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DICHIARAZIONE DI PRESTAZIONE N. 0482

1. Cod unic de identificare al produsului-tip:

   GeoSteel FRM (GeoSteel Grid 200 e Geocalce F Antisismico)

2. Utilizări preconizate: **Kit adecvat pentru consolidarea, îmbunătățirea și adaptarea seismică a elementelor structurale din zidărie de cărămidă, tuf și piatră naturală.**

3. Fabricant: **Kerakoll S.p.A Via dell'Artigianato, 9 - 41049 Sassuolo (MO) Italia**

4. Sistemele de evaluare și de verificare a constanței performanței: **Sistem 2+**

5. Documentul de evaluare europeană: **EAD 340275-00-0104, Ianuarie 2018**

   Evaluare tehnică europeană: **ETA-19/0326 din 13/07/2022**

   Organism de evaluare tehnică: **ITC CNR**

   Organisme notificate: **ITC n° 0970**

6. Performanțe declarate:
   - valori caracteristice pentru forțe de tracțiune și deformații
   - valori medii pentru modulii de elasticitate

Caracteristici esenţiale	Performanţă
Reactie 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 Grid 200-Geocalce F Antisismico

Essential characteristics			Performance	
			Average value	Characteristic value
Tensile strength (σ_u)	WEFT		NPA	NPA
Strain (ε_u)	WEFT		NPA	NPA
Stress-strain curve (E)	WEFT	Elastic modulus of stage A	6073 GPa	4049 GPa
		Stiffness modulus in stage C	NPA	NPA
Interlaminar shear strength (τ)			0.24 MPa	0.12 MPa
Lap tensile strength (l_{lap})	Tested Overlap length l_{lap}=300 mm		969 MPa	829 MPa
Bond strength on substrate CLAY: pull-off test	Ambient		1.70 MPa	-
	Water	1000 h	f_h 1.59 MPa	-
		3000 h	f_h 1.86 MPa	-
	saltwater	1000 h	f_h 2.13 MPa	-
		3000 h	f_h 2.18 MPa	-
	alkali	1000 h	f_h 1.82 MPa	-
		3000 h	f_h 2.02 MPa	-
Bond strength on substrate TUFF: pull-off test	Ambient		0.40 MPa	-
	Water	1000 h	f_h 0.51 MPa	-
		3000 h	f_h 0.46 MPa	-
	saltwater	1000 h	f_h 0.46 MPa	-
		3000 h	f_h 0.54 MPa	-
	alkali	1000 h	f_h 0.44 MPa	-
		3000 h	f_h 0.49 MPa	NPA
Bond strength on substrate CLAY: single-lap shear test (failure mode FR)	ambient		P_{max} 1799 N P_{deb} - (1) $\sigma_{lim,conv}$ 1102 MPa	P_{max} 1543 N P_{deb} - (1) $\sigma_{lim,conv}$ 945 MPa
	Water	1000 h	NPA	-
		3000 h	P_{max} 1377 N	-
	saltwater	1000 h	NPA	-
		3000 h	NPA	-
	alkali	1000 h	NPA	-
		3000 h	NPA	-

