

Research and Development Project Geodesic Family Tent

The new Geodesic Family Tent was recently introduced in the Emergency Items Catalogue.

<http://procurement.ifrc.org/catalogue/detail.aspx?volume=1&groupcode=111&familycode=111001&categorycode=TENT&productcode=HSHETENT11>

The Emergency Items Catalogue has supported this R&D project, and is happy to release this new specification. This is a special EIC newsletter on the new Geodesic Tent.

Background

The IFRC and the ICRC, with the support of the UNHCR have conducted a R&D Project from 2011 to 2016 to design a new type of Family Tent, for a family of five.

The new Tent requirements were:

- Light weight tent
- Synthetic materials
- Fire retardant materials
- Self-supporting structure for the tent

The new Geodesic Family Tent



Project milestones

In **July 2011**, several manufacturers were invited to join the project, offering their R&D capacities, free of charge. All partners had signed a "Copyright renouncement" before engaging into the project. Thanks to Alpinter, NRS, and Oxylane for their engagement.

To start on open bases, the R&D team produced a list of requirements for the new tent. This list was made as generic as possible to leave the field fully open to creativity. There were 46 requirements points, in the areas of:

- Tent sheet
- Structure
- Insulation
- Winterisation
- Logistics
- Procurement
- Environment

In **2011-2012**, several designs were proposed, including tepee, dome, tunnel, umbrella, square, hexagonal, octagonal. The R&D team selected 3 designs, for further testing and evaluation.

In **2013**, 3 sets of 10 tents of each design were sent to Burkina Faso, Rwanda, and Tanzania for field testing in life condition. Thanks to the participants, and to the test supervisors, the R&D team was able to collect an important amount of information.

The tests were organised and supervised by the IFRC-SRU (Shelter Research Unit), and with the essential participation of the Red Cross National Societies of Burkina Faso, Rwanda and Tanzania.

The selected first series of prototypes:



Dome



Hexagonal



Umbrella

In particular, the use of polyethylene (PE) sheeting as the main tent material was validated, with many advantages as compared to the usual polyester-cotton mix canvas.

- Lighter weight, high tensile strength, 100% waterproof
- Higher opacity, for privacy and for temperature control
- Less costly
- More durable, 100% rot-proof, high resistance to UV
- Slow burning material, for fire safety



Field test 2013

The field test results, together with the sample analysis produced by the R&D team, allowed to design one tent that would fit all criteria.

All along this process, the industrial partners, Alpinter and NRS, provided their continued support, offering technical expertise and production capacities to manufacture the different prototypes.

In **2014**, samples of that new design were submitted to the team. After several adjustments, the R&D team approved the interim specification for that new tent, so called "Improved Dome Tent", and planned a final field test for validation.

In **2015**, 10 tents were sent to Burkina Faso for field testing, which validated most of the features of this new tent.

The Improved Dome Tent prototype:



Field test 2015

Nevertheless, due to harsh climatic conditions, the field test allowed to identify two major failures.

Based on this feedback, the industrial partners were requested to propose solutions to achieve:

- A better stability in wind
- A more efficient shade cover



Field test 2015

At the end of **2015**, several adjustments in the design were proposed, and tested in laboratory (wind tunnel test).

In **February 2016**, after analysing the final test results, the ICRC and IFRC validated one final design.

Later in **2016**, samples of the final design were produced by the two industrial partners, and validated by the Quality Management team at ICRC Logistic Centre in Geneva.

Fire resistance

One final test was required to verify in real condition the efficiency of the tent fire resistance. In case of fire, the occupants of the tent must have minimum 4 minutes to evacuate, a requirement included in the tent specification under EU standard EN13823. The result is a Slow Flame Spread product that burns slowly, and does not require chemical additives.

In January **2017**, thanks to the Geneva Fire Brigade, 3 tents were installed at CECOFOR training centre, in Geneva. Two tents were set in fire. The third tent being positioned to observe the fire transmission from tent to tent, if any.



The test result is above the requirements. The tents did not catch fire, leaving far more than 4 minutes to evacuate. See the video of the test on <https://www.youtube.com/watch?v=Y7Frz-MlqSY>

Final product

After this final check, the specifications were 100% validated by the ICRC and IFRC Procurement and Technical depts., allowing the publication in the Emergency Items Catalogue. A tender process has now started, with active sourcing to validate several suppliers.

Thanks to the continuous commitment of the IFRC Shelter and Settlement dpt, The ICRC Water and Habitat dpt, IFRC and ICRC Procurements dpts, Alpinter and NRS, without whom this R&D Project could not have been so successful. All the original requirements are met:

- Lighter weight
- Better durability
- Better protection against heat and cold, ventilation
- Increased habitability, meet Sphere standard
- Self-standing structure
- Rot-proof during storage and usage
- Slow Flame Spread
- No cost increase

