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## DECLARATION OF PERFORMANCE Nr. 0480

1. Cod unic de identificare al produsului-tip: **GeoSteel SRG**  
(GeoSteel G600e Geocalce F Antisismico/Geocalce FL Antisismico/Geolite/Geolite Magma)
2. Utilizări preconizate: **Sistemul SRG este potrivit pentru consolidarea și modernizarea seismică a zidărilor din lut, tuf, piatră naturală, precum și a elementelor și structurilor din beton armat.**
3. Fabricant: **Kerakoll S.p.A Via dell'Artigianato, 9 - 41049 Sassuolo (MO) Italia**
4. Sistemele de evaluare și de verificare a constanței performanței: **System 2+**
5. Documentul de evaluare europeană: **EAD 340275-00-0104, Ianuarie 2018**  
Evaluare tehnică europeană: **ETA-19/0325 din 13/07/2022**  
Organism de evaluare tehnică: **ITC CNR**  
Notified body/ies: **ITC nr. 0970**
6. Performanțe declarate:
  - valori caracteristice pentru forțe de tracțiune și deformații
  - valori medii pentru modulii de elasticitate

Caracteristici esențiale	Performanță
Reacție la foc	Clasa A1
GeoSteel Grid 200-Geocalce F Antisismico	A se vedea Annex A

Performanța produsului identificat mai sus este în conformitate cu setul de performanțe declarate. Această declarație de performanță este eliberată în conformitate cu Regulamentul (UE) nr. 305/2011, pe răspunderea exclusivă a fabricantului identificat mai sus.

Semnată pentru și în numele fabricantului de către: **Romano Sghedoni**

În Sassuolo, la 29/07/2022

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## Annex A – GeoSteel G600-Geocalce F Antisismico /Geocalce FL Antisismico/Geolite /Geolite Magma

Essential characteristics		Performance		
		Average Value		Characteristic value
<b>Direct Tensile Strength - Ambient</b>				
Tensile strength ( $\sigma_u$ )		GL	2871 MPa	2697 MPa
Strain ( $\epsilon_u$ )			1,65 %	1,38 %
Stress-strain curve (E)	Elastic modulus of stage A		2065 GPa	827 GPa
	Stiffness modulus in stage C	190 GPa	150 GPa	
Tensile strength ( $\sigma_u$ )		GCF	2969 MPa	2798 MPa
Strain ( $\epsilon_u$ )			1,81 %	1,42 %
Stress-strain curve (E)	Elastic modulus of stage A		1246 GPa	956 GPa
	Stiffness modulus in stage C	195 GPa	160 GPa	
<b>Direct Tensile Strength – maximum service temperature</b>				
Tensile strength ( $\sigma_{u, 80}$ )		GL	2374 MPa	1939 MPa
Strain ( $\epsilon_{u, 80}$ )			1,24 %	1,09 %
Stress-strain curve ( $E_{1, 80}; E_{3, 80}$ )	Elastic modulus of stage A		1453 GPa	-(1)
	Stiffness modulus in stage C	191 GPa	150 GPa	
Tensile strength ( $\sigma_{u, 80}$ )		GCF	2075 MPa	817 MPa
Strain ( $\epsilon_{u, 80}$ )			1,16 %	0,49 %
Stress-strain curve ( $E_{1, 80}; E_{3, 80}$ )	Elastic modulus of stage A		2225 GPa	-(1)
	Stiffness modulus in stage C	179 GPa	163 GPa	
Interlaminar shear strength ( $\tau$ )	G600 + GL		2.93 MPa	1.21 MPa
	G600 + GCF		1.45 MPa	0.65 MPa
Lap tensile strength ( $\sigma_{lap}$ )	Tested Overlap length $l_{lap} = 300 \text{ mm}$	GL	2675 MPa	2471 MPa
		GCF	2783 MPa	2434 MPa
Bond strength on substrate CONCRETE: pull-off test ( $f_h$ ) G600+GL	ambient		2.83 MPa	-
	Water	1000 h	$f_h$ 2.75 MPa $f_{h \text{ ret}}$ 97 %	-
		3000 h	$f_h$ 3.24 MPa $f_{h \text{ ret}}$ 115 %	-
	saltwater	1000 h	$f_h$ 2.89 MPa $f_{h \text{ ret}}$ 102 %	-
		3000 h	$f_h$ 3.43 MPa $f_{h \text{ ret}}$ 121 %	-
	alkali	1000 h	$f_h$ 2.95 MPa $f_{h \text{ ret}}$ 104 %	-
		3000 h	$f_h$ 3.68 MPa $f_{h \text{ ret}}$ 130 %	-