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Essential characteristics			Performance		
			Average value	Characteristic value	
Bond strength on substrate TUFF: single-lap shear test (failure mode FR)	ambient		P_{max} 1641 N P_{deb} - (1) $\sigma_{lim,conv}$ 1005 MPa	P_{max} 1498 N P_{deb} - (1) $\sigma_{lim,conv}$ 917 MPa	
	Water	1000 h	P_{max} 1369 N	-	
		3000 h	P_{max} 1498 N	-	
	saltwater	1000 h	NPA	-	
		3000 h	NPA	-	
	alkali	1000 h	NPA	-	
		3000 h	NPA	-	
Bond strength on substrate NATURAL STONE: single-lap shear test (failure mode FR)	ambient		P_{max} 1537 N P_{deb} - (1) $\sigma_{lim,conv}$ 942 MPa	P_{max} 1421 N P_{deb} - (1) $\sigma_{lim,conv}$ 871 MPa	
	Water,saltwater and alkali conditioning		NPA	NPA	
Pull out from substrate			NPA	NPA	
Freezing and Thawing	Direct tension		Tensile strength $\sigma_{u,FT}$ Strain $\varepsilon_{u,FT}$ Stiffness moduli E_{1FT}; E_{3FT} Inter. shear strenght(τ_{FT})	641 MPa NPA NPA 0.98 MPa	209 MPa NPA NPA 0.58 MPa
	Retained properties		Tensile strength $\sigma_{u,FT,ret}$ Stiffness moduli $E_{1FT,ret}$;$E_{3\,FT,ret}$ Inter. shear strenght($\tau_{FT,ret}$)	106 % NPA 408 %	-
Water resistance	Direct tension (1000 h)		Tensile strength $\sigma_{u,w}$ Strain $\varepsilon_{u,w}$ Stiffness moduli $E_{1w;}$ $E_{3\,w}$ Inter. shear strength (τ_w)	565 MPa NPA NPA 0.29 MPa	333 MPa NPA NPA 0.24 MPa
	Direct tension (3000 h)		Tensile strength $\sigma_{u,w}$ Strain $\varepsilon_{u,w}$ Stiffness moduli $E_{1w;}$ E_{3w} Inter. shear strength (τ_w)	696 MPa NPA NPA 1.24 MPa	319 MPa NPA NPA 0.82 MPa
	Retained properties (1000 h)		Tensile strength $\sigma_{u,\,w,ret}$ Stiffness moduli $E_{1\,w,ret;}$ $E_{3\,w,ret}$ Inter. shear strength ($\tau_{w\,ret}$)	93 % NPA 122 %	-
	Retained properties (3000 h)		Tensile strength $\sigma_{u,\,w,ret}$ Stiffness moduli $E_{1\,w,ret;}$ $E_{3\,w,ret}$ Inter. shear strength ($\tau_{w\,ret}$)	115 % NPA 520 %	-

(1) Rupture of fibres was observed outside the bonded length, therefore no value for the bond capacity is indicated

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Essential characteristics		Performance		
			Average value	Characteristic value
Saltwater resistance	Direct tension (1000 h)	Tensile strength $\sigma_{u,sw}$	662 MPa	335 MPa
		Strain $\varepsilon_{u,sw}$	NPA	NPA
		Stiffness moduli $E_{1\,sw}$; $E_{3\,sw}$	NPA	NPA
		Inter. shear strength (τ_{sw})	0.45 MPa	0.30 MPa
	Direct tension (3000 h)	Tensile strength $\sigma_{u,sw}$	749 MPa	225 MPa
		Strain $\varepsilon_{u,sw}$	NPA	NPA
		Stiffness moduli $E_{1\,sw}$; $E_{3\,sw}$	NPA	NPA
		Inter. shear strength (τ_{sw})	1.01 MPa	0.68 MPa
	Retained properties (1000 h)	Tensile strength $\sigma_{u,w,ret}$	109 %	
		Stiffness moduli $E_{1\,w,ret}$; $E_{3\,w,ret}$	NPA	-
		Inter. shear strength ($\tau_{sw\,ret}$)	188 %	
	Retained properties (3000 h)	Tensile strength $\sigma_{u,sw,ret}$	123 %	
		Stiffness moduli $E_{1\,sw,ret}$; $E_{3\,sw,ret}$	NPA	-
		Inter. shear strength ($\tau_{sw\,ret}$)	422 %	
Alkali resistance	Direct tension (1000 h)	Tensile strength $\sigma_{u,alk}$	650 MPa	300 MPa
		Strain $\varepsilon_{u,alk}$	NPA	NPA
		Stiffness moduli $E_{1\,alk}$; $E_{3\,alk}$	NPA	NPA
		Inter. shear strength (τ_{alk})	0.41 MPa	0.35 MPa
	Direct tension (3000 h)	Tensile strength $\sigma_{u,alk}$	755 MPa	394 MPa
		Strain $\varepsilon_{u,alk}$	NPA	NPA
		Stiffness moduli $E_{1\,alk}$; $E_{3\,alk}$	NPA	NPA
		Inter. shear strength (τ_{alk})	0.96 MPa	0.84 MPa
	Retained properties (1000 h)	Tensile strength $\sigma_{u,alk,ret}$	107 %	
		Stiffness moduli $E_{1\,alk,ret}$; $E_{3\,alk,ret}$	NPA	-
		Inter. shear strength ($\tau_{alk\,ret}$)	170 %	
	Retained properties (3000 h)	Tensile strength $\sigma_{u,alk,ret}$	124 %	
		Stiffness moduli $E_{1\,alk,ret}$; $E_{3\,alk,ret}$	NPA	-
		Inter. shear strength ($\tau_{alk\,ret}$)	399 %	
Alkali soil resistance	Direct tension (1000 h)	Tensile strength $\sigma_{u,soil}$	931 MPa	582 MPa
		Strain $\varepsilon_{u,soil}$	0.96 %	NPA
		Stiffness moduli $E_{1\,soil}$	6147 GPa	5134 GPa
		Stiffness moduli $E_{3\,soil}$	73 GPa	NPA
	Retained properties (1000 h)	Tensile strength $\sigma_{u,soil,ret}$	153 %	
		Stiffness moduli $E_{1\,soil,ret}$;	101 %	-
		Stiffness moduli $E_{3\,soil,ret}$	131 %	
Dry heat resistance	Direct tension (1000 h)	Tensile strength $\sigma_{u,heat}$	778 MPa	639 MPa
		Strain $\varepsilon_{u,heat}$	NPA	NPA
		Stiffness moduli $E_{1\,heat}$	6795 GPa	5942 GPa
		Stiffness moduli $E_{3\,heat}$	NPA	NPA
	Retained properties (1000 h)	Tensile strength $\sigma_{u,heat,ret}$	128 %	
		Stiffness moduli $E_{1\,heat,ret}$;	112 %	-
		Stiffness moduli $E_{3\,heat,ret}$	NPA	
	Direct tension (3000 h)	Tensile strength $\sigma_{u,heat}$	866 MPa	593 MPa
		Strain $\varepsilon_{u,heat}$	1.08 %	NPA
		Stiffness moduli $E_{1\,heat}$	5615 GPa;	5150 GPa;
		Stiffness moduli $E_{3\,heat}$	56 GPa	NPA
	Retained properties (3000 h)	Tensile strength $\sigma_{u,heat,ret}$	143 %	
		Stiffness moduli $E_{1\,heat,ret}$;	92 %	-
		Stiffness moduli $E_{3\,heat,ret}$	101 %	

