TYPAR®
GEOTEXTILES

UNPAVED ROADS
LESS AGGREGATE, LESS RUTTING

PAVED ROADS AND PARKING LOTS
LONGER LIFE, LESS MAINTENANCE

INDUSTRIAL YARDS
LESS AGGREGATE, LONGER LASTING

SUBSURFACE DRAINS
PRESERVES DRAINS

EROSION CONTROL
PREVENTS PIPING

LANDFILLS
TOUGH, DURABLE AND STOPS CLAY

RECREATION FACILITIES
EASY INSTALLATION,
MINIMAL MAINTENANCE

WASTE HANDLING SYSTEMS
PREVENTS SOIL INTERMIXING
FOR LONG LASTING SEPTIC SYSTEMS

LANDSCAPING
EFFECTIVE WEED CONTROL

Typar is the tough, long lasting and versatile geotextile fabric to cut your construction and maintenance costs.

TYPAR®
GEOTEXTILES

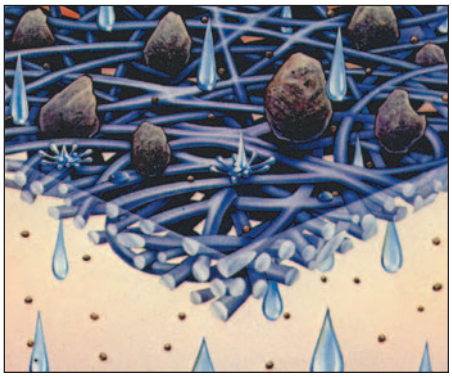
TYPAR – The ideal geotextile

Typar is a long lasting, durable nonwoven geotextile fabric for paved and unpaved roads and surfaces, drainage, waste handling systems, erosion control and landfills. Manufactured from high quality polypropylene, Typar is a continuous filament, heat bonded fabric with superior uniformity that separates, reinforces and filters soil particles while letting water pass freely through.

No matter what your needs, Typar geotextiles offer an easy to install, economical and proven alternative to more expensive and less effective construction materials and methods.

Typar is a high quality geotextile that offers a number of benefits including:

- Lower construction cost from reduced aggregate base thickness
- Reduction in construction time from reliable product quality and ease of installation
- Reduction in ongoing maintenance costs through Typar's proven performance, toughness and durability over time



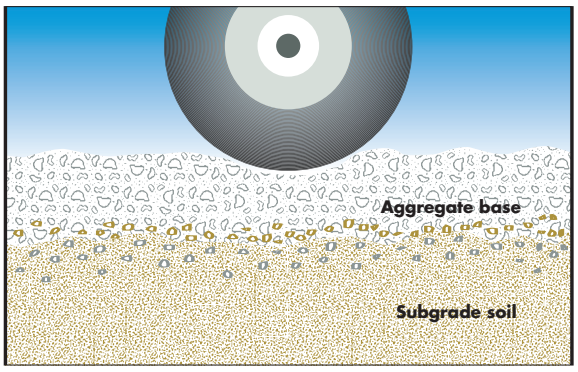
Typar is available in a variety of widths and lengths and weights ranging from 1.5 oz/yd^2 to 8 oz/yd^2. The requirements of AASHTO M288 are met by the following styles:

Class 3 – Typar 3401
Class 2 – Typar 3501
Class 1 – Typar 3631

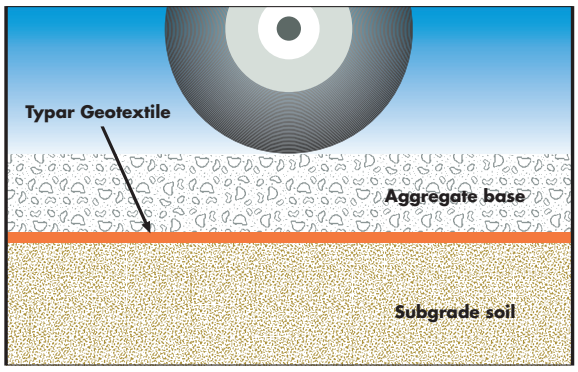
Unpaved Roads and Industrial Yards

Unpaved roads and yards built without an asphalt or concrete surface course derive all structural support from the aggregate base and are generally used by heavy trucks and equipment that are prone to cause severe damage. Greater thicknesses of aggregate base are needed to support the loads. Typar is vital to prevent intermixing of the aggregate into the subgrade soil which results in ruts and pot holes.

