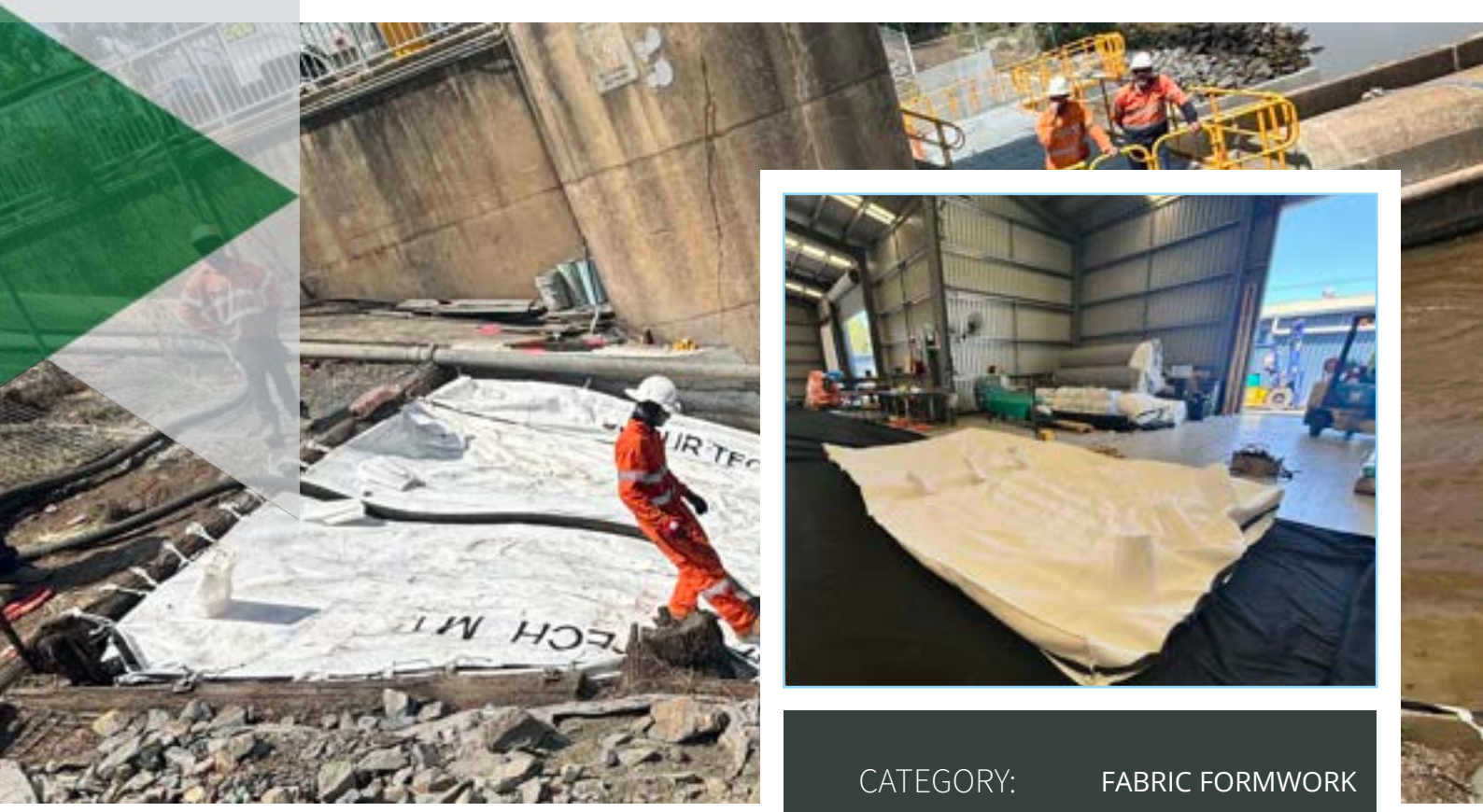
FABRIC FORMWORK

DATA SPECIFICATION SHEET



CATEGORY:	FABRIC FORMWORK
APPLICATION:	SCOUR & EROSION PREVENTION
SIZE:	CUSTOM MADE

PRODUCT OVERVIEW

Fabric formwork is used underwater as well as above water. This system is a controlled and reliable form of scour prevention where concrete is poured underwater and contained in a fabric capsule or structure

Unlike traditional rigid forms, fabric formwork can create complex organic shapes due to the flexibility of the fabric, allowing for more efficient designs and improved structural performace since it naturally adapts to the tensile forces exerted by the concrete as it cures. The fabric formwork produces smoother and more precise concrete surfaces. The versatility of fabric formwork ensures its suitability for a wide range of applications, from small projects to large-scale infrastructural developments.

