

# Miragrid® GX Geogrids

## Properties of TenCate Miragrid® GX Geogrids

Property	Unit	GX 40/40	GX 60/30	GX 60/60	GX 80/30	GX 80/80	GX 100/30	GX 130/30	GX 160/50	GX 200/50
Characteristic short term tensile strength (ISO 10319) MD	kN/m	40	60	60	80	80	100	130	160	200
Characteristic short term tensile strength (ISO 10319) CD	kN/m	40	30	60	30	80	30	30	50	50
Strain at short term strength	MD %	11	11	11	11	11	11	11	12	12
Partial factor -creep rupture										
at 60 years design life		1.40	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	1.45
Creep limited strength										
at 60 years design life	kN/m	28.6	42.9	42.9	57.1	57.1	71.4	92.9	114.3	142.9
at 120 years design life	kN/m	27.6	41.4	41.4	55.2	55.2	69.0	89.7	110.3	137.9
Partial factor -construction damage										
in clay, silt or sand		1.15	1.08	1.08	1.08	1.08	1.08	1.08	1.05	1.05
in sandy gravel		1.21	1.19	1.19	1.17	1.17	1.14	1.11	1.10	1.08
in gravel		1.25	1.23	1.23	1.20	1.20	1.17	1.14	1.12	1.10
Partial factor -environmental effects in soil environment (pH <11)										
at 60 years design life		1.05	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	1.10
Long term design strength										
at 60 years design life										
in clay, silt or sand	kN/m	23.7	37.8	37.8	50.4	50.4	63.0	81.9	103.7	129.6
in sandy gravel	kN/m	22.5	34.3	34.3	46.5	46.5	59.7	79.7	98.9	126.0
in gravel	kN/m	21.8	33.2	33.2	45.4	45.4	58.1	77.6	97.2	123.7
at 120 years design life										
in clay, silt or sand	kN/m	21.8	34.8	34.8	46.4	46.4	58.1	75.5	95.5	119.4
in sandy gravel	kN/m	20.7	31.6	31.6	42.9	42.9	55.0	73.4	91.2	116.1
in gravel	kN/m	20.1	30.6	30.6	41.8	41.8	53.6	71.5	89.6	114.0
Nominal roll width	m	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
Nominal roll length	m	100	100	100	100	100	100	100	100	100
Estimated roll weight (+/- 10%)	kg	132	129	176	160	249	189	244	310	374

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

TenCate Miragrid® is a registered trademark of TenCate.

The values given are indicative and correspond to average values obtained in accredited testing laboratories and institutes.

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# Description of Miragrid® Geogrids

## 1. General

TenCate Miragrid® geogrids are engineered materials suitable for short and long term soil reinforcement applications. They are composed of high modulus polyester fibres laid in a flat orientation that enables maximum load carrying efficiency.

To use TenCate Miragrid® geogrids 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 TenCate Miragrid® geogrid is compatible with the procedures adopted by various national codes of practice such as the US Federal Highway 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. 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 1 shows the creep rupture curve for TenCate Miragrid® geogrids obtained from long term creep testing and accelerated tests. From Figure 1 values of  $f_c$  can be obtained for different design lives. For example, at 60 years design life, TenCate Miragrid® geogrid shows a 72% strength retention which equates to a partial factor  $f_c = 1.40$  (1.00/0.72). Similarly, a 120 years design life has a value of  $f_c = 1.45$ .

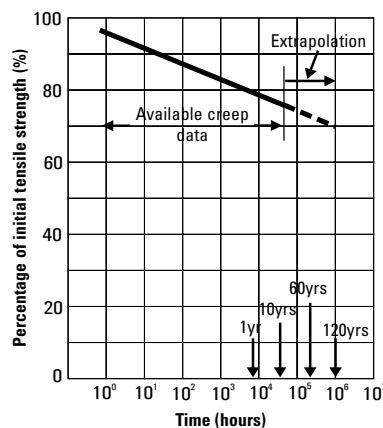


Figure 1. Creep rupture curve for Miragrid® geogrids.

TenCate Miragrid® geogrids, being composed of high modulus 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% initial tensile strength are obtained.

## 3. 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 TenCate Miragrid® geogrids placed in clay, silt and sand, sandy gravel, and gravel are listed in this data sheet. Where appropriate, the partial factor is interpolated for different grades of TenCate Miragrid® geogrids.

## 4. Partial factor relating to environmental effects, $f_e$

The magnitude of  $f_e$  is dependent on the structure of the reinforcement as well as the durability of the polymers used. The high modulus polyester fibres used in TenCate Miragrid® geogrids are highly resistant to soil environments. For the vast majority of soil environments, the pH level is  $\leq 10$ . It is only in very extreme cases that the soil environment may have a pH  $> 10$ . Values of  $f_e$  for TenCate Miragrid® geogrids for 60 and 120 years design lives are given in this data sheet.

## 5. Partial factor relating to consistency of manufacture, $f_m$

This factor is concerned with the consistency of the manufacture of the geogrids and how variations during manufacturing affect the stated strengths. TenCate Miragrid® geogrids are manufactured under strict ISO9001:2000 quality control procedures. Quality assurance to ensure compliance with published data sheet is undertaken in an ISO/IEC17025 accredited laboratory specialising in geosynthetic testing. Therefore, this partial factor has the value of 1.0 for TenCate Miragrid® geogrids for design lives up to and including 120 years.