

# Plastic sheeting, use and procurement in humanitarian relief

Plastic sheeting is one of the most widely used and distributed Non food Items in humanitarian relief. It is a highly adaptable material with many uses in many different sectors.

This technical brief focuses on when to use, how to use and fix plastic sheeting as well as summarising its procurement.

## What is plastic sheeting?

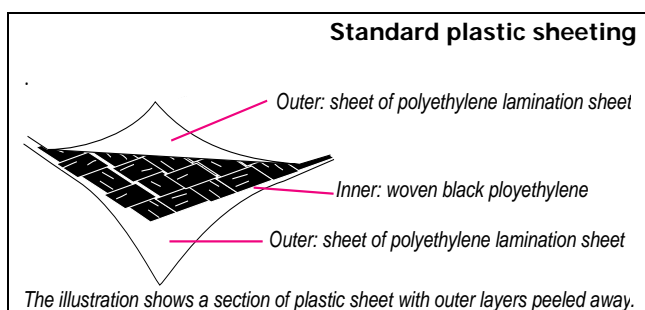
Plastic sheeting (also known as plastic tarpaulin, tarp, or polythene sheet) is a sheet of strong, flexible, water resistant or waterproof material. Plastic sheeting suitable for humanitarian relief is made from polyethylene.

Although there are many types of plastic sheeting available on the market, not all are suitable for relief distributions on account of their lack of resistance to sunlight or the lack of strength.

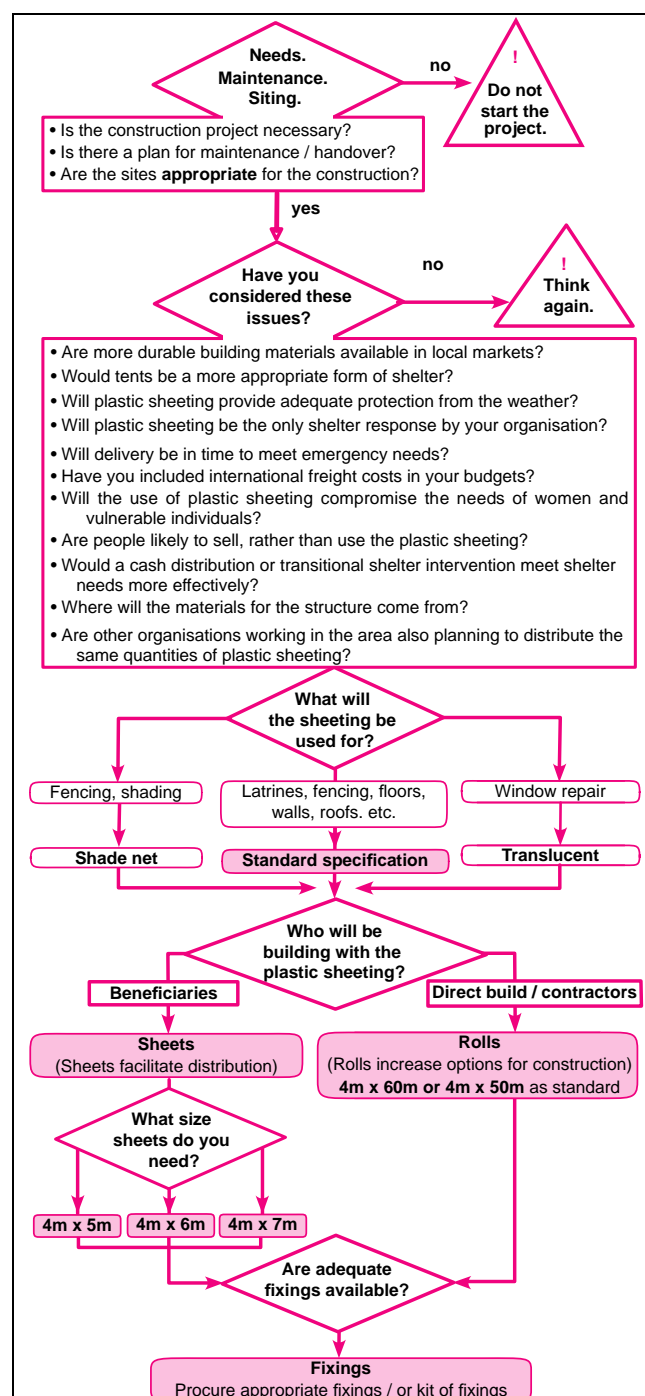
Standard sheet has a black woven or braided core and is laminated on both sides. All plastic sheeting must reach minimum performance standards

The anticipated lifetime of plastic sheeting is less than 2 years. It is often used to cover emergency shelter and sanitation needs until more durable solutions are found.

