

Mirafi® PET Woven Polyester Geotextiles

Properties of Mirafi® PET Woven Polyester Geotextiles										
Property	Unit	PET 100	PET 150	PET 200	PET 300	PET 400	PET 600	PET 800	PET 1000	
Mechanical properties										
Characteristic short term tensile strength	MD	kN/m	100	150	200	300	400	600	800	1000
Characteristic short term tensile strength ISO 10319, ASTM D4595	CD	kN/m	50	50	50	50	50	50	100	100
Strain at short term strength	MD	%	10	10	10	10	10	10	10	10
Partial factor – creep rupture										
at 5 years design life			1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28
at 10 years design life			1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
at 60 years design life			1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
at 120 years design life			1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45
Creep limited strength										
at 5 years design life	MD	kN/m	78	117	156	234	313	469	625	781
at 10 years design life	MD	kN/m	77	115	154	231	308	462	615	769
at 60 years design life	MD	kN/m	71	107	143	214	286	429	571	714
at 120 years design life	MD	kN/m	69	103	138	207	276	414	552	690
Partial factor – construction damage in clay, silt or sand										
			1.10	1.10	1.10	1.10	1.10	1.05	1.05	1.05
Partial factor – environmental effects in soil environment, pH<11										
not exceeding 10 years design life			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
at 60 years design life			1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
at 120 years design life			1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
Long term design strengths in clay, silt or sand										
at 5 years design life	MD	kN/m	71	107	142	213	284	446	595	744
at 10 years design life	MD	kN/m	70	105	140	210	280	440	586	733
at 60 years design life	MD	kN/m	62	93	124	186	247	389	518	648
at 120 years design life	MD	kN/m	57	85	114	171	228	358	478	597
Nominal roll width	m		5	5	5	5	5	5	5	5
Nominal roll length	m		300	300	300	200	200	150	100	100
Estimated roll weight	kg		600	645	765	720	950	950	880	1060

Other forms of supply as well as grades, adjusted to the requirements of the project, are available on request.

Characteristic value denotes the value within the 95% confidence level.

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Description of Mirafi® PET Woven Polyester Geotextiles

1. General

Mirafi PET woven geotextiles are engineered materials suitable for short and long term soil reinforcement applications. They are composed of high tenacity polyester fibres, assembled to form a directionally structured and stable geotextile that enables maximum load carrying efficiency.

To use Mirafi PET woven geotextiles in long term soil reinforcement applications an assessment of their load carrying capabilities is required. Several assessment procedures are in practice, each adopting the use of the partial factor approach to describe the behaviour of the reinforcement material over time under specific load and environmental regimes. The procedure adopted for Mirafi PET woven geotextiles is compatible with the procedures adopted by various national codes of practice such as the US Federal Highway of Administration, the British Code of Practice BS8006:1995 and the Australian Standard. The procedure utilises the following partial factor approach to determine the long term design strengths for the reinforcement materials at different design lives:

$$T_d = \frac{T_c}{f_c \cdot f_d \cdot f_e \cdot f_m}$$

where,

T_d is the long term design strength of the reinforcement at the required design life,

T_c is the characteristic short term tensile strength of the reinforcement,

f_c is the partial factor relating to creep effects over the required design life of the reinforcement,

f_d is the partial factor relating to the installation damage of the reinforcement,

f_e is the partial factor relating to environmental effects on the reinforcement,

f_m is the partial factor relating to consistency of manufacture of the reinforcement.

2. Tensile strength-strain properties

The short term relationship of tensile strength and strain properties of Mirafi PET woven geotextiles is given as a master curve in Figure 1. The

ordinate value are expressed in terms of a percentage of the characteristic short term tensile strength. Thus, this one master curve may be used for all Mirafi PET grades by converting the percentage values into actual strength values for individual grades.

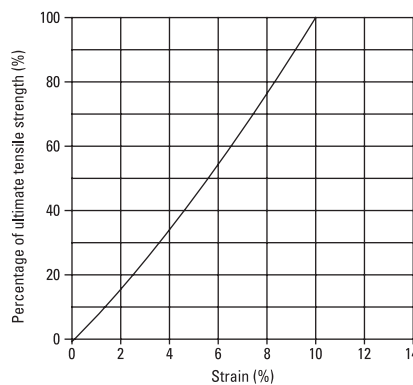


Figure 1. Short term tensile strength-strain master curve for Mirafi PET woven geotextiles

3. Partial factor relating to creep, f_c

In assessing the magnitude of the partial factor f_c , the creep rupture properties of the reinforcement must be known. Figure 2 shows the creep rupture curve for Mirafi PET geotextiles obtained from long term creep testing and accelerated tests. From figure 2 values of f_c can be obtained for different design lives. For example, at 60 years design life, Mirafi PET shows a 72% strength retention which equates to a partial factor $f_c = 1.40$. The published value of f_c for a 120 year design life is given as 1.45.

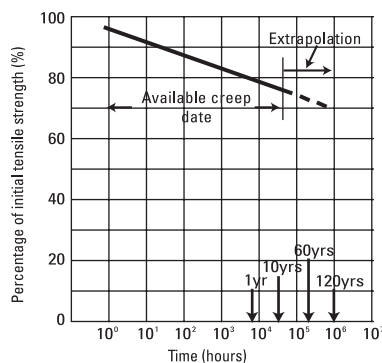


Figure 2. Creep rupture curve for Mirafi PET woven geotextiles

Mirafi PET woven geotextiles, being composed of high tenacity polyester fibres, exhibit very low creep strains even at high tensile load levels. Creep strains of less than 1% over a 120 years design life at a design load of 40% of initial tensile strength are obtained

4. Partial factor relating to installation damage, f_d

The magnitude of f_d is dependent on the structure of the reinforcement, the aggressiveness of the soil placed either side of the reinforcement and the level of compaction performed. Values of f_d are derived from either field or large scale laboratory tests. Values of f_d for Mirafi PET woven geotextiles placed in clay, silt and sand are listed in this datasheet. Where appropriate, the partial factor is interpolated for different grades of Mirafi PET woven geotextiles.

5. Partial factor relating to environmental effect, f_e

The magnitude of f_e is dependent on the structure of the reinforcement as well as the durability of the polymers used. The high tenacity polyester fibres used in Mirafi PET woven geotextiles are highly resistant to soil environments. For the vast majority of soil environments the $pH \leq 11$. It is only in very extreme cases that the soil environment may have a $pH > 11$. Values of f_e for Mirafi PET woven geotextiles for 60 and 120 years design lives are given in this datasheet.

6. Partial factor relating to consistency of manufacture, f_m

This factor is concerned with the consistency of manufacture of the geotextiles and how variations during manufacturing affect the stated strengths. Mirafi PET woven geotextiles are manufactured according to strict Quality Assurance and Control standards to meet a 95% confidence level of the published tensile strengths. Therefore, this partial factor has the value of 1.0 for Mirafi PET woven geotextiles for design lives of up to and including 120 years.