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Essential characteristics			Performance	
			Average Value	Characteristic value
Bond strength on substrate CLAY: pull-off test ( $f_h$ ) G600+GCF	ambient		1.47 MPa	-
	Water	1000 h	$f_h$ 2.22 MPa $f_{h,ret}$ 152 %	-
		3000 h	$f_h$ 2.32 MPa $f_{h,ret}$ 158 %	-
	saltwater	1000 h	$f_h$ 1.85 MPa $f_{h,ret}$ 126 %	-
		3000 h	$f_h$ 2.28 MPa $f_{h,ret}$ 156 %	-
	alkali	1000 h	$f_h$ 2.74 MPa $f_{h,ret}$ 187 %	-
		3000 h	$f_h$ 2.68 MPa $f_{h,ret}$ 183 %	-
	Bond strength on substrate TUFF: pull-off test ( $f_h$ ) G600+GCF	ambient		0.35 MPa
Water		1000 h	$f_h$ 0.50 MPa $f_{h,ret}$ 144 %	-
		3000 h	$f_h$ 0.41 MPa $f_{h,ret}$ 117 %	-
saltwater		1000 h	$f_h$ 0.56 MPa $f_{h,ret}$ 162 %	-
		3000 h	$f_h$ 0.46 MPa $f_{h,ret}$ 131 %	-
alkali		1000 h	$f_h$ 0.42 MPa $f_{h,ret}$ 120 %	-
		3000 h	$f_h$ 0.45 MPa $f_{h,ret}$ 128 %	-

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Essential characteristics			Performance	
			Average Value	Characteristic value
Bond strength on substrate CONCRETE: single-lap shear test G600+GL	ambient		$P_{max}$ 10143 N $P_{deb}$ 8683 N $\sigma_{lim,conv}$ 2357 MPa	$P_{max}$ 7865 N $P_{deb}$ 4799 N $\sigma_{lim,conv}$ 1827 MPa
	Water	1000 h	$P_{max}$ 10574 N $P_{deb}$ 10040 N $P_{max ret}$ 104 % $P_{deb ret}$ 116 %	-
		3000 h	$P_{max}$ 10682 N $P_{deb}$ 9727 N $P_{max ret}$ 105 % $P_{deb ret}$ 112 %	-
	saltwater	1000 h	$P_{max}$ 11008 N $P_{deb}$ 10048 N $P_{max ret}$ 109 % $P_{deb ret}$ 116 %	-
		3000 h	$P_{max}$ 8597 N $P_{deb}$ - $P_{max ret}$ 85 % $P_{deb ret}$ -	-
	alkali	1000 h	$P_{max}$ 11946 N $P_{deb}$ 10939 N $P_{max ret}$ 118 % $P_{deb ret}$ 126 %	-
		3000 h	$P_{max}$ 11594 N $P_{deb}$ 10872 N $P_{max ret}$ 114 % $P_{deb ret}$ 125 %	-

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Essential characteristics			Performance		
			Average Value	Characteristic value	
Bond strength on substrate CLAY: single-lap shear test G600+GCF	ambient		$P_{max}$ 10158 N $P_{deb}$ 8504 N $\sigma_{lim,conv}$ 2360 MPa	$P_{max}$ 7606 N $P_{deb}$ 4152 N $\sigma_{lim,conv}$ 1767 MPa	
	Water	1000 h	$P_{max}$ 9632 N $P_{deb}$ 8728 N $P_{max ret}$ 95 % $P_{deb ret}$ 103 %	-	
		3000 h	$P_{max}$ 7803 N $P_{deb}$ 6416 N $P_{max ret}$ 77 % $P_{deb ret}$ 75 %	-	
	saltwater	1000 h	$P_{max}$ 8946 N $P_{deb}$ 8315 N $P_{max ret}$ 88 % $P_{deb ret}$ 98 %	-	
		3000 h	$P_{max}$ 8577 N $P_{deb}$ 8238 N $P_{max ret}$ 84 % $P_{deb ret}$ 97 %	-	
	alkali	1000 h	$P_{max}$ 8727 N $P_{deb}$ 7217 N $P_{max ret}$ 86 % $P_{deb ret}$ 85 %	-	
		3000 h	$P_{max}$ 8917 N $P_{deb}$ 7693 N $P_{max ret}$ 88 % $P_{deb ret}$ 90 %	-	
	Bond strength on substrate TUFF: single-lap shear test G600+GCF	ambient		$P_{max}$ 7488 N $P_{deb}$ 6322 N $\sigma_{lim,conv}$ 1740 MPa	$P_{max}$ 6855 N $P_{deb}$ 4297 N $\sigma_{lim,conv}$ 1593 MPa
		Water	1000 h	$P_{max}$ 7378 N $P_{deb}$ 6859 N $P_{max ret}$ 99 % $P_{deb ret}$ 109 %	-
			3000 h	$P_{max}$ 8183 N $P_{deb}$ 7200 N $P_{max ret}$ 109 % $P_{deb ret}$ 114 %	-
saltwater		1000 h	$P_{max}$ 7493 N $P_{deb}$ 7305 N $P_{max ret}$ 100 % $P_{deb ret}$ 116 %	-	
		3000 h	$P_{max}$ 6669 N $P_{deb}$ 6313 N $P_{max ret}$ 89 % $P_{deb ret}$ 100 %	-	

