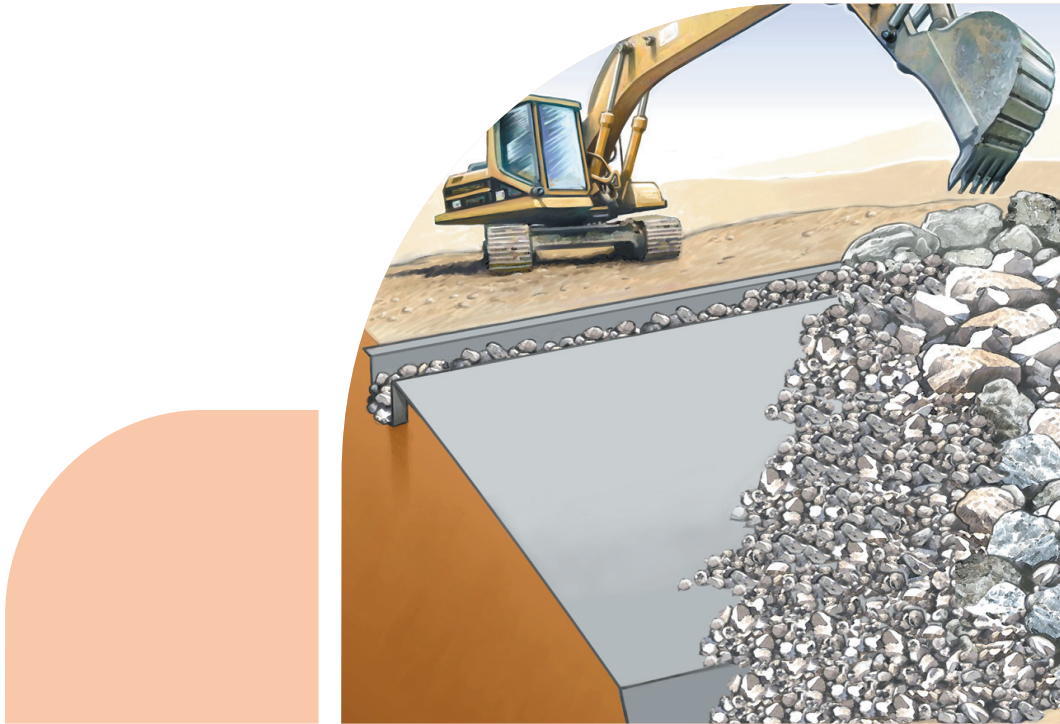


# Geotextiles



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# TYPAR® - The ideal geotextile

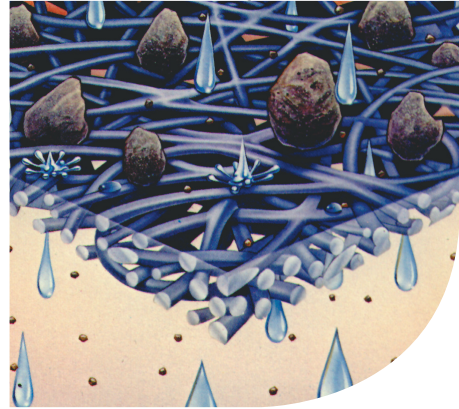
TYPAR is a long lasting, durable nonwoven geotextile fabric for paved and unpaved roads and surfaces, drainage, waste handling systems, erosion control and landfills. Manufactured from high quality polypropylene, TYPAR is a continuous filament, heat bonded fabric with superior uniformity that separates, 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

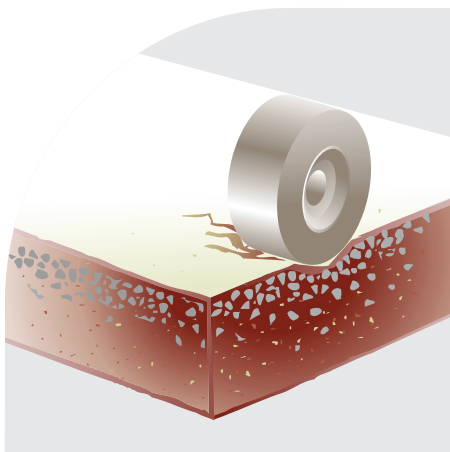


TYPAR is available in a variety of widths and lengths and weights ranging from 1.5 oz/yd<sup>2</sup> to 8 oz/yd<sup>2</sup>.