- Prevents intermixing of aggregate with underlying soils
- Reduces the thickness of aggregate required
- Eliminates the need for frequent re-application of aggregate



Without Typar, soil contaminates and weakens aggregate base resulting in failure of the road.



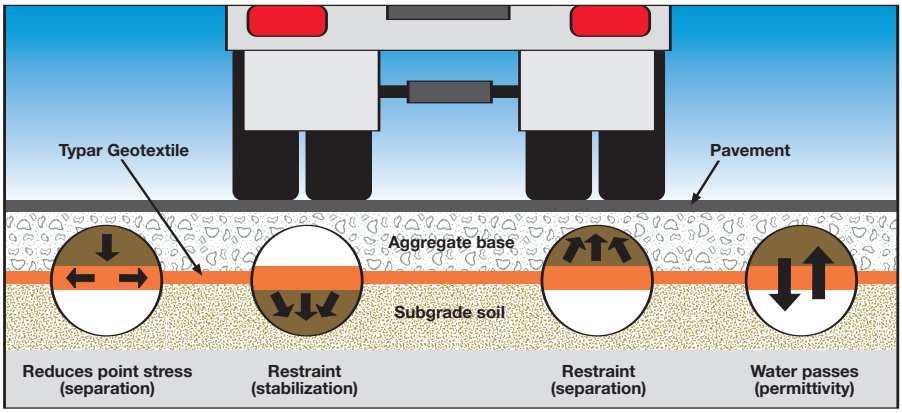
With Typar, aggregate won't sink into poor soil but stays in tact to support loads.

Paved Roads and Parking Lots

Typar provides a rugged separation and stabilization layer between the road structure and the subgrade soils. The use of Typar in this application goes back over 30 years, and is proven to be an exceptionally durable geotextile.

- Prevents mixing of the valuable road base aggregate with the underlying subgrade soils
- Enhances drainage of the subgrade soils while preventing pumping of fine soil particles into the base aggregate
- Reduces the required amount of road base aggregate by preventing intermixing
- Assures long term prevention of road base deterioration

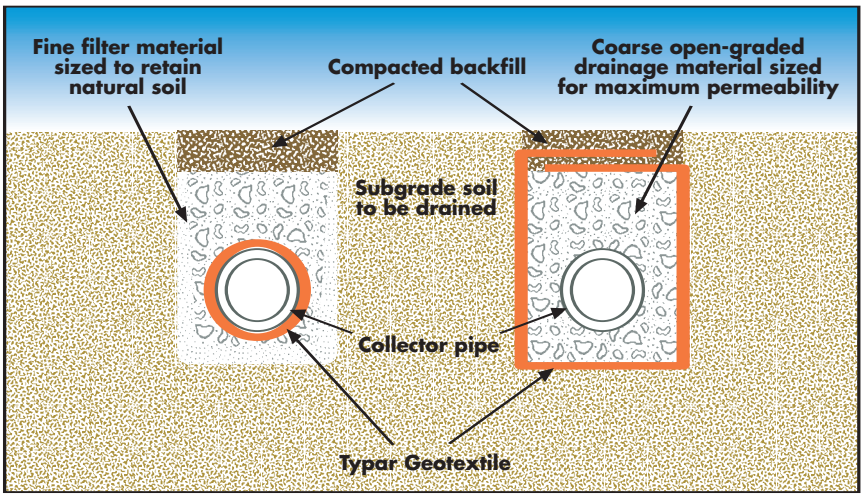
Typar stabilizes and preserves paved roads by providing a separation layer between the aggregate base and subgrade.



Subsurface Drains

Subsurface drains require a properly designed protective layer that prevents the movement of soil into a drain that would cause clogging of the drainage system. Typar geotextiles provide a uniform filter layer around subsurface drains, allowing water to pass freely into and through to the drain. Typar Geotextiles also function similarly behind retaining walls and next to pools.

