contracts with several shipping companies and can provide you with a shipping quote for delivery of your shelter order. Nonetheless, for large volume and international orders in particular, we
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recommend that you verify shipping options and pricing with local companies familiar with your specific requirements. [See PD: TRANSPORT REQUIREMENTS – GETTING IT THERE (FH YURTS), PD: SHIPPING & STORAGE SIZE (FH YURTS), and PD: SHIPPING CONTAINER CAPACITY (FH YURTS)]

TEKYURTS & UTIYURTS – WHAT’S THE DIFFERENCE?

The Folded Homes® line of high-tech yurt shelters contains three varieties; TekYurts, UtiYurts, and LiteYurts. The fundamental origami architecture technology for all three is the same. The general method of assembly is the same. But LiteYurts differ from the other two designs because they are single-walled decahedrons while the TekYurts and UtiYurts are double-walled twenty-sided polygons with identical overall sizes. The differences between the TekYurts and the UtiYurts are in the plastic and the secondary features. UtiYurts are manufactured with standard polypropylene extruded plastic. TekYurts are manufactured with polypropylene enhanced with an anti-UV additive that slows the gradual degradation of plastic from the sun's UV rays. [See FH: ORIGAMI ARCHITECTURE – WHAT’S THAT?, and PMT: EXTRUDED PLASTIC – WHAT’S THAT?]

Consider the UtiYurt as a utility yurt having fewer and simpler parts than a TekYurt. An UtiYurt is comprised of a round wall, a cone roof with insulated central vent that supports a stove chimney, and a single full-length door that latches but does not lock. UtiYurts may be the ideal choice for annex structures that don’t require windows or Dutch doors.

The TekYurt is an enhanced version of the UtiYurt. It includes a latching and locking Dutch Door, and a locking window as standard parts. [See SC: DUTCH DOORS – WHAT ARE THEY?, and SC: WINDOW DIMENSIONS (TEKYURTS)]

TekYurt and UtiYurt doors are interchangeable and both versions of these high-tech yurt shelters can be upgraded with additional doors and windows. [See SC: CUSTOMIZING TEKYURTS & UTIYURTS]

You can use TekYurts and UtiYurts interchangeably when constructing multi-room structures. [See SC: MULTI-ROOM FH YURT STRUCTURES]

TRANSPORT REQUIREMENTS – GETTING IT THERE (FH YURTS)

FH Yurts are relatively light weight. Two people can carry a boxed 160 lbs. (72.6kg) TekYurt or UtiYurt. A boxed LiteYurt weighs only 90 lbs. (40.82kg). The unassembled shelter is small enough that it can be delivered to its final destination on the backs of two men (or one donkey.) [See SC: WEIGHT (FH YURTS), and PD: SHIPPING & STORAGE SIZE (FH YURTS)]
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Because *FH Yurts* take advantage of origami architecture, they pack and store extremely efficiently. This also means that large quantities of these shelters can be palletized and shipped efficiently. [See FH: ORIGAMI ARCHITECTURE – WHAT’S THAT?, and PD: SHIPPING CONTAINER CAPACITY (FH YURTS)]

It is easy and efficient to break apart palletized stacks of individually boxed *TekYurts* and *UtiYurts* if heavy equipment like fork lifts is unavailable.

We do not recommend pushing them out of the back of helicopters (unless the helicopter is on the ground)...

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UV-ENHANCED PLASTIC (FH YURTS)

Long-life *FH Yurts* manufactured from polypropylene extruded plastic containing an anti-UV additive are available. [See PD: EXTRUDED PLASTIC OPTIONS – MAX UV]

At maximum strength, UV enhancement additives increase the expected functional life-time of the extruded plastic by about 100%. Major manufacturers of polypropylene typically report that standard polypropylene extruded plastic sheets will perform satisfactorily for about two years. They report that their UV-enhanced polypropylene will perform satisfactorily for between four and five years in high-sunlight environments.

The *Folded Homes*® long-term shelter test program is ongoing. As of December 3, 2007, the oldest remaining *UtiYurt* being tested had been performing satisfactorily for 416 days in the high desert country of Christmas Valley Oregon. The remoteness of that test site makes it difficult to visit frequently.

[See PMT: EXTRUDED PLASTIC – WHAT’S THAT?]

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VALUE EQUATION – WHAT IS SHELTER PROVISION’S REAL COST?

Inevitably, two competing factors must be balanced when making a choice about shelter. What kind of shelter is required? How much will it really cost?

To help answer the first question consider SC: 10 QUESTIONS TO ASK ABOUT SHELTERS. To answer the second question, consider the following.

The displacement occasioned by a humanitarian crisis frequently lasts substantially longer than anticipated. Often “short term” shelter becomes, by necessity, “long term” shelter.