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	alkali	1000 h	$P_{max}$ 7277 N $P_{deb}$ 6375 N $P_{max\ ret}$ 97 % $P_{deb\ ret}$ 101 %	-
		3000 h	$P_{max}$ 7221 N $P_{deb}$ 6601 N $P_{max\ ret}$ 96 % $P_{deb\ ret}$ 105 %	-
Bond strength on substrate NATURAL STONE: single-lap shear test G600+GCF		ambient		$P_{max}$ 11801 N $P_{deb}^{(2)}$ $\sigma_{lim,conv}$ 2742 MPa $P_{max}$ 10636 N $P_{deb}^{(2)}$ $\sigma_{lim,conv}$ 2471 MPa
Pull out from substrate CONCRETE: (failure mode FR) G600+GLM	ambient		$\sigma_{pull-out}$ 2525 MPa $\delta_{pull-out}$ 7,2 mm	-
	Water	1000 h	$\sigma_{pull-out}$ 2549 MPa $\delta_{pull-out}$ 5.30 mm $\sigma_{pull-out\ ret}$ 101%	-
		3000 h	$\sigma_{pull-out}$ 2634 MPa $\delta_{pull-out}$ 7.81 mm $\sigma_{pull-out\ ret}$ 104 %	-
	saltwater	1000 h	$\sigma_{pull-out}$ 2491 MPa $\delta_{pull-out}$ 7.40 mm $\sigma_{pull-out\ ret}$ 97%	-
		3000 h	$\sigma_{pull-out}$ 2340 MPa $\delta_{pull-out}$ 5.20 mm $\sigma_{pull-out\ ret}$ 93%	-
	alkali	1000 h	$\sigma_{pull-out}$ 2712 MPa $\delta_{pull-out}$ 6.04 mm $\sigma_{pull-out\ ret}$ 107 %	-
		3000 h	$\sigma_{pull-out}$ 2522 MPa $\delta_{pull-out}$ 5.50 mm $\sigma_{pull-out\ ret}$ 100 %	-

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Pull out from substrate CLAY: (failure mode FR) G600+GCFL	ambient		$\sigma_{\text{pull-out}}$ 2709 MPa $\delta_{\text{pull-out}}$ 7,7 mm	-
	Water	1000 h	$\sigma_{\text{pull-out}}$ 2555 MPa $\delta_{\text{pull-out}}$ 6.94 mm $\sigma_{\text{pull-out ret}}$ 94 %	-
		3000 h	$\sigma_{\text{pull-out}}$ 2510 MPa $\delta_{\text{pull-out}}$ 6.28 mm $\sigma_{\text{pull-out ret}}$ 93 %	-
	saltwater	1000 h	$\sigma_{\text{pull-out}}$ 2575 MPa $\delta_{\text{pull-out}}$ 7.70 mm $\sigma_{\text{pull-out ret}}$ 95 %	-
		3000 h	$\sigma_{\text{pull-out}}$ 2542 MPa $\delta_{\text{pull-out}}$ 7.12 mm $\sigma_{\text{pull-out ret}}$ 94 %	-
	alkali	1000 h	$\sigma_{\text{pull-out}}$ 2593 MPa $\delta_{\text{pull-out}}$ 7.19 mm $\sigma_{\text{pull-out ret}}$ 96 %	-
		3000 h	$\sigma_{\text{pull-out}}$ 2642 MPa $\delta_{\text{pull-out}}$ 7.30 mm $\sigma_{\text{pull-out ret}}$ 98 %	-
	Pull out from substrate TUFF: (failure mode FR) G600+ GCFL	ambient		$\sigma_{\text{pull-out}}$ 2503 MPa $\delta_{\text{pull-out}}$ 8,3 mm
Water		1000 h	$\sigma_{\text{pull-out}}$ 2803 MPa $\delta_{\text{pull-out}}$ 8.32 mm $\sigma_{\text{pull-out ret}}$ 112 %	-
		3000 h	$\sigma_{\text{pull-out}}$ 2730 MPa $\delta_{\text{pull-out}}$ 8.06 mm $\sigma_{\text{pull-out ret}}$ 109 %	-
saltwater		1000 h	$\sigma_{\text{pull-out}}$ 2480 MPa $\delta_{\text{pull-out}}$ 8.34 mm $\sigma_{\text{pull-out ret}}$ 99 %	-
		3000 h	$\sigma_{\text{pull-out}}$ 2665 MPa $\delta_{\text{pull-out}}$ 7.70 mm $\sigma_{\text{pull-out ret}}$ 106 %	-
alkali		1000 h	$\sigma_{\text{pull-out}}$ 2557 MPa $\delta_{\text{pull-out}}$ 7.62 mm $\sigma_{\text{pull-out ret}}$ 102 %	-
		3000 h	$\sigma_{\text{pull-out}}$ 2616 MPa $\delta_{\text{pull-out}}$ 7.48 mm $\sigma_{\text{pull-out ret}}$ 105 %	-