- Prevents migration of subgrade soil particles into the drain
- Enhances the natural long-term development of a graded particle filter
- Reduces construction time and cost
- Eliminates the cost and difficulty of constructing an alternative graded aggregate filter
- Easy to handle and install
- Typar is available in a range of opening sizes to deal with most any soil



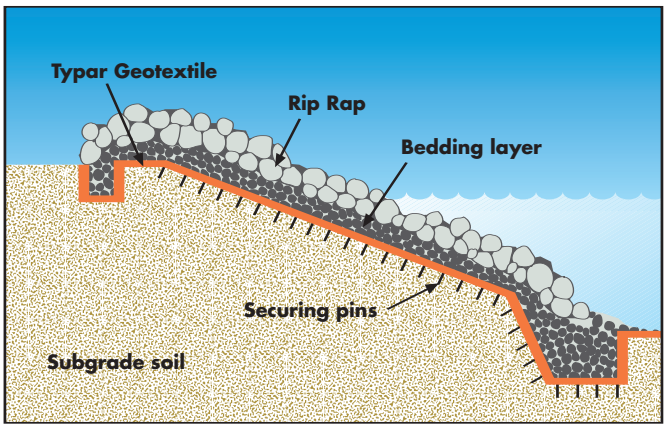
Interceptor drain systems.

Erosion Control

Erosion control structures dissipate the mechanical and hydraulic forces that cause erosion of the soil behind them. Typar geotextiles provide a dependable filter and protection layer for stream banks, shorelines, slopes, submerged foundations, retaining walls, bulkheads and revetments. Typar is installed with a layer of bedding stone under armor stone (rip rap), gabions or pre-cast block systems.

Bedding stones are needed to provide intimate contact (prevent piping), UV protection, protection from armor stones and vandalism.

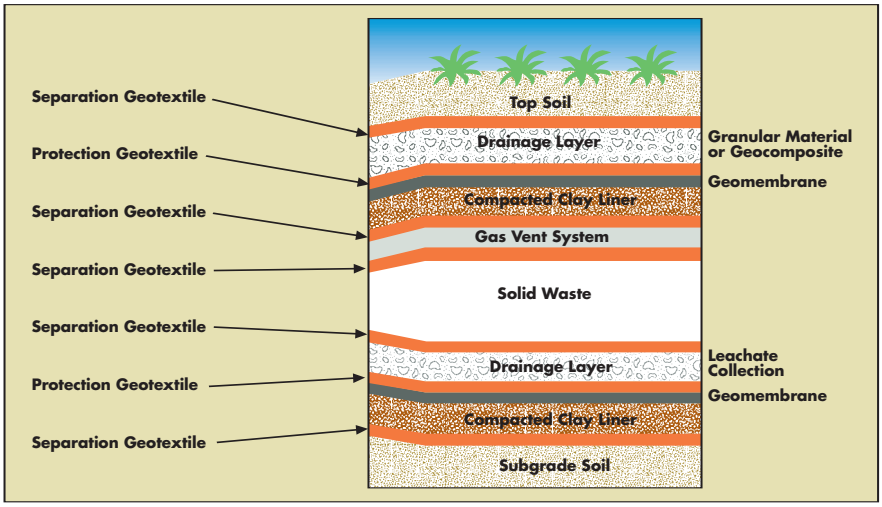
- Prevents undermining of the armor layer by soil movement
- Enhances drainage of the slope soils without associated pumping or piping of fine soil particles
- Eliminates the difficulty and uncertainty associated with graded aggregate systems
- Simplifies construction and reduces construction time and cost



Stream bank erosion control.

Landfills

Typar geotextiles serve a number of important functions in all types of landfill and waste management applications. It is used as a protective layer to prevent geomembrane liner damage, as a permeable separation layer to preserve drainage integrity and prevent clay intrusion into a geonet, and in landfill cover systems as well as for temporary daily covers. Because Typar resists a wide range of chemicals, it is frequently used in hazardous waste landfills which must meet stringent EPA regulations and FHWA drainage criteria. Typar has particularly high strength and tear resistance properties when compared to other geotextiles of the same weight making it the economical choice.



Typical hazardous waste landfill lining and cover system to meet EPA regulations.

- Typar is a very effective and durable daily cover, easy to use and store
- Prevents damage to or abrading of the geomembrane during its deployment and the placement of overlying materials
- High modulus protects drainage layers from soil intrusion
- Small opening size prevents clay from passing into leachate collection and leak detection layers
- Resists chemical attack
- Assures long term tear resistance

Recreational Facilities

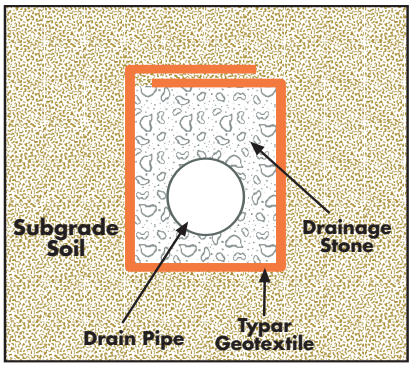
From football fields, baseball parks and race tracks to golf courses, Typar geotextiles are needed to keep layers of the structure separate and prevent contamination of customized surfaces by underlying soils. Blanket and trench drain systems for recreational facilities often use Typar for economical reasons and for ease of installation permitting fast, simple construction.