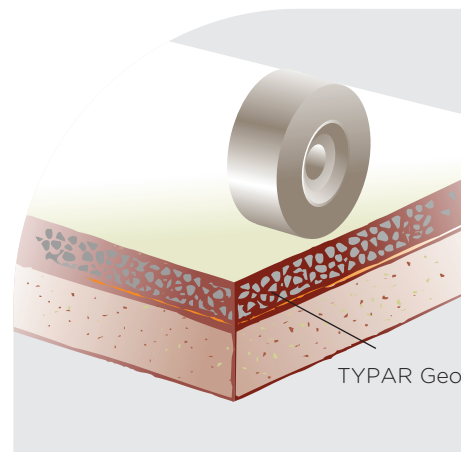
## Unpaved Roads and Industrial Yards

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.

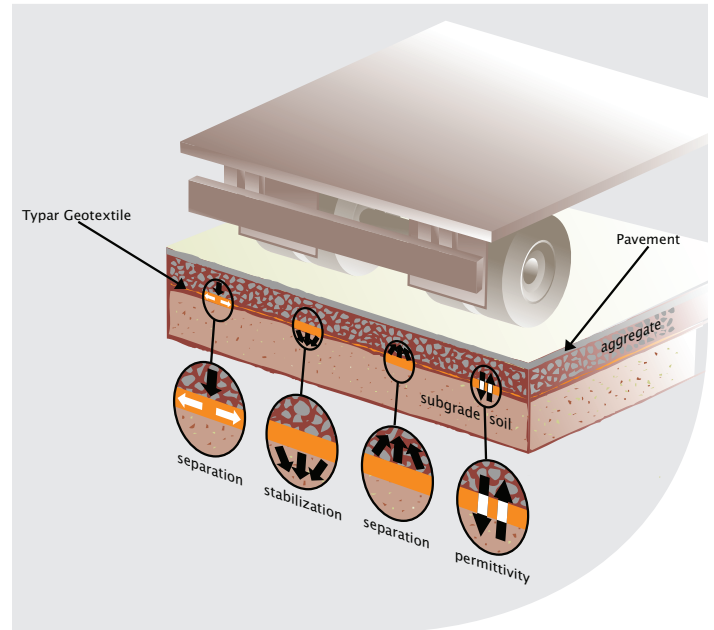


With TYPAR, aggregate won't sink into base soil but stays intact to support loads.

# 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 35 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

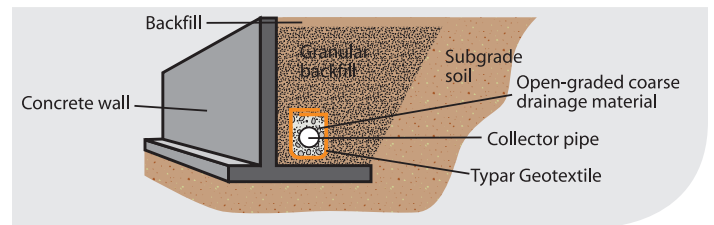
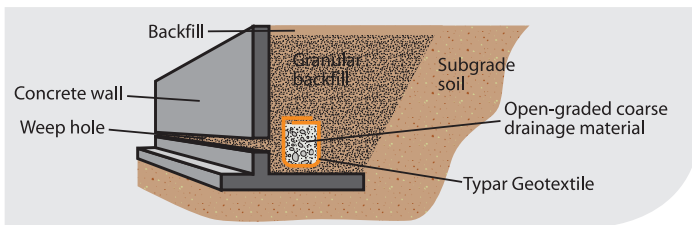


TYPAR stabilizes and preserves paved roads by providing a separation layer between the aggregate base and subgrade.