PRODUCT FEATURES

- TEXEL R® Series
- Robust, Resillient and Versatile
- Easily Conforms to Terrains
- Flexible and Sustainable
- 100 Year Lifespan on Geotextile
- Protected by a Registered Patent No 2019203298

MANUFACTURED PRODUCTS

- Scour Mats
- Pile Bags
- Pier Mattresses
- Trench Breakers
- Cavity Bags
- Free Span Correction Grout Bags

APPLICATIONS

- Bridge Abutments and Revetments
- Bridge Piles
- Pipeline Protection
- Filing Cavaties
- Wind Farm Protection
- Free Span Correction

MATERIAL OVERVIEW

Texcel R® is non-woven staple fibre geotextile developed to stabilize coastal structures and protect landfill lining systems. Made using either polyester and/or polypropylene fibres, they have a unique staple fibre blend and an inbuilt flexibility to allow engineers to specify mechanical and hydraulic criteria to suit tough environmental conditions.

Fabrics are according to the application using specific characteristics, e.g. elongation to peak strength, to complement the finished product. Most commonly use heavy weight non-wovens, for example, Texcel R® Series; where elongation optimizes gap/cavity, irregular surface conformance.

MATERIAL FEATURES

- High Abrasion minimizes installation damage
- UV Resistant
- Superior Filtration
- Effective Soil Contact, Interaction and Stability
- Wind Farm Protection
- Free Span Correction

MATERIAL CHARACTERISTIC

TEXCEL R - TYPICAL VALUES TECHNICAL DATA

TEST	UNITS	400R	600R	900R	1200R
Fibre Type	-	100% Virgin Polyester Fibre			
CBR Burst Strength (AS 3706.4)	N	2,750	4,360	6,140	8,850
CBR Toughness (AS 3706.4)	kJ/m²	2.7	5.6	8.1	9.3
Wide Strip Tensile Strength MD* (AS 3706.2)	kN/m	14.8	21.2	30.4	43.0
Wide Strip Tensile Strength XMD* (AS 3706.2)	kN/m	15.6	28.6	38.9	57.2
Wide Strip Toughness MD (AS 3706.2)	kJ/m²	5.5	10.2	14.6	21.7
Wide Strip Toughness XMD (AS 3706.2)	kJ/m²	5.8	12.7	18.6	30.0
Grab Tensile Strength MD (AS 3706.2)	N	820	1,200	1,790	2,800
Grab Tensile Strength XMD (AS 3706.2)	N	870	1,440	2,160	3,260
Abrasion Resistance MD/XMD (Belt Rotating Drum)	kN/m Strength Retained	7.1/8.9	11.2/11.5	22.7/26.2	34.2/40.5
12 Month Outdoor Exposure MD/XMD (ASTM D4355)	kN/m Strength Retained	9.1/11	11.1/11.0	23.2/23.3	42.4/47.6
Hydrocarbon (Diesel) Resistance MD/XMD (AS 3706.10)	% Strength Retained	>90	>90	>90	>90
Accelerated UV Resistance MD/XMD (AS 3706.11)	% Strength Retained	>80	>80	>80	>80
Pore Size O_{90} (AS 3706.7)	µm	≤75	≤75	≤75	≤70
Pore Size O_{90} - Capillary Flow Method (ASTM D6767)	µm	160	124	126	108
Permittivity (AS 3706.9)	s⁻¹	1.41	0.69	0.45	0.30
Coefficient of Permeability (AS 3706.9)	m/s x 10⁻³	48	34	25	22
Flow Rate @ 100mm Head (AS 3706.9)	L/m²/s	161	89	46	30