- Preserves the integrity of specialized surface materials
- Enhances the natural long-term development of a graded particle filter
- Eliminates the need for sacrificial layers and allowances in the structure
- Simplifies construction and reduces construction time and cost

Waste Handling Systems

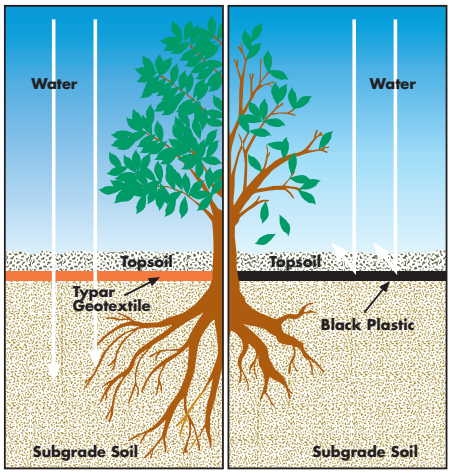
On site waste water disposal or septic systems serve approximately one-third of the households in the United States. Septic systems are designed to disperse large volumes of liquid by percolation into the ground through large subsurface drainage systems. Typar extends the system life significantly.

- Prevents soil particles from clogging large drainage systems
- Enhances the passing of liquid through the system
- Unaffected by most chemicals
- Simplifies construction of large drainage fields
- Proven alternative to graded aggregate or sand filters which are more expensive and difficult to install



Typar is a permeable barrier that separates soil from drainage material.

Landscaping



Compared to the plastic film on the right, Typar's porous structure allows water, nutrients and air to pass through to plant roots

Typar is ideally suited for landscaping applications. Its permeability allows for fast drainage and the passage of air and fertilizers. Its tight fiber structure minimizes penetration by weeds and roots and prevents unwanted growth beneath the fabric. Its small opening size prevents piping or erosion of subgrade soils. Typar is generally placed over natural soil and covered with a layer of decorative stone, bark or mulch. Weed growth is inhibited in landscaped beds and under decks. Gravel and stone paths retain their structure longer by separating cover materials from subgrade soils. When roots are a problem particularly in sidewalks, curbs and drainage systems, Typar Biobarrier® root control system should be used which involves the controlled release of a herbicide from the Biobarrier® fabric system.

- Allows moisture, fertilizers and air to reach soil for healthy plants
- Reduces weed germination
- Prohibits weed growth beneath fabric
- Prevents uneven settling of patios
- Durable, tear resistant, won't rot or mildew
- Lightweight and easy to install
- Assures long term minimal maintenance of the landscape

TYPAR English Properties

AASHTO Class M288			-	-	-	-	3	2	2	1	1
			Typar 3151	**Typar 3201**	**Typar 3301**	**Typar 3341**	**Typar 3401**	**Typar 3501**	**Typar 3601**	**Typar 3631**	**Typar 3801**
MECHANICAL (MARV)[1]											
Grab tensile strength	ASTM D4632	lbs	35	60	120	120	130	160	240	250	300
Grab elongation	ASTM D4632	%	60	60	60	60	60	60	60	60	60
Trapezoidal tear strength	ASTM D4533	lbs	15	25	35	40	60	60	90	90	95
Puncture strength	ASTM D4833	lbs	10	18	25	34	41	56	67	81	93
CBR Puncture	ASTM D6241	lbs	-	-	-	-	225	310	370	435	510
ENDURANCE (MARV)[1]											
UV resistance @ 500 hrs	ASTM D4355	%	-	-	-	70	70	70	70	70	70
HYDRAULIC (MARV)[1]											
Apparent opening size[2]	ASTM D4751	US Sieve	20/30	30	50	60	70	70	140	140	170
Permittivity	ASTM D4491	sec^{-1}	1.5	1.0	0.8	0.7	0.7	0.5	0.1	0.2	0.1
Water flow rate	ASTM D4491	$gal/min/ft^2$	235	190	95	85	60	50	15	20	8
PHYSICAL (Typical)											
Unit weight		oz/yd^2	1.6	1.9	3.0	3.4	4.0	5.0	6.0	6.3	8.0
Roll diameter		in	7	7	8	8	9	10	10	10	12
Length		yd	100	100	100	100	100	100	100	100	100
Width		in	151	151	151	151	151	151	151	151	151
Roll area		yd^2	419	419	419	419	419	419	419	419	419
Roll weight gross		lbs	50	58	87	97	113	138	165	173	218
Width		In	-	-	-	-	187	187	187	187	187
Roll area		yd^2	-	-	-	-	519	519	519	519	519
Roll weight gross		lbs	-	-	-	-	142	175	209	219	275