# 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



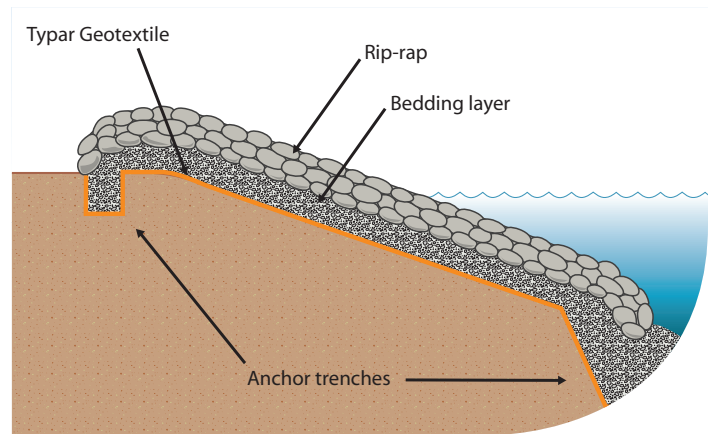
Interceptor drain systems.

# 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 (rip-rap) 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

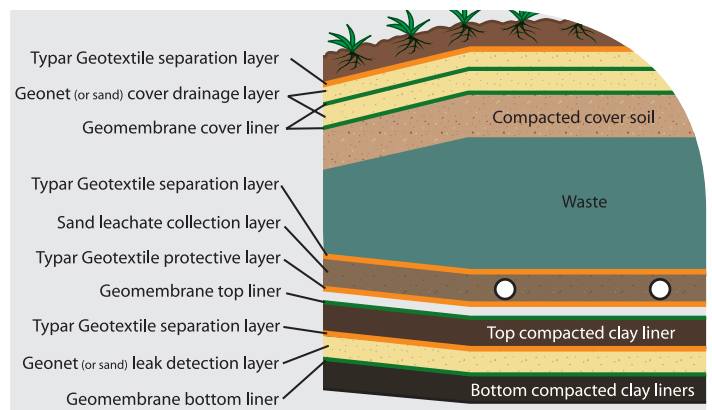


Stream bank erosion control.

# 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.

- Provides 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



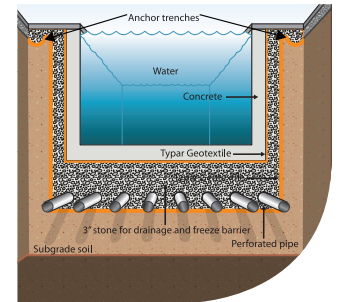
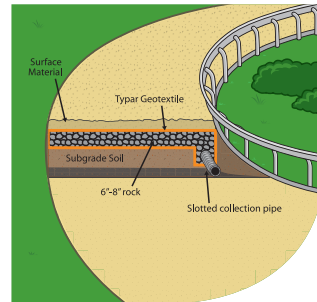
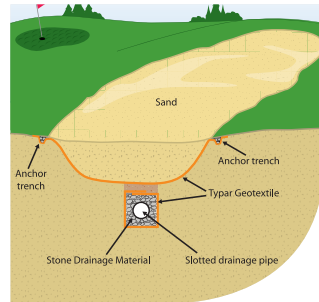
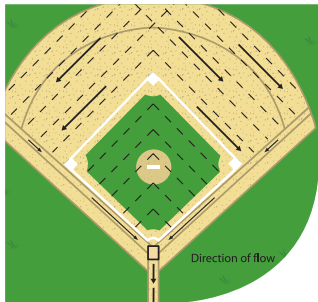
Typical hazardous waste landfill lining and cover system to meet EPA regulations.