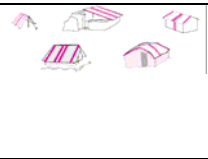
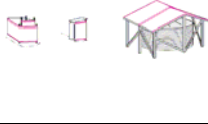

Plastic sheeting is not a building solution on its own. It must be combined with local materials and tools to provide structure and fixings



## When to use plastic sheeting



## Using plastic sheeting

Some of the uses of plastic sheeting	
<b>Family shelter:</b> - Basic shelter structures - Repair of damaged buildings - Upgrade of tents and shelters - Timber framed shelters	
<b>Sanitation and water supply:</b> - Latrines - Washrooms - Protection of water tanks	
<b>Infrastructure / other uses:</b> - Fencing - Repair of schools and clinics - Temporary structures - Rainwater harvesting - Cholera beds - market stalls - food storage and drying	

### Using plastic sheeting : Shelter

Shelter is a **habitable, covered** living space.

**Shelter is more than just a roof.**

For a space to be habitable, it must offer protection from the elements and have access to water and sanitation.

### Plastic sheet, plus poles and fixings.

Various uses of plastic sheeting in kits and basic shelters are illustrated below. Although these structures are not ideal, they are commonly required to meet emergency needs following conflict or disasters.

Plastic sheeting can be used in cold climates to create a thermal buffer zone, windows and for emergency upgrading of tents



**Example:** A family shelter repair kit following an earthquake (note: Most items can be purchased nationally. The kit will have to be adapted according to circumstances.)

#### **Roof, and / or walls and floor**

- Plastic sheet

**Tools** - possibly distributed per community instead of by family.

- Hammer

- Saw

#### **Fixings**

- Nails (5kg), 5cm -12.5cm, (2" -5")

- Washers ( $\frac{1}{2}$ kg)

- Rope (20m)

- Metal strap, 1mm thick (20 pcs.) (to nail over / strengthen timber joints)

- Binding wire (5kg)



**Example:** A very basic plastic sheeting shelter (with no ends) for hot climates.

This type of emergency structure is a last resort when no other options are possible. It should be upgraded as soon as possible.

#### **Basic structure and fixings**

- Timber for ridge pole (4m long)

- Timber batten for ridge (A.5.1)

- Rope (20m)

- Nails, 5cm, (2"), ( $\frac{1}{2}$ kg)

- Nails, 12.5cm, (5"), ( $\frac{1}{2}$ kg)

- Ground pegs (metal or timber)

**Roof,** and / or walls and floor

- Plastic sheeting



**Example:** Waterproof covering for a bush pole and grass matting shelter.

(Design details depend on local construction and materials availability.)

**Basic structure** - quantities dependent on local design:

Bush poles - type as used locally

Strong binding wire

Woven grass mats

Oil / diesel - termite treatment

**Roof, and / or floor**

Plastic sheet

**Fixings**

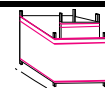
Rope (20m) (for fixing sheeting)

### Using plastic sheeting: Sanitation

The **primary objective** of sanitation programmes in disasters is to provide dignity for people and to reduce the risks associated with faecal-oral diseases.

### Sanitation is more than a latrine

Construction on its own will not solve all sanitation issues. Ensure that disaster-affected people have the necessary information, knowledge and understanding to prevent disease from poor sanitation.



**Example:** A basic superstructure for latrine / washroom

#### **Structure**

- Solid timber poles (6x3m)

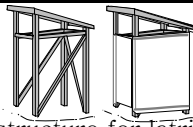
#### **Cover**

- Plastic sheet , 6x3m (cut in half)

#### **Fixings**

- Domed head nails (1kg)

or nails and battening



**Example:** A superstructure for latrine / washroom using plastic sheeting  
*Building blocks of latrines can save materials but it can be harder to encourage ownership and keep them clean.*

*Aim for a minimum of one latrine per twenty people*

**Structure**

- Timber (0.1M<sup>3</sup>)
- Nails (3Kg)

**Cover**

- Plastic sheet (6.5m<sup>2</sup>)
- Domed head nails (1kg) or nails and battening



**Example:** Use of plastic sheeting as temporary but washable latrine slab

**Use of plastic sheeting in infrastructure**

Plastic sheeting is commonly used in the repair or construction of temporary buildings for use as clinics, schools, community centres, distribution or registration centres, way stations, offices, or warehousing. It is also commonly used for covering of materials and fencing.