GL = GeoLite; GCF = Geocalce F Antisismico

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Essential characteristics		Performance			
			Average value	Characteristic value	
Freezing and Thawing	Direct tension	GL	Tensile strength $\sigma_{u,FT}$	2561 MPa	2423 MPa
			Strain $\epsilon_{u,FT}$	1,55 %	1,36 %
	GCF	GL	Stiffness moduli $E_{1FT}$	NPA	NPA
			Stiffness moduli $E_{3FT}$	183 GPa	163 GPa
	GCF	GCF	Inter shear strength ( $\tau_{FT}$ )	3.61 Mpa	2.73 Mpa
			Tensile strength $\sigma_{u,FT}$	2832 MPa	2709 MPa
Retained properties	GL	Strain $\epsilon_{u,FT}$	1,80 %	1,57 %	
		Stiffness moduli $E_{1FT}$	NPA	NPA	
GCF	GCF	Stiffness moduli $E_{3FT}$	199 GPa	173 GPa	
		Inter shear strength ( $\tau_{FT}$ )	1.54 MPa	1.03 MPa	
Retained properties	GL	Tensile strength $\sigma_{u,FT,ret}$	89%	-	
		Stiffness moduli $E_{1FT,ret}$	NPA	-	
GCF	GCF	Stiffness moduli $E_{3 FT,ret}$	97%	-	
		Inter shear strength ( $\tau_{FT,ret}$ )	123 %	-	
GCF	GCF	Tensile strength $\sigma_{u,FT,ret}$	95%	-	
		Stiffness moduli $E_{1FT,ret}$	NPA	-	
GCF	GCF	Stiffness moduli $E_{3 FT,ret}$	103%	-	
		Inter shear strength ( $\tau_{FT,ret}$ )	106%	-	
Water resistance	Direct tension (1000 h)	GL	Tensile strength $\sigma_{u,w}$	2532 MPa	2377 MPa
			Strain $\epsilon_{u,w}$	1,61 %	1,31 %
	GCF	GL	Stiffness moduli $E_{1w}$	NPA	NPA
			Stiffness moduli $E_{3 w}$	217 GPa	178 GPa
	GCF	GCF	Inter. shear strength ( $\tau_w$ )	3.81 MPa	2.95 MPa
			Lap tensile ( $\sigma_{lap w}$ )	NPA	NPA
	GCF	GCF	Tensile strength $\sigma_{u,w}$	2528 MPa	2489 MPa
			Strain $\epsilon_{u,w}$	1,92 %	1,61 %
	GCF	GCF	Stiffness moduli $E_{1w}$	NPA	NPA
			Stiffness moduli $E_{3 w}$	246 GPa	166 GPa
	GCF	GCF	Inter. shear strength ( $\tau_w$ )	1.04 MPa	0.70 MPa
			Lap tensile ( $\sigma_{lap w}$ )	NPA	NPA
Direct tension (3000 h)	GL	Tensile strength $\sigma_{u,w}$	2806 MPa	2705 MPa	
		Strain $\epsilon_{u,w}$	1,57 %	1,39 %	
GCF	GL	Stiffness moduli $E_{1w}$	NPA	NPA	
		Stiffness moduli $E_{3 w}$	281 GPa	239 GPa	
GCF	GCF	Inter. shear strength ( $\tau_w$ )	4.92 MPa	3.85 MPa	
		Lap tensile ( $\sigma_{lap w}$ )	NPA	NPA	
Retained properties (1000 h)	GL	Tensile strength $\sigma_{u,w}$	2585 MPa	2514 MPa	
		Strain $\epsilon_{u,w}$	1,88 %	1,55 %	
GCF	GL	Stiffness moduli $E_{1w}$	NPA	NPA	
		Stiffness moduli $E_{3 w}$	199 GPa	155 GPa	
GCF	GCF	Inter. shear strength ( $\tau_w$ )	1.97 MPa	1.48 MPa	
		Lap tensile ( $\sigma_{lap w}$ )	NPA	NPA	
Retained properties (1000 h)	GL	Tensile strength $\sigma_{u,w,ret}$	88 %	-	
		Stiffness moduli $E_{1 w,ret}$	NPA	-	
GCF	GCF	Stiffness moduli $E_{3 w,ret}$	115 %	-	
		Inter. shear strength ( $\tau_{w ret}$ )	130 %	-	
GCF	GCF	Lap tensile ( $\sigma_{lap w ret}$ )	NPA	-	
		Tensile strength $\sigma_{u,w,ret}$	85 %	-	
Retained properties (3000 h)	GL	Stiffness moduli $E_{1 w,ret}$	NPA	-	
		Stiffness moduli $E_{3 w,ret}$	127 %	-	
GCF	GCF	Inter. shear strength ( $\tau_{w ret}$ )	72 %	-	
		Lap tensile ( $\sigma_{lap w ret}$ )	NPA	-	
Retained properties (3000 h)	GL	Tensile strength $\sigma_{u,w,ret}$	98 %	-	
		Stiffness moduli $E_{1 w,ret}$	NPA	-	
GCF	GCF	Stiffness moduli $E_{3 w,ret}$	149 %	-	
		Inter. shear strength ( $\tau_{w ret}$ )	168 %	-	
GCF	GCF	Lap tensile ( $\sigma_{lap w ret}$ )	NPA	-	