# 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.

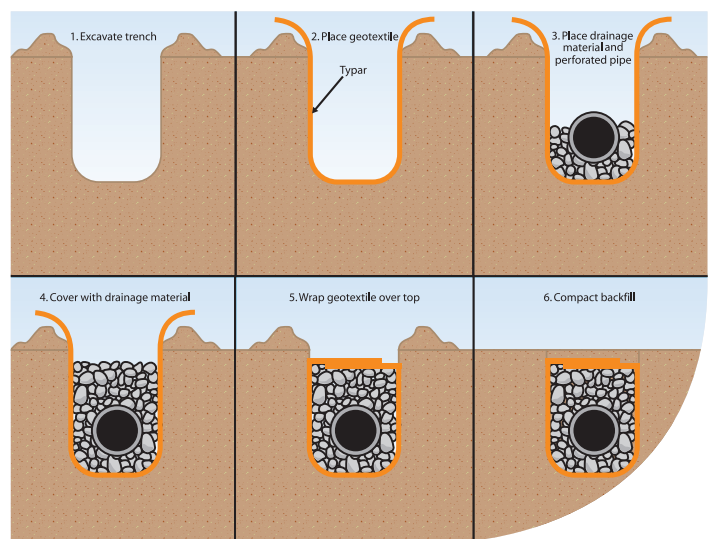
- Preserves the integrity of specialized surface materials
- Enhances the natural long-term development of a graded particle filter
- Eliminates the need for sacrificial layers and allowances in the structure
- Simplifies construction and reduces construction time and cost



# Waste Handling Systems

Onsite 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.

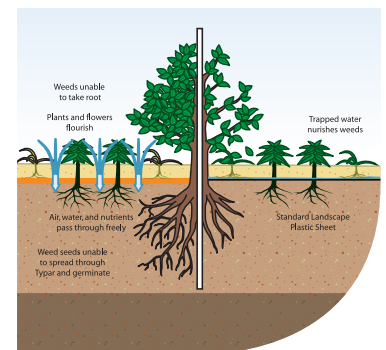
# Landscaping

TYPAR is ideally suited for landscaping applications. Its permeability allows for fast drainage and the passage of air and fertilizers while 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

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

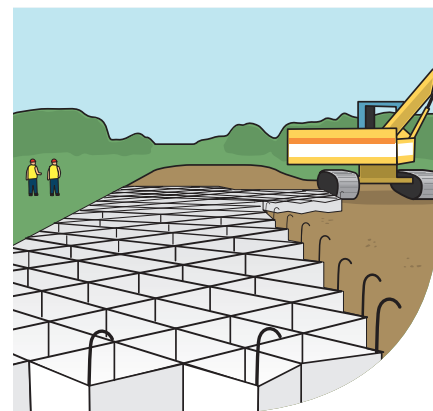


# GEOCELLS

A TYPAR® GEOCELLS unit is a unique confinement system of heavy-duty geotextile fabric cells in a honeycomb formation. The three-dimensional cellular design allows for custom sizes, configuration and adaptability to a variety of terrains. The hydraulic properties are influenced by the type and compaction of the fill material.

Folded into an accordion shape for easy transportation and construction, a TYPAR GEOCELLS unit is expanded on site and filled with a ballast material such as sand, stones, all soil types, mulch or other material. It can also offer an excellent environment for re-vegetation. The TYPAR GEOCELLS system functions as a single unit, and units can be interlocked without complicated joints. Built into self-supporting higher walls by stacking one unit on another filled unit in a vertical or setback fashion, the resulting barrier is stable, strong and durable.

- Cost efficient and project effective
- Lightweight, durable and easy to install
- Includes metal frame for ease of filling
- UV stabilized for two years, longer if covered
- Patch, reinforce or replace for easy repair
- Available in multiple sizes



Cellular Confinement System

# GEOCELLS (continued)

## Flood and Water Control

Lightweight and easy to build, but strong, rugged and able to withstand differing volumes of water, TYPAR GEOCELLS units can be brought in by hand, on equipment or dropped from helicopters in emergency situations. Quicker to fill than sandbags, as well as more durable and stable, the system has the strength and durability to last, but it is also easy to remove from temporary situations.

- Rapid flood control barrier
- Levee construction, raising and repair



## Construction Erosion and Sediment Control

The heavy-duty geotextile fabric construction of the TYPAR Geocells system adapts to the terrain while offering excellent structural strength and durability. Water filters through while the geotextile retains the vast majority of fill material and soil particles.