KEY FEATURES & BENEFITS

- Significantly reduces force placed on impermeable liners, protecting them in the short and long term
- High abrasion, UV resistance and consistent mechanical and hydraulic performance
- Made in Australia, developed and tested in accordance with Australian standards
- High elongation properties minimizing installation damage and ensuring effective soil contact, interaction and stability
- Water and air, in excess, will pass through the fabric formwork
- Fabric allows water to “bleed” from its pores resulting in the strengthening of the concrete above its normal strength capacity. Texel R® ≤75 pore
- The fabric will protect the concrete from scouring and erosion until the concrete mix gains sufficient strength.
- Cost effective versus rock
- Mats are rolled up thus small area required to stockpile
- Small team is required to offload, place in position and fill with concrete
- No Damage to piles, revetments or sheet piles, versus rock
- Light and easy to install
- Follows the contours of the terrain
- Bespoke and purpose made
- A reliable form of scour protection
- Fabric can be manufactured to any shape
- Baffles ensure that a robust form is created. Baffles control the filling capacity
- Fabric formwork mattresses, filled with concrete, can withstand up to 3.5m/s currents, propeller thrusts and wave action.
- Fabric formwork will not roll or slide and thus not fail, unlike rock or rock armor

MATERIAL THICKNESS

Due to the consistent thickness of the mattress i.e. commonly 200-350mm, the concrete mattress is effective in handling larger velocity hydrodynamic flow, dissipating the energy of waves and currents. This reduction in velocity minimizes the erosive forces that contribute to scour.

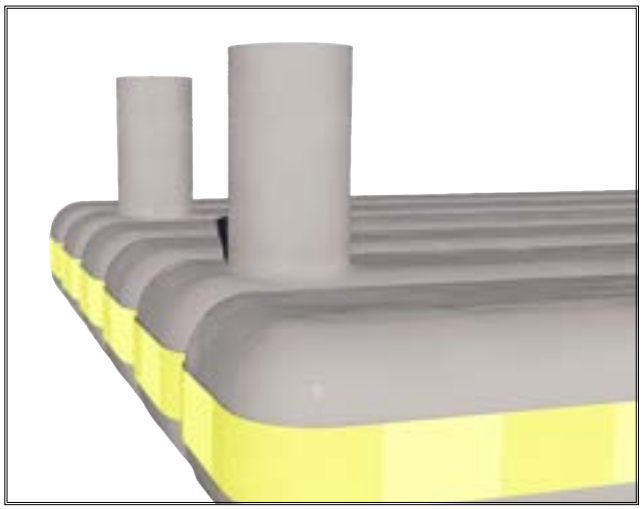
The mattress density determines the weight and therefore the resistance to the mattress uplift. In addition, thicker mattresses ensure better coverage of the seabed and a more robust barrier against erosive forces. This is particularly important in areas with high sediment mobility

The thickness of the mattress and correlates with durability. Thicker mattresses are more resistant to wear and degradation over time providing longer-lasting protection and offer better resistance to abbrasion thereby maintaining their integrity and protectiveness.

WEBBING

Polyester lashing, lifting and seatbelt style webbing with a static breaking load of 22.8kN (50mm) which is 2324Kgf (AS/NZS 1891.1-2007). Safe working load of 800Kg's.

Webbing is dual stitched into fabric formwork, around the entire perimeter. The function is to incorporate secure / tie-in points to secure the fabric formwork to an adjacent mattress or pile or static anchor point.



FILL PORTS

Fabric formwork has dedicated fill ports typically 200mm diameter by 400mm in length, to allow a pump hose to be inserted.

Location of these filing ports are included in detailed designs. Once the scour mattresses are filled with concrete, a cable tie or polypropylene rope is used to tie off and seal the fill port.

STITCHING

All fabrics are manufactured in accordance with ISO 9001. Mattress construction is configured using a heavy-duty dual stitch with a 15mm seam. The heavy- duty stitch provides more thread in the stitch as material stretches laterally (usual testing comparison) and provides 15 to 20% strength increase than an equivalent conventional stitch reducing stress points ensuring durability under load

Type of thread used are all subject to application either:

- High strength polyester continuous filament, bonded thread
- Includes PFC-free water-repellent finish
- Specially suited for multidirectional sewing
- Excellent UV resistance due to special dyestuffs
- Weathering test according to ISO 4892-1 and ISO 4892-2 (DIN EN ISO12402-7) and cold storage at -30
- This thread is used for awnings, boat covers, outdoor furniture
- Webbing straps are dual stitched and cross stitched around the entire perimeter of the mattress, including the corners
- The stitching of the 50mm seatbelt webbing is called a 150mm gate stich

All stitching on webbing includes a dual gate stitch in an area of approx.150mm, an internal gap of 150mm, repeated cross stitch of 150mm, step and repeat. Star pickets are typically used used to secure the mattress at each corner for stabilization on the sea or river bed. Each star picket can be secured with polypropylene rope to the webbing of the mattress.