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		GCF	Tensile strength $\sigma_{u, w, ret}$ Stiffness moduli $E_{1 w, ret}$ Stiffness moduli $E_{3 w, ret}$ Inter. shear strength ( $\tau_{w ret}$ ) Lap tensile ( $\sigma_{lap w ret}$ )	87 % NPA 103 % 136 % NPA	-
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Essential characteristics			Performance		
				Average value	Characteristic value
Saltwater resistance	Direct tension (1000 h)	GL	Tensile strength $\sigma_{u, sw}$	2819 MPa	2622 MPa
			Strain $\epsilon_{u, sw}$	1,59 %	1,31 %
			Stiffness moduli $E_{1 sw}$	NPA	NPA
		Stiffness moduli $E_{3 sw}$	189 GPa	162 GPa	
		Inter. shear strength ( $\tau_{sw}$ )	3.94 MPa	3.10 MPa	
		Lap tensile ( $\sigma_{lap sw}$ )	NPA	NPA	
	GCF	Tensile strength $\sigma_{u, sw}$	2712 MPa	2639 MPa	
		Strain $\epsilon_{u, sw}$	1,92 %	1,63 %	
		Stiffness moduli $E_{1 sw}$	NPA	NPA	
	Stiffness moduli $E_{3 sw}$	229 GPa	197 GPa		
	Inter. shear strength ( $\tau_{sw}$ )	0.62 MPa	0.44 MPa		
	Lap tensile ( $\sigma_{lap sw}$ )	NPA	NPA		
Direct tension (3000 h)	GL	Tensile strength $\sigma_{u, sw}$	2933 MPa	2765 MPa	
		Strain $\epsilon_{u, sw}$	1,57 %	1,33 %	
		Stiffness moduli $E_{1 sw}$	NPA	NPA	
	Stiffness moduli $E_{3 sw}$	182 GPa	161 GPa		
	Inter. shear strength ( $\tau_{sw}$ )	3.73 MPa	3.19 MPa		
	Lap tensile ( $\sigma_{lap sw}$ )	NPA	NPA		
GCF	Tensile strength $\sigma_{u, sw}$	2542 MPa	2470 MPa		
	Strain $\epsilon_{u, sw}$	1,77 %	1,55 %		
	Stiffness moduli $E_{1 sw}$	NPA	NPA		
Stiffness moduli $E_{3 sw}$	184 GPa	160 GPa			
Inter. shear strength ( $\tau_{sw}$ )	1.28 MPa	0.77 MPa			
Lap tensile ( $\sigma_{lap sw}$ )	NPA	NPA			
Retained properties (1000 h)	GL	Tensile strength $\sigma_{u, sw, ret}$	98 %	-	
		Stiffness moduli $E_{1 sw, ret}$	NPA	-	
		Stiffness moduli $E_{3 sw, ret}$	100 %	-	
	Inter. shear strength ( $\tau_{sw ret}$ )	135 %	-		
	Lap tensile ( $\sigma_{lap sw ret}$ )	NPA	-		
	GCF	Tensile strength $\sigma_{u, sw, ret}$	91 %	-	
Stiffness moduli $E_{1 sw, ret}$		NPA	-		
Stiffness moduli $E_{3 sw, ret}$		118 %	-		
Inter. shear strength ( $\tau_{sw ret}$ )	43 %	-			
Lap tensile ( $\sigma_{lap sw ret}$ )	NPA	-			
Retained properties (3000 h)	GL	Tensile strength $\sigma_{u, sw, ret}$	102 %	-	
		Stiffness moduli $E_{1 sw, ret}$	NPA	-	
		Stiffness moduli $E_{3 sw, ret}$	96 %	-	
	Inter. shear strength ( $\tau_{sw ret}$ )	127 %	-		
	Lap tensile ( $\sigma_{lap sw ret}$ )	NPA	-		
	GCF	Tensile strength $\sigma_{u, sw, ret}$	86 %	-	
Stiffness moduli $E_{1 sw, ret}$		NPA	-		
Stiffness moduli $E_{3 sw, ret}$		95 %	-		
Inter. shear strength ( $\tau_{sw ret}$ )	88 %	-			
Lap tensile ( $\sigma_{lap sw ret}$ )	NPA	-			