- Shelters distributed for summer use become problematical when colder or wetter weather sets in.
• After a year, the cotton or nylon thread holding tents together begins to disintegrate from UV exposure.

These are some of the temporal realities that affect the type of shelter that is appropriate for a given crisis. How long does the shelter need to last? What are the weather conditions that it will need both to withstand and to protect its occupants from? When comparing the value of one solution relative to others, the necessary maintenance and/or replacement of the initial shelter should be considered along side to the cost of the initial shelter itself. In short, the cost of shelter provision through the entire period of the crisis needs to be considered.

Humanitarian crises rarely occur in convenient locations. The cost of getting shelter to those that need it often exceeds the value of the shelter itself. Yet if that delivery cost isn’t incurred the shelter won’t be provided. Related factors include

• unit shelter weight,
• unit shelter shipping size,
• delivery of required shelter deployment accessories such as ladders and stakes,
• the size and type vehicle required for delivery and whether local transportation infrastructure at the crisis location will support those vehicles,
• heavy equipment required for loading and unloading during transit,

All the delivery requirements imposed by the shelter selected should have a bearing on which shelter is chosen in order to reduce their contribution to cost. In general, a compact, reasonably light-weight shelter will incur fewer delivery costs. [SEE PD: TRANSPORT REQUIREMENTS – GETTING IT THERE (FH YURTS)]

Finally, the shelter technology itself has a bearing on costs. Technology factors affecting shelter deployment include
• required terrain preparation
• ease of assembly affecting deployment time,
• required trainers and on-site supervision,
• necessary tools and erection scaffolding or ladders
• whether power is required.

All of these real costs should also be factored into the value equation.

Considering all factors when comparing available shelter options helps determine the relative cost benefits of various shelter solutions.

[See SC: TEKYURTS – WHAT ARE THEY?]
VOLUME ORDER QUOTATIONS

The Folded Homes® website Price List includes pricing for individual shelters and accessories as well as examples of volume pricing. The price and volume availability of raw materials is constantly changing. Please allow us three days to produce a specific quotation for you.

WARRANTY (FH YURTS)

Folded Homes® warrants that TekYurts, UtiYurts, LiteYurts and associated FH Yurt accessory kits will leave the manufacturing facility complete, undamaged and properly packaged, and that all materials used in manufacture will perform according to the specifications of their primary manufacturers for the duration of the Folded Homes® warranty.

This warranty explicitly excludes any assumption of a TekYurt's, UtiYurt's or a LiteYurt's suitability for any specific purpose.

The lengths of Folded Homes® warranties are shelter dependent since they reflect the types of materials used in manufacture. LiteYurts and UtiYurts are
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covered by a limited 9-month warranty. TekYurts are covered by a limited 18-month warranty.

[See SC: TEKYURTS – WHAT ARE THEY? and SC: UTIYURTS – WHAT ARE THEY?]

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FOLDDED HOMES, LLC (FH)

ALLIANCE PACKAGING - FOLDED HOMES PARTNER

Alliance Packaging is more than just a manufacturer of Folded Homes® shelters. The development of the FH Yurt was a joint effort between Folded Homes® and Alliance Packaging motivated by our common desire to develop an effective humanitarian shelter solution.

[See FH: FOLDDED HOMES MISSION, and PSD: ALLIANCE PACKAGING – PRIMARY MANUFACTURER]

FOLDDED HOMES’ EXPERIENCED TEAM

The Folded Homes® team brings considerable experience to bear in our delivery and deployment of shelter solutions.

Folded Homes® founder and CEO, Markus Robinson has been actively working on the design and deployment of humanitarian shelters around the world since 2002. For the first 3 ½ years Markus was the president and CEO of Icosa Village Inc. which pioneered folded-shelter technology. Through the start of 2006 Markus was directly involved in the installation of more than 140 Icosa Village Pod shelters in six countries. Lessons learned from the summer 2004 construction of a five month 40-Pod village at Forum Barcelona Exhibition in Spain and the winter deployment of 50 Pod shelters to Pakistani quake victims high up in the Himalayas in December 2005 with MSF (Médecins sans Frontiers / Doctors
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without Borders) were pivotal to Markus’ understanding of the challenges that must be addressed in large volume shelter deployments. Markus’ shelter-

technology mantra following the Pakistan deployment was ‘simplify, simplify, simplify!’ and a return to the drawing board.

After Icosa Village was closed down against Markus' wishes in the spring of 2006, Markus improved folding structure technology and developed a new shelter in collaboration with the engineers of Alliance Packaging. [See FH: ALLIANCE PACKAGING: FOLDED HOMES PARTNER]

Alliance Packaging General Manager Scott Younger and the AP design team lead by Larry Rutstrom bring years of container design and manufacturing experience to bear on the problem as well as a strong desire to make a contribution to solving the humanitarian housing crisis. This collaboration produced the Folded Homes® Yurt shelters. [See SC: TEKYURTS – WHAT ARE THEY?, and FH: ORIGAMI ARCHITECTURE – WHAT’S THAT?]

