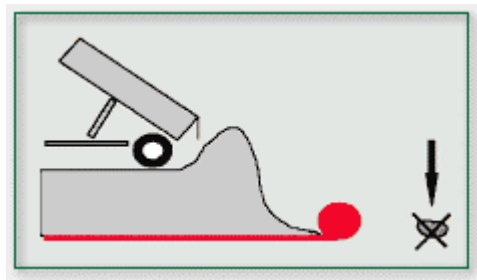


Installation Guidelines

Temporary roads

Ground separation and support are the two main functions of Typar® in temporary road construction. Since the soil / Geotextile / aggregate system tends to be deformed by imposed traffic loads, special attention must be paid to laps and anchorage:

- Remove all large debris which might puncture Typar®.
- Unroll Typar®. The width of Typar® should be at least as great as that of the aggregate layer.
- If two or more widths are required, ensure sufficient [overlap](#).
- If it is windy, use shovelfuls of coarse aggregate at regular intervals to hold Typar® in place.
- Backdump aggregate without driving on Typar®.
- Level and compact aggregate before any heavy traffic occurs.
- Avoid aggregate size in excess of 1/3 of aggregate layer thickness.
- Fill up ruts, if any, as soon as they exceed 1/3 of aggregate thickness. Rutting will then be stopped.
- First aggregate layer must be at least 25cm thick.



Permanent roads

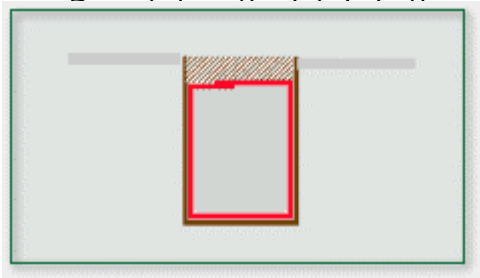
The prime role of Typar® in permanent road construction is that of ground separation. However, during the construction phase the base courses are often used as a temporary road surface and in these cases Typar® also acts as a support membrane. The installation of Typar® in permanent road construction is identical to that for temporary roads.

Drainage systems with Typar®

a) Trenches

DYSTRYBUCJA TYPAR

- The base and side walls of the trench should be as free of irregularities as possible (holes, roots,
- Lay Typar® parallel to the trench and anchor the edges of the fabric.



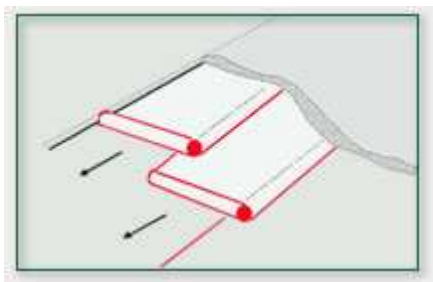
ud. This will result in the deposit of a large amount of fine particles on an impervious film.

es carefully to avoid the fabric being dragged towards the bottom of

- Do not use over-large stones to fill up the trench. Gravel of max. size 2 cm is required to ensure good fabric-to-soil contact
- Compact the aggregate and enclose it with Typar® before backfilling to the top of the trench.
- Overlap lengths of Typar® by at least 30 cm

b) Blanket drains

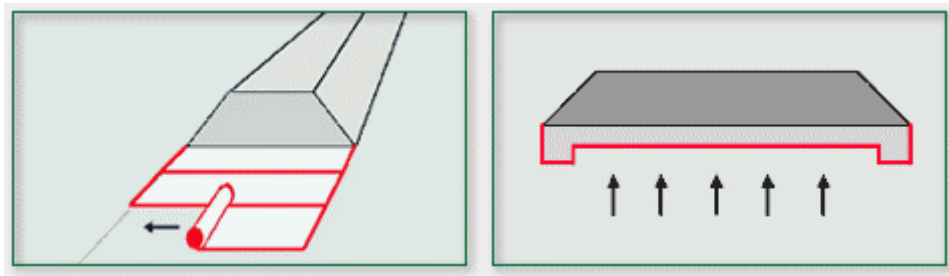
- Overlap min. 30 cm.
- Do not unroll Typar® too far in advance, especially in windy conditions.
- Use relatively small sized aggregate to ensure good fabric-to-soil contact.



Embankments on compressible soil

A Geotextile will stretch considerably during consolidation and settlement and, by providing lateral support, will tend to increase embankment stability horizontal.

- Level surface.
- Unroll Typar® perpendicular to the embankment axis to ensure full efficiency in the principal direction of force. Side-laps must be at least 1m.
- If necessary, lengths of Typar® can be sewn together in order to obtain a continuous sheet parallel to the embankment axis.
- To increase rate of settlement it may be beneficial to install a layer of sand or gravel to act as a drainage blanket. In this case Typar® will act as a filter membrane

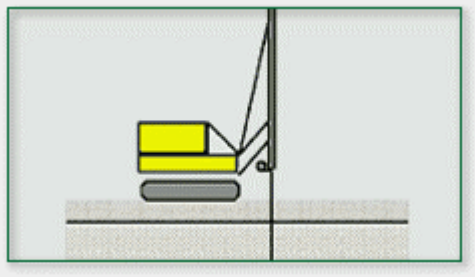


Vertical drains with Typar®

In some cases vertical drains are required to accelerate embankment settlement on soft, saturated soils.