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Alkali resistance	Direct tension (1000 h)	GL	Tensile strength $\sigma_{u, alk}$ Strain $\varepsilon_{u, alk}$ Stiffness moduli $E_{1, alk}$ Stiffness moduli $E_{3, alk}$ Inter. shear strength ( $\tau_{alk}$ ) Lap tensile ( $\sigma_{lap, alk}$ ) NPA	2917 MPa 1,66 % NPA 187 GPa 4.18 MPa NPA	2755 MPa 1,47 % NPA 156 GPa 3.45 MPa NPA
		GCF	Tensile strength $\sigma_{u, alk}$ Strain $\varepsilon_{u, alk}$ Stiffness moduli $E_{1, alk}$ Stiffness moduli $E_{3, alk}$ Inter. shear strength ( $\tau_{alk}$ ) Lap tensile ( $\sigma_{lap, alk}$ )	2713 MPa 2,15 % NPA 218 GPa 0.62 MPa NPA	2604 MPa 1,76 % NPA 170 GPa 0.53 MPa NPA
	Direct tension (3000 h)	GL	Tensile strength $\sigma_{u, alk}$ Strain $\varepsilon_{u, alk}$ Stiffness moduli $E_{1, alk}$ Stiffness moduli $E_{3, alk}$ Inter. shear strength ( $\tau_{alk}$ ) Lap tensile ( $\sigma_{lap, alk}$ )	3007 MPa 1,67 % NPA 186 GPa 3.61 MPa NPA	2855 MPa 1,47 % NPA 160 GPa 2.55 MPa NPA
		GCF	Tensile strength $\sigma_{u, alk}$ Strain $\varepsilon_{u, alk}$ Stiffness moduli $E_{1, alk}$ Stiffness moduli $E_{3, alk}$ Inter. shear strength ( $\tau_{alk}$ ) Lap tensile ( $\sigma_{lap, alk}$ )	2627 MPa 1,88 % NPA 207 GPa 1.59 MPa NPA	2519 MPa 1,59 % NPA 169 GPa 1.23 MPa NPA
	Retained properties (1000 h)	GL	Tensile strength $\sigma_{u, alk, ret}$ Stiffness moduli $E_{1, alk, ret}$ Stiffness moduli $E_{3, alk, ret}$ Inter. shear strength ( $\tau_{alk, ret}$ ) Lap tensile ( $\sigma_{lap, alk, ret}$ )	102 % NPA 99 % 143 % NPA	-
		GCF	Tensile strength $\sigma_{u, alk, ret}$ Stiffness moduli $E_{1, alk, ret}$ Stiffness moduli $E_{3, alk, ret}$ Inter. shear strength ( $\tau_{alk, ret}$ ) Lap tensile ( $\sigma_{lap, alk, ret}$ )	91 % NPA 112 % 43 % NPA	-

GL = GeoLite; GCF = Geocalce F Antisismico

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Essential characteristics			Performance		
				Average value	Characteristic value
Alkali resistance	Retained properties (3000 h)	GL	Tensile strength $\sigma_{u, alk, ret}$ Stiffness moduli $E_{1 alk, ret}$ Stiffness moduli $E_{3 alk, ret}$ Inter. shear strength ( $\tau_{alk ret}$ ) Lap tensile ( $\sigma_{lap alk ret}$ )	105 % NPA 98 % 123 % NPA	-
		GCF	Tensile strength $\sigma_{u, alk, ret}$ Stiffness moduli $E_{1 alk, ret}$ Stiffness moduli $E_{3 alk, ret}$ Inter. shear strength ( $\tau_{alk ret}$ ) Lap tensile ( $\sigma_{lap alk ret}$ )	89 % NPA 107 % 109 % NPA	-
Alkali soil resistance	GL	Direct tension (1000 h)	Tensile strength $\sigma_{u, soil}$ Strain $\epsilon_{u, soil}$ Stiffness moduli $E_{1 soil}$ Stiffness moduli $E_{3 soil}$	2744 MPa 1.61 % 1301 GPa 175 GPa,	2414 MPa 1.07 % 716 GPa 150 GPa,
		Retained properties (1000 h)	Tensile strength $\sigma_{u, soil, ret}$ Stiffness moduli $E_{1 soil, ret}$ Stiffness moduli $E_{3 soil, ret}$	96 % 63 % 92 %	-
	GCF	Direct tension (1000 h)	Tensile strength $\sigma_{u, soil}$ Strain $\epsilon_{u, soil}$ Stiffness moduli $E_{1 soil}$ Stiffness moduli $E_{3 soil}$	2687 MPa 1.49 % 1576 GPa 186 GPa	2169 MPa 0.89 % 790 GPa 162 GPa
		Retained properties (1000 h)	Tensile strength $\sigma_{u, soil, ret}$ Stiffness moduli $E_{1 soil, ret}$ Stiffness moduli $E_{3 soil, ret}$	91 % 127 % 96 %	-
Dry heat resistance	GL	Direct tension (1000 h)	Tensile strength $\sigma_{u, heat}$ Strain $\epsilon_{u, heat}$ Stiffness moduli $E_{1 heat}$ Stiffness moduli $E_{3 heat}$	2817 MPa 1.73 % 1379 GPa, 194 GPa,	2560 MPa 1.49 % 677 GPa, 172 GPa,
		Retained properties (1000 h)	Tensile strength $\sigma_{u, heat, ret}$ Stiffness moduli $E_{1 heat, ret}$ Stiffness moduli $E_{3 heat, ret}$	98 % 67 % 102 %	-
		Direct tension (3000 h)	Tensile strength $\sigma_{u, heat}$ Strain $\epsilon_{u, heat}$ Stiffness moduli $E_{1 heat}$ Stiffness moduli $E_{3 heat}$	2778 MPa 1.37 % 2069 GPa, 215 GPa	2247 MPa 0.63 % 22 GPa, 166 GPa
		Retained properties (3000 h)	Tensile strength $\sigma_{u, heat, ret}$ Stiffness moduli $E_{1 heat, ret}$ Stiffness moduli $E_{3 heat, ret}$	97 % 100 % 114 %	-
	GCF	Direct tension (1000 h)	Tensile strength $\sigma_{u, heat}$ Strain $\epsilon_{u, heat}$ Stiffness moduli $E_{1 heat}$ Stiffness moduli $E_{3 heat}$	3102 MPa 1.53 % 1233 GPa 221 GPa	3056 MPa 1.43 % 551 GPa 196 GPa
		Retained properties (1000 h)	Tensile strength $\sigma_{u, heat, ret}$ Stiffness moduli $E_{1 heat, ret}$ Stiffness moduli $E_{3 heat, ret}$	104 % 99 % 114 %	-