Folded Homes® yurts underwent almost two years of development and alpha testing prior to their release to market in Q1 2008. All Folded Homes® trainers and deployment team leads have previously participated in Folded Homes® shelter deployments during this development or in deployments in the field. [See
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**FOLDED HOMES MISSION**

*Folded Homes®* was incorporated Q1 2008 to provide environmentally appropriate and cost-effective solutions to human shelter needs. The company is particularly focused on addressing humanitarian shelter needs at the same time as it offers shelters for personal use.

We believe that a truly effective humanitarian shelter solution is one that quickly delivers large numbers of easy-to-assemble, language-neutral, low-cost, four-season shelters even to locations where transportation infrastructure may have broken down.

While our *FH Yurt* shelters are our first shelter solution, over time we intend to provide a range of shelter solutions.

[See SC: *TEKYURTS – WHAT ARE THEY?*](#)

**FOLDED HOMES PRODUCT LOGO**

The *Folded Homes®* product logo is inspired by the more than 7,000 Hawaiian petroglyphs at the Pu’u Loa site in Volcano National Park on the Big Island. The left side of the logo invokes the centuries-old Mongolian Yurt design. The right side of the logo invokes its high-tech 21st century reincarnation as *FH Yurt* origami architecture.[See FH: *MONGOLIAN YURT – THE FH YURT PROGENITOR*, FH: *ORIGAMI ARCHITECTURE – WHAT’S THAT?*, and SC: *TEKYURTS – WHAT ARE THEY?*](#)
MONGOLIAN YURT – THE FH YURT PROGENITOR

The progenitor of the Folded Homes® Yurt is the yurt (more properly called a Ger) developed in the Mongolian steppe. These very simple and efficient structures consist of a covering (traditionally, felt cloth) stretched over a wood-frame lattice. Mongolian Ger date back at least as far as the 13th century when Genghis Khan unified the Mongolian tribes and created an empire that spanned most of the known world.

[See SC:TEKYURTS – WHAT ARE THEY?]

ORIGAMI ARCHITECTURE – WHAT’S THAT?

Origami is the art of paper folding. The goal of this art is to create a given result using geometric folds and crease patterns. At the start you have a flat two-dimensional sheet. At the finish you have a three-dimensional object.

Wired Magazine’s Alexander Rose coined the expression ‘origami architecture’ in March 2002 when he first set eyes upon the folded shelters of the company previously led by Folded Homes® CEO Markus Robinson. [See http://www.wired.com/wired/archive/10.03/eword.html?pg=6]

The Folded Homes® technology has dramatically improved although the basic idea is the same as the earlier technology: take flat sheets that have been stamped into a set of two-dimensional parts, fold them along their crease lines to make three-dimensional parts of the structure, and assemble those parts together to create a sturdy, rigid-walled shelter. [See FH:FOLDED HOMES MISSION.]

The approach to origami architecture developed by Folded Homes® improves upon the original technology Rose reported on in three important ways. Folded Homes® technology is human fault tolerant [See PMT:FAULT-TOLERANT DESIGN (FH YURTS)], it uses a more robust connection technology [See A:ASSEMBLY TECHNOLOGY (FH YURTS)], and it integrally solves the
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problem of water-tightness without reliance on additional tapes or films. [See SC: \texttt{KEEPING DRY - ROOF DESIGN (FH YURTS)}]

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PRODUCTION, SALES, & DISTRIBUTION (PSD)

ALLIANCE PACKAGING – PRIMARY MANUFACTURER

Alliance Packaging (http://www.alliancepackaging.net), the largest independent custom corrugated products manufacturer in the Pacific Northwest, is the primary manufacturer of Folded Homes® Yurts. Alliance Packaging’s manufacturing facility is located in Renton Washington outside of Seattle. [See FH: ALLIANCE PACKAGING – FOLDED HOMES PARTNER]

COMMISSION SALES

Folded Homes® offers an attractive commission sales program. Contact the company for information.

INTERNATIONAL MANUFACTURE

Alliance Packaging enjoys exclusive manufacturing rights to the TekYurts and UtiYurts. It has the option, at its discretion, to sub-contract as it sees fit. [See FH: ALLIANCE PACKAGING – FOLDED HOMES PARTNER]

WHOLESALE PRICING

Folded Homes® offers an attractive wholesale pricing structure to its distribution partners. [See PSD: WORLD-WIDE DISTRIBUTION]

WORLD-WIDE DISTRIBUTION

Although all international humanitarian market orders channel through Folded Homes®, we are actively seeking world-wide distribution channels for shelter sales in the consumer market. Please see the Distribution Opportunities page of our website for additional details. [See PSD: WHOLESAL PRICING]