NOTES:
1 Minimum average roll values (MARV) in the weaker principal direction
2 O_{95} Max. ARV

Product Selection Guide

	3151	3201	3301	3341	3401	3501	3601	3631	3801
Paved roads & parking lots				●	●	●	●	●	
Unpaved roads				●	●	●	●	●	
Industrial yards				●	●	●	●	●	
Subsurface drains		●	●	●	●	●	●	●	
Erosion control				●	●	●	●	●	●
Landfills				●	●	●	●	●	●
Recreational facilities		●	●	●	●	●	●	●	
Waste handling systems	●	●	●	●	●	●	●	●	●
Landscaping		●	●	●	●				

Typar also has many other unique related applications.

TYPAR Metric Properties

AASHTO Class M288			-	-	-	-	3	2	2	1	1
			Typar 3151	**Typar 3201**	**Typar 3301**	**Typar 3341**	**Typar 3401**	**Typar 3501**	**Typar 3601**	**Typar 3631**	**Typar 3801**
MECHANICAL (MARV)[1]											
Grab tensile strength	ASTM D4632	N	156	267	533	533	578	710	1067	1110	1445
Grab elongation	ASTM D4632	%	60	60	60	60	60	60	60	60	60
Trapezoidal tear strength	ASTM D4533	N	70	110	155	180	270	270	400	400	425
Puncture strength	ASTM D4833	N	45	80	110	150	180	250	300	360	415
CBR Puncture	ASTM D6241	N	-	-	-	-	990	1375	1650	1925	2285
ENDURANCE (MARV)[1]											
UV resistance @ 500 hrs	ASTM D4355	%	-	-	-	70	70	70	70	70	70
HYDRAULIC (MARV)[1]											
Apparent opening size[2]	ASTM D4751	mm	0.840	0.590	0.300	0.250	0.212	0.200	0.100	0.100	0.090
Permittivity	ASTM D4491	sec^{-1}	1.5	1.0	0.8	0.7	0.7	0.5	0.1	0.2	0.1
Water flow rate	ASTM D4491	$l/min/m^2$	9635	7790	3895	3485	2460	2050	615	820	328
PHYSICAL (Typical)											
Unit weight		g/m^2	54	65	104	116	136	170	204	214	272
Roll diameter		mm	180	180	200	200	230	250	250	250	300
Length		m	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4
Width		m	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83	3.83
Roll area		m^2	350	350	350	350	350	350	350	350	350
Roll weight gross		kg	23	26	40	44	51	63	75	79	100
Width		m	-	-	-	-	4.75	4.75	4.75	4.75	4.75
Roll area		m^2	-	-	-	-	434	434	434	434	434
Roll weight gross		kg	-	-	-	-	63	78	93	98	124

NOTES:
1 Minimum average roll values (MARV) in the weaker principal direction
2 O_{95} Max. ARV

Product Width Guide

Width (inches)*	**3151**	**3201**	**3301**	**3341**	**3401**	**3501**	**3601**	**3631**	**3801**
36		●	●						
48		●	●		●				
60	●				●				
75		●	●						
108			●						
151	●	●	●	●	●	●	●	●	●
187					●	●	●	●	●

**Available in other put-ups*

Fiberweb™
70 Old Hickory Blvd.
Old Hickory, TN 37138-3651
Toll Free: 800-321-6271
Tel: 615-847-7000
Fax: 615-847-7068
www.typargeotextiles.com

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TYPAR® GEOTEXTILES

Bio barrier®

Note: Typar is manufactured from the highest quality polypropylene. During the manufacturing process a surface tension is formed on the product which, prior to contact with soil, will cause water to run off the fabric giving the appearance of water resistance. This is a temporary phenomenon which disappears when the fabric comes into contact with soil, and normal hydraulic properties will take effect.

GEO-2007-1

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ANSI-RAB QMS ACCREDITED