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		Direct tension (3000 h)	Tensile strength $\sigma_{u, \text{heat}}$ Strain $\varepsilon_{u, \text{heat}}$ Stiffness moduli $E_{1 \text{ heat}}$ Stiffness moduli $E_{3 \text{ heat}}$	3133 MPa 1.75 % 1232 GPa; 197 GPa	3017 MPa 1.49 % 175 GPa; 175 GPa
		Retained properties (3000 h)	Tensile strength $\sigma_{u, \text{heat,ret}}$ Stiffness moduli $E_{1 \text{ heat,ret}}$ Stiffness moduli $E_{3 \text{ heat,ret}}$	106 % 99 % 102 %	-
Fuel resistance	GL	Direct tension	Tensile strength $\sigma_{u, \text{fuel}}$ Strain $\varepsilon_{u, \text{fuel}}$ Stiffness moduli $E_{1 \text{ fuel}}$ Stiffness moduli $E_{3 \text{ fuel}}$	1209 MPa 1.30 % NPA 81.9 GPa	1040 MPa 1.04 % NPA 70.9 GPa
		Retained properties	Tensile strength $\sigma_{u, \text{fuel,ret}}$ Stiffness moduli $E_{1 \text{ fuel,ret}}$ Stiffness moduli $E_{3 \text{ fuel,ret}}$	42 % NPA 43 %	-
	GCF	Direct tension	Tensile strength $\sigma_{u, \text{fuel}}$ Strain $\varepsilon_{u, \text{fuel}}$ Stiffness moduli $E_{1 \text{ fuel}}$ Stiffness moduli $E_{3 \text{ fuel}}$	809 MPa 1.44 % NPA 70.9 GPa	617 MPa 0.61 % NPA 52.2 GPa
		Retained properties	Tensile strength $\sigma_{u, \text{fuel,ret}}$ Stiffness moduli $E_{1 \text{ fuel,ret}}$ Stiffness moduli $E_{3 \text{ fuel,ret}}$	27 % NPA 36 %	-
Creep behaviour related to the adhesion on substrate	Substrate: concrete		Displacement vs time (tabular) Maximum load $P_{\text{max, creep}}$ Bond capacity $P_{\text{max, creep}}$	0.023 mm 8898 N 8268 N	- -(1) 8268 N
	Substrate: clay		Displacement vs time (tabular) Maximum load $P_{\text{max, creep}}$ Bond capacity $P_{\text{max, creep}}$	0.010 mm 8154 N 7605 N	- 5402 N 7605 N
	Substrate: tuff		Displacement vs time (tabular) Maximum load $P_{\text{max, creep}}$ Bond capacity $P_{\text{max, creep}}$	0.007 mm 3484 N 3248 N	- 2795 N 3248 N
Tensile strength after long term actions (creep) - GL	100 h	Direct tension	Tensile strength $\sigma_{u, \text{creep}}$ Strain $\varepsilon_{u, \text{creep}}$ Stiffness moduli $E_{3 \text{ creep}}$	2994 MPa 1.72 % 221 GPa;	-
		Retained properties	Tensile strength $\sigma_{u, \text{creep,ret}}$ Stiffness moduli $E_{3 \text{ creep,ret}}$	104 % 117 %	-
	500 h	Direct tension	Tensile strength $\sigma_{u, \text{creep}}$ Strain $\varepsilon_{u, \text{creep}}$ Stiffness moduli $E_{3 \text{ creep}}$	3027 MPa 1.94 % 209 GPa	-
		Retained properties	Tensile strength $\sigma_{u, \text{creep,ret}}$ Stiffness moduli $E_{3 \text{ creep,ret}}$	105 % 110 %	-
	1000 h	Direct tension	Tensile strength $\sigma_{u, \text{creep}}$ Strain $\varepsilon_{u, \text{creep}}$ Stiffness moduli $E_{3 \text{ creep}}$	3001 MPa 1.72 % 215 GPa	-
		Retained properties	Tensile strength $\sigma_{u, \text{creep,ret}}$ Stiffness moduli $E_{3 \text{ creep,ret}}$	105 % 113 %	-
	4000 h	Direct tension	Tensile strength $\sigma_{u, \text{creep}}$ Strain $\varepsilon_{u, \text{creep}}$ Stiffness moduli $E_{3 \text{ creep}}$	3007 MPa 1.63 % 223 GPa	-
		Retained properties	Tensile strength $\sigma_{u, \text{creep,ret}}$ Stiffness moduli $E_{3 \text{ creep,ret}}$	105 % 118 %	-