DYSTRYBUCJA TYPAR

To permit installation of vertical drains using heavy plant, it will be necessary to install a layer of coarse aggregate on Typar®. The aggregate layer will then also act as a drainage blanket. Since Typar® is sandwiched between the subsoil and the gravel layer, friction forces are usually sufficient to hold it in place during perforation by the vertical drain mandrel.



Required overlap

- The side and end laps needed depend on soil properties (CBR), the project nature and on the deformations which might be expected to occur.

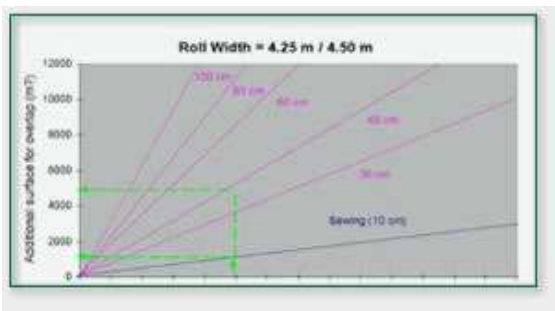
Overlaps normally used:

- Drainage systems: 30 cm
- Parking lots, permanent roads: 30 to 50 cm
- Erosion control systems: 50 to 100 cm
- Temporary roads: see graph

Additional area required allowing for over laps:

The two following graphs show the amount of extra Typar® needed, depending on the calculated surface area and the overlap width.

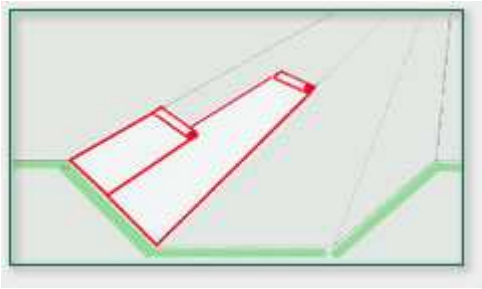
Estimates of the savings possible by sewing or welding instead of overlapping are clearly demonstrated. For applications where Typar® is used for reinforcement purposes, overlapping requires special attention. Calculations by experienced design engineers may be needed to check the correct transmission of stresses.



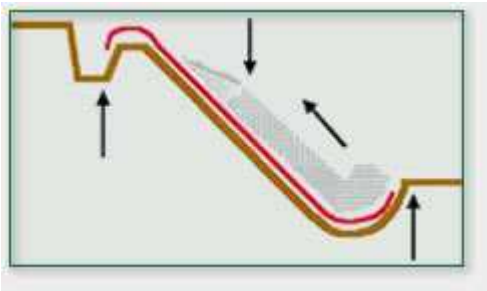
Erosion control systems with Typar®

- If possible, grade and compact slopes.
- If slope width is less than 8m, unroll Typar® along the length of the lower half of the slope first, then place Typar® on upper half of the slope with 0.5 to 1m overlap.

DYSTRYBUCJA TYPAR

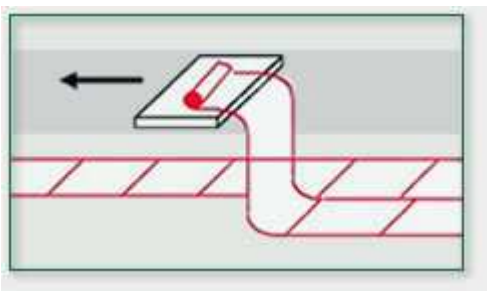


- If slope is over 8m, place Typar® in full-width lengths from slope top to bottom. Overlap in direction of waterflow.
- Excavate ditches for anchoring Typar® at top and toe of slope. The toe is the foundation of the structure and should get special attention to prevent undermining.
- When placing rip-rap or gabions, start at toe and work up the slope to prevent sliding. Install rip-rap smoothly, without dropping it heavily on to the Typar®
- To ensure good fabric-to-soil contact, first of all place a layer of bedding material (gravel) on the Typar® This layer will also help prevent puncturing by heavy rip-rap.
- Anchor the fabric in the ditch at the top edge of the slope with soil and vegetation. This deep anchoring method will prevent large volumes of surface water from getting under the fabric and lifting the entire structure.



Hydraulic applications

- With a density of just 0.91, polypropylene sheets of Typar® float naturally on water.
- For rapid and consistent installation, attach steel rods (e.g. typical 6 mm diameter rebar) every 5 metres. These rods will keep the fabric flat, thus allowing a regular overlap. (No need for divers. Smaller overlap = cost savings.)



Handling of rolls

- No Soak

Thick Geotextiles soak up water. When it rains they are difficult to install because of their increased weight. At sub-zero temperatures they become impossible to use since they freeze solid. Typar® can be stored outside. It does not absorb water and therefore will not freeze.

DYSTRYBUCJA TYPAR

- Storage

Typar® rolls take up less space than many other Geotextiles, thus storage and transportation are efficient.

- Cutting

Typar® is thin and light making the compact rolls easy to transport and install. Rolls can be easily cut to the desired width with a chain saw. This is almost impossible with most other Geotextiles.