When plastic sheeting is to be used for infrastructure purposes by organisations or contractors, it is easier to use by the roll than in individual sheets.

**Shadenet**

Shadenet should be encouraged as a cheaper (but durable) alternative to plastic sheeting for fencing and for the provision of shade in hot climates. (further reading: Shadenet / msf / sheltercentre)

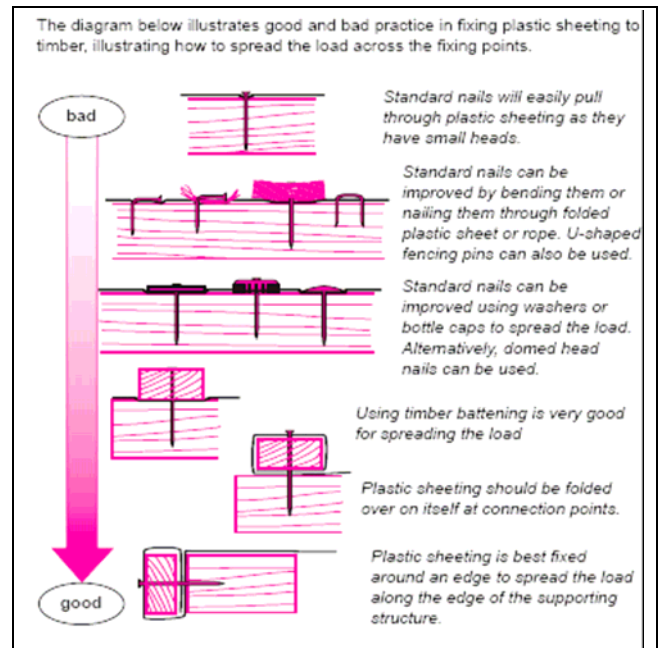
**Fixings**

Once good plastic sheeting has been procured, the main principles to observe when fixing plastic sheeting are:

- 1) Spread the load
- 2) Prevent the sheeting from flapping
- 3) Avoid contact with points of friction
- 4) Avoid Hotspots

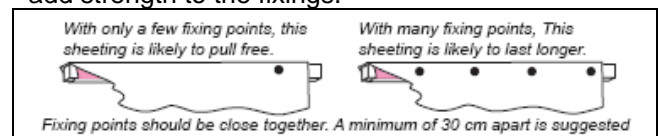
**1) Spread the Load**

Fixings of plastic sheeting must be spread over a large area to prevent them from pulling through.



**Reinforcement bands**

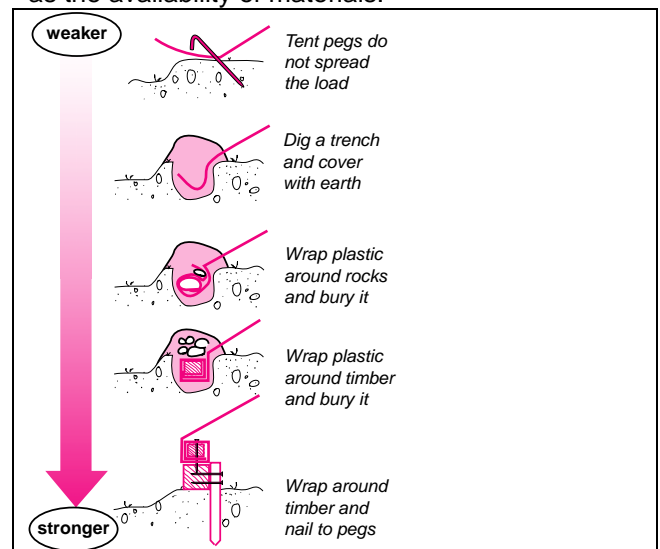
If plastic sheeting with reinforcement bands is available, fixings should pass through the bands to add strength to the fixings.



**Fixing to the ground**

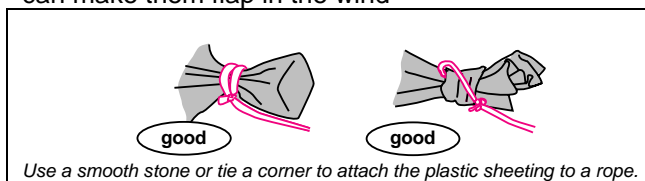
When plastic sheeting is connected directly to the ground, 50cm of additional plastic is required on each side for burying in trenches. If timber is available, then the plastic sheeting can be nailed to timber runners that are pegged to the ground (or connected to the foundations).

Whilst sandy soils will not grip the plastic sheeting as well as other soil types, it may be very difficult to dig trenches in some rocky soils. Choosing a method for fixing the sheeting to the ground therefore depends upon the soil conditions as well as the availability of materials.