BAFFLES

The construction/configuration of each mattress includes baffles that contain the concrete/grout.
These baffles are sized appropriately for the application considering site constraints such as rate of supply of concrete or grout, depth of water, and available access.

The integrated baffles allow the units to inflate to the optimum thickness (depending on design but generally 250mm - 300mm thickness). The baffles are strategically located to ensure that a robust form is created, and suitable concrete / grout flow is sustained, and the height of the slab is controlled.

When the mattress is inflated with concrete/grout, the mattress formwork will take the shape of the topography of the ground it is laid on.

Baffles' primary function is to ensure the mattress is filled to the designed thickness, it can also be used to drain any water that may "pond" on top of the mattress, depending on the orientation of the baffles. This type of function would occur where the mattress is installed, for example on a boat ramp where the mattress is above water.

The baffles are tested to 800kPA (8 bar) and certified to 400kPA (4 bar).

GEOTEXTILE MATERIAL

Hydrolysis Assessment: Texcel R®

(*Refer to Geosynthetic research Report, Hydrolysis assessment reference BD101.01*)
The conclusion: The hydrolysis assessments demonstrate a high level of resistance to internal hydrolysis for the range of Geofabrics polyester manufactured geotextiles (both continuous filament and staple fibre).

There was visually no degradation of any product after each exposure period. The benchmark to qualify a polyester geotextile for this assessment is >50% strength retained after each exposure period.

- 14 days exposure under the conditions tested for service life up to 25 years
- 28 days exposure under the conditions tested for service life up to 50 years
- 56 days exposure under the conditions tested for service life up to 100 years

THE ASSESSMENTS UNDERTAKEN QUALIFY TEXCEL FOR 100-YEAR DURABILITY IN NON-REINFORCING APPLICATIONS AT SERVICE TEMPERATURES <25°C, WITHIN ENVIRONMENTAL CONDITIONS 4≤PH≤9

Sample:	Texcel 400R, Roll No: 1172597			
Property	**Control**	**Exposed 14d**	**Exposed 28d**	**Exposed 56d**
Mass per Unit Area (g/m²)	394.4	397.4	388.0	397.8
Thickness (mm)	4.31	4.22	4.18	4.18
Strength (N/50mm)	685.9	573.8	546.5	495.5
Elongation (%)	63.8	60.4	59.7	55.3
Strength (per g) Retained (%)	-	83.1	81.1	71.7
Elongation Retained (%)	-	94.6	93.6	86.7

WEBBING MATERIAL

Polyester lashing, lifting and seatbelt style webbing with a static breaking load of 22.8kN which is 2324Kgf (AS/NZS 1891.1-2007). Safe working load of 800Kg's.

Webbing is double stitched into fabric formwork, around the entire perimeter. The function is to incorporate secure / tie-in points to secure the fabric formwork to an adjacent mattress or pile or static anchor point.

Webbing	Test Average	Units	Standard
Composition	Polyester webbing high-strength		100% polyester
Width	50	mm	50
Thickness	1.08	mm	1.1+/- 1.08
Mass			
Breaking strength (AS/NZS 1891.1-2007)	22.8	kN	23 (2324Kgf)
Selvedge (self finished edge of fabric)	as specified		lockstitch
Finish	as specified		dyed
Safe working load	800	kg	
UV-Stabalized polyester			

ANCHOR POINTS

Installation requires fabric formwork to be temporarily secured in position firstly, prior to concrete / grout filling. The temporary securing is to be developed in consultation with Scour Tech.

- Typically, one would secure with star pickets and/ or eyebolts anchored into the ground or timber/ concrete piles which will act as temporary fixtures before the fabric formwork is filled with grout/ concrete.
- These fixings are to be integrated into the fabric formwork detailing.
- Additional fixing would be required between mattresses using polypropylene rope through the webbing of each mattress to secure the mattresses together.
- This is done by sewing webbing around the entire perimeter of the mattress or any fabric formwork.
- Fill ports (after filliing) can be sealed with polypropylene rope or cable

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