The easy-to-construct TYPAR GEOCELLS system is also well suited for irregular terrain, such as slopes, to reduce erosion and promote vegetation.

- Mudslide/Debris flow barrier
- Erosion control for slopes and channels
- Sediment pond berms and check dams
- Filter screen for pond spillways
- Mulch berm and sediment trap filter berm
- Silt screen and dewatering filter



## Soil Stabilization

The TYPAR GEOCELLS system is also available in a low profile and flexible width, providing effective slope and infill protection by reinforcing, restraining and confining soft soils. As a single or multi-layer cellular confinement system, it is water permeable to meet a wide range of structural and hydraulic requirements. A variety of infill materials can be used depending on the specific situation and, if desired, vegetation can be grown in suitable fill material.

- Road beds and culverts
- Channel and stream banks
- Earth retention, slopes and steep embankments
- Dam faces and spillways
- Storm water containment or diversion
- Lagoons and ponds
- Landfill linings and covers





# TYPAR® GEOCELLS

Physical Properties	Units	DT1	DC2	GS 250/150	GS 350/150
Cell Diameter	mtr/in	0.6 / 24	0.5 / 20	0.25 / 10	0.35 / 14
Cell Depth	mtr/ in	0.5 / 20	0.5 / 20	0.15 / 6	0.15 / 6
Panel Length	mtr/in	4.90 / 194	5.0 / 197	5.0 / 197	5.0 / 197
Panel Width	mtr/in	0.6 / 24	1.35 / 54	7.0 / 275	7.0 / 275
Panel Coverage Area	ft <sup>2</sup>	32	73	376	376
Panel Volume	ft <sup>3</sup>	52	96	200	205
Cells in Length	No.	8	8	34	24
Cells in Width	No.	1	2	29	20
Color		Tan	Tan	Dark Grey	Dark Grey
Panel Weight	lbs	935	15	55	37
Panels Per Pallet	No.	70	44	10	10

Data above based on nominal measurements

\* Additional sizes available upon request.

The facts stated and the recommendations and suggestions herein are based upon experiments and information believed to be reliable. No guarantee is made of their accuracy, however, and Fiberweb, Inc. assumes no liability for product failure other than to supply replacement material for Fiberweb, Inc. products shown to be defective when delivered. Except as stated above, there are no warranties expressed or implied on merchantability, fitness or use, or otherwise. Fiberweb, Inc. shall not be liable for special, incidental and consequential damages. No statement contained herein shall be construed as an inducement to infringe existing patents or an endorsement of products of specific manufacture.

# TYPAR® English Properties

			TYPAR 3151	TYPAR 3201	TYPAR 3301	TYPAR 3341	TYPAR 3401	TYPAR 3501	TYPAR 3601	TYPAR 3801	TYPAR 3100
Mechanical (Marv) <sup>1</sup>											
Grab tensile strength	ASTM D4632	lbs	35	60	120	120	130	160	240	300	335
Grab elongation	ASTM D4632	%	60	60	60	60	60	60	60	60	61
Trapezoidal tear strength	ASTM D4533	lbs	15	25	35	40	60	60	90	95	74
Puncture strength	ASTM D4833	lbs	10	18	25	34	41	56	67	93	-
CBR Puncture	ASTM D6241	lbs	-	-	-	-	225	310	370	510	697
Endurance (MARV) <sup>1</sup>											
UV Resistance @ 500 hrs	ASTM D4355	%	-	-	-	70	70	70	70	70	-
Hydraulic (MARV) <sup>1</sup>											
Apparent opening size <sup>2</sup>	ASTM D4751	US Sieve	20/30	30	50	60	70	70	140	170	-
Permittivity	ASTM D4491	sec <sup>-1</sup>	1.5	1.0	0.8	0.7	0.7	0.5	0.1	0.1	0.123
Water flow rate	ASTM D4491	gal/min/ft <sup>2</sup>	235	190	95	85	60	50	15	8	-
Physical (Typical)											
Unit weight		oz/yd <sup>2</sup>	1.6	1.9	3.0	3.4	4.0	5.0	6.0	8.0	10
Roll diameter		in	7	7	8	8	9	10	10	12	-
Length		yd	100	100	100	100	100	100	100	100	-
Width		in	151	151	151	151	151	151	151	151	-
Roll area		yd <sup>2</sup>	419	419	419	419	419	419	419	419	-
Roll weight gross		lbs	50	58	87	97	113	138	165	218	-
Width		in	-	-	-	-	187	187	187	187	-
Roll area		yd <sup>2</sup>	-	-	-	-	519	519	519	519	-
Roll weight gross		lbs	-	-	-	-	142	175	209	275	-