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Essential characteristics	Performance				
			Average value	Characteristic value	
Tensile strength after long term actions (creep) - GCF	100 h	Direct tension	Tensile strength $\sigma_{u, creep} \geq$ Strain $\varepsilon_{u, creep}$ Stiffness moduli $E_{3, creep}$	2702 MPa 1.48 % 218 GPa	-
		Retained properties	Tensile strength $\sigma_{u, creep, ret}$ Stiffness moduli $E_{3, creep, ret}$	91 % 112 %	-
	500 h	Direct tension	Tensile strength $\sigma_{u, creep}$ Strain $\varepsilon_{u, creep}$ Stiffness moduli $E_{3, creep}$	2725 MPa 1.58 % 210 GPa	-
		Retained properties	Tensile strength $\sigma_{u, creep, ret}$ Stiffness moduli $E_{3, creep, ret}$	92 % 108 %	-
	1000 h	Direct tension	Tensile strength $\sigma_{u, creep}$ Strain $\varepsilon_{u, creep}$ Stiffness moduli $E_{3, creep}$	2858 MPa 1.52 % 217 GPa	-
		Retained properties	Tensile strength $\sigma_{u, creep, ret}$ Stiffness moduli $E_{3, creep, ret}$	96 % 111 %	-
	4000 h	Direct tension	Tensile strength $\sigma_{u, creep}$ Strain $\varepsilon_{u, creep}$ Stiffness moduli $E_{3, creep}$	3014 MPa 1.68 % 224 GPa	-
		Retained properties	Tensile strength $\sigma_{u, creep, ret}$ Stiffness moduli $E_{3, creep, ret}$	102 % 115 %	-
	Tensile strength after low number of cycles (seismic behaviour)	GL	Tensile strength $\sigma_{u, seismic}$ Strain $\varepsilon_{u, seismic}$ Stiffness moduli $E_{1, seismic, ret}$ Stiffness moduli $E_{3, seismic, ret}$	3004 MPa 1.78 % 2080 GPa 200 GPa	2910 MPa 1.65 % 452 GPa 170 GPa
		GCF	Tensile strength $\sigma_{u, seismic}$ Strain $\varepsilon_{u, seismic}$ Stiffness moduli $E_{1, seismic, ret}$ Stiffness moduli $E_{3, seismic, ret}$	3063 MPa 2.00 % 1218 GPa 193 GPa	3024 MPa 1.92 % 549 GPa 188 GPa
	Tensile strength after high number of cycles (fatigue actions)			NPA	
	Mechanical properties of fabric	5 cords		Ultimate stress $\sigma_{u, f}$ Ultimate strain $\varepsilon_{u, f}$ Mean elastic modulus $E_f$	3124 MPa 2,06 % 190 GPa
8 cords		Ultimate stress $\sigma_{u, f}$ Ultimate strain $\varepsilon_{u, f}$ Mean elastic modulus $E_f$	3087 MPa 2,07 % 195 GPa	2889 MPa 1,67 % 161 GPa	
8 cords		concrete + GL clay + GCF tuff + GCF natural stone+ GCF	$\varepsilon_{lim, conv}$	1,21 %	0,94 %
			$\varepsilon_{lim, conv}$	1,21 %	0,91 %
Tensile strength on bent fabric	Straight fabric		$\sigma_{u, f, straight}$ $\sigma_{u, f, straight, sw 1000}$ $\sigma_{u, f, straight, sw 3000}$	3118 MPa 2965 MPa 2535 MPa	2959 MPa 2794 MPa 2416 MPa
	Bent fabric		$\sigma_{u, f, bent}$ $\sigma_{u, f, bent, sw 1000}$ $\sigma_{u, f, bent, sw 3000}$	2652 MPa 2330 MPa 2165 MPa	2416 MPa 2195 MPa 2006 MPa

GL = GeoLite; GCF = Geocalce F Antisismico

- (1) value not determinable due to the high dispersion of results
- (2) Rupture of fibres was observed outside the bonded length

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