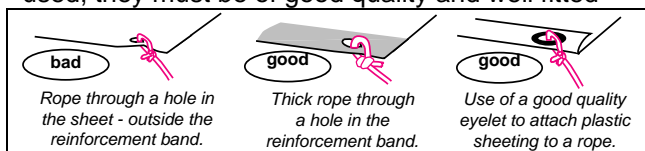
## Fixing to rope: Rock and stone

A strong way of fixing rope to plastic sheeting is to fold a smooth stone (minimum 3cm diameter) inside the plastic sheeting and tie rope or strong cord behind it. This can cause sheets to crease which can make them flap in the wind



## Fixing to rope: Reinforcement bands

Plastic sheeting either comes with reinforcement bands or with eyelets fitted. The reinforcement bands are usually grey or blue. Sheeting can be fixed by cutting a small hole in the reinforcement band and tying thick cord through it. Where eyelets are used, they must be of good quality and well fitted



### 2) Keep sheeting tight

When plastic sheeting is not tight, it flaps with the wind and can collect water puddles. This is both noisy and damages the plastic sheeting. To avoid flapping, always encourage people to **pull plastic sheeting tight** when building with it.

### Ponding and puddles

With poorly designed roofs, puddles of water can collect on the plastic. These puddles can break the roof, cause the plastic sheeting to stretch, increase the likelihood that roofs will leak, and can become breeding ponds for mosquitos.

### 3) Avoid sharp points

Plastic sheeting is easily punctured by sharp points or worn away by rough surfaces (especially if it is not fixed tightly). When building a frame for plastic sheeting ensure that all nails are flush with the timber. Ensure that edges and rough surfaces that will be in contact with the plastic have been smoothed. External objects such as tree branches can puncture plastic sheeting.

### 4) Avoid hot spots.

Plastic sheeting will get hotter where it is stressed over any structure that will hold and release heat, especially metal or black surfaces. This can cause the plastic to weaken and break. Prevent sheeting from overheating at contact points by:

- Designing structures to reduce the number of contact points.
- Covering the plastic sheeting with opaque adhesive tape on the outside of the cover.
- Painting the plastic sheeting with aluminium or bitumastic paint at the contact points.

- Covering the structure with light coloured insulating material.

## Procuring plastic sheeting

The quality of plastic sheeting is impossible to identify by visual inspection, specifically with regards to durability under sunlight. For this reason, plastic sheeting is commonly procured in bulk by head office to very precise specifications. However, regional and headquarters staff should proactively identify regional sources of good quality sheeting in preparedness rather than at the time of a crisis

## Further information

### Plastic sheeting / Shade net

Plastic sheeting – A guide to the specification and use of plastic sheeting in humanitarian relief. Oxfam / IFRC 2007. [www.plastic-sheeting.org](http://www.plastic-sheeting.org)

Howard and Spice, Plastic Sheetting, Oxfam Publishing 1989

Sheltercentre, MSF-B shade nets, use deployment and procurement of shade nets in hamintarian relief environments, MSF-B, 2006. ([www.shelterlibrary.org](http://www.shelterlibrary.org))

### General reference

The Sphere project, Humanitarian Charter and Minimum Standards in Disaster Response, 2004, ([www.sphereproject.org](http://www.sphereproject.org))

UNHCR Handbook for Emergencies, UNHCR, 1999 ([www.unhcr.ch](http://www.unhcr.ch))

### Sanitation

Lambert and Davies, Engineering in Emergencies, 2003, RedR

### Shelter

Shelterproject / Oxfam publishing, Transitional Settlement: Displaced Populations, 2004. ([www.shelterproject.org](http://www.shelterproject.org))

UN/OCHA, tents, A guide to the logistics and use of family tents in humanitarian response, UN/OCHA, 2004 (Available from [www.shelterproject.org](http://www.shelterproject.org))

### Infrastruture

MSF, Temporary and Semi-permanent structures for health strucctures in Refugee camps, MSF (Available from [www.shelterlibrary.org](http://www.shelterlibrary.org))

Procurement catalogues, specifications and guidance

ICRC / IFRC (International Committee of the Red Cross / International Federation of the Red Cross) Emergency Relief Items Catalogue.

MSF (Medecins Sans Frontières) Catalogue ([www.msf.org/source/refbooks](http://www.msf.org/source/refbooks))

UN/OCHA Timber: A guide to the planning, use, procurement and logistics of timber as a

construction material in emergencies (first draft 2007). (available from [www.humanitarian timber.org](http://www.humanitarian timber.org))