Notes:

1 Minimum average roll values (MARV) in the weaker principal direction

2 O<sub>95</sub> Max. ARV

## Product Selection Guide

	TYPAR 3151	TYPAR 3201	TYPAR 3301	TYPAR 3341	TYPAR 3401	TYPAR 3501	TYPAR 3601	TYPAR 3801
Paved Roads and Parking Lots				•	•	•	•	
Unpaved Roads				•	•	•	•	
Industrial Yards				•	•	•	•	
Subsurface Drains		•	•	•	•	•	•	
Erosion Control				•	•	•	•	•
Landfills				•	•	•	•	•
Recreational Facilities		•	•	•	•	•	•	
Waste Handling Systems	•	•	•	•	•	•	•	•
Landscaping		•	•	•	•			

# TYPAR® Metric Properties

			TYPAR 3151	TYPAR 3201	TYPAR 3301	TYPAR 3341	TYPAR 3401	TYPAR 3501	TYPAR 3601	TYPAR 3801	TYPAR 3100
Mechanical (Marv) <sup>1</sup>											
Grab tensile strength	ASTM D4632	N	156	267	533	533	578	710	1067	1350	1508
Grab elongation	ASTM D4632	%	60	60	60	60	60	60	60	60	61
Trapezoidal tear strength	ASTM D4533	N	70	110	155	180	270	270	400	425	333
Puncture strength	ASTM D4833	N	45	80	110	150	180	250	300	415	-
CBR Puncture	ASTM D6241	N	-	-	-	-	990	1375	1650	2285	3136
Endurance (MARV) <sup>1</sup>											
UV Resistance @ 500 hrs	ASTM D4355	%	-	-	-	70	70	70	70	70	-
Hydraulic (MARV) <sup>1</sup>											
Apparent opening size <sup>2</sup>	ASTM D4751	mm	0.840	0.590	.0300	0.250	.0212	.0200	0.100	0.090	-
Permittivity	ASTM D4491	sec <sup>-1</sup>	1.5	1.0	0.8	0.7	0.7	0.5	0.1	0.1	0.123
Water flow rate	ASTM D4491	l/min/m <sup>2</sup>	9635	7790	3895	3485	2460	2050	615	328	-
Physical (Typical)											
Unit weight		g/m <sup>2</sup>	54	65	104	116	136	170	204	272	339
Roll diameter		mm	180	180	200	200	230	250	250	300	-
Length		m	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	-
Roll area		m <sup>2</sup>	350	350	350	350	350	350	350	350	-
Roll weight gross		kg	23	26	40	44	51	63	75	100	-
Width		m	-	-	-	-	4.75	4.75	4.75	4.75	-
Roll area		m <sup>2</sup>	-	-	-	-	434	434	434	434	-
Roll weight gross		kg	-	-	-	-	63	78	93	124	-

**Notes:**

1 Minimum average roll values (MARV) in the weaker principal direction

2 0<sub>95</sub> Max. ARV

## Product Width Guide

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

Product data sheets, case studies, installation guides and project information request forms are available on request or can be downloaded from [www.typargeosynthetics.com](http://www.typargeosynthetics.com). Please contact our sales team for reference projects or for further advice.

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.

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By intelligently applying our high-performance fiber technology, we are helping industry solve its most complex material challenges, and providing our customers with the answers they will need tomorrow.

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