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Essential characteristics				Performance		
					Average value	Characteristic value
Fuel resistance					NPA	NPA
Creep behaviour related to the adhesion on substrate	Substrate: clay			Displacement vs time (tabular) Maximum load $P_{max, creep}$ Bond capacity $P_{deb, creep}$	0.040 mm 1488 N - (1)	- 575 N -
	Substrate: tuff			Displacement vs time (tabular) Maximum load $P_{max, creep}$ Bond capacity $P_{deb, creep}$	0.027 mm 1455 N - (1)	- 767 N -
Tensile strength after long term actions (creep)	100 h	Direct tension		Tensile strength $\sigma_{u, creep}$ Strain $\varepsilon_{u, creep}$ Stiffness moduli $E_{3\ creep}$	903 MPa 1.02 % 76 GPa;	-
		Retained properties		Tensile strength $\sigma_{u, creep,ret}$ Stiffness moduli $E_{3\ creep,ret;}$	149 % NPA	-
	500 h	Direct tension		Tensile strength $\sigma_{u, creep}$ Strain $\varepsilon_{u, creep}$ Stiffness moduli $E_{3\ creep}$	862 MPa 1.23 % 70 GPa	-
		Retained properties		Tensile strength $\sigma_{u, creep,ret}$ Stiffness moduli $E_{3\ creep,ret}$	142 % NPA	-
	1000 h	Direct tension		Tensile strength $\sigma_{u, creep}$ ≥ Strain $\varepsilon_{u, creep}$ Stiffness moduli $E_{3\ creep}$	896 MPa 1.11 % 74 GPa	-
		Retained properties		Tensile strength $\sigma_{u, creep,ret}$ Stiffness moduli $E_{3\ creep,ret;}$	147 % NPA	-
	4000 h	Direct tension		Tensile strength $\sigma_{u, creep}$ Strain $\varepsilon_{u, creep}$ Stiffness moduli $E_{3\ creep}$	893 MPa 1.11 % 68 GPa	-
		Retained properties		Tensile strength $\sigma_{u, creep,ret}$ Stiffness moduli $E_{3\ creep,ret;}$	147 % NPA	-
Tensile strength after low number of cycles (seismic behaviour) - WEFT				Tensile strength $\sigma_{u, seismic}$ Strain $\varepsilon_{u, seismic}$ Stiffness moduli $E_{1\ seismic,ret;}$ Stiffness moduli $E_{3\ seismic,ret}$	1071 MPa 1.34 % 1104 GPa 71 GPa	948 MPa 1.11 % 391 GPa 61 GPa
Tensile strength after high number of cycles (fatigue actions)					NPA	NPA
Mechanical properties of fabric				Ultimate stress $\sigma_{u,f}$ Ultimate strain $\varepsilon_{u,f}$ Mean elastic modulus E_f	1341 MPa 2,22 % 62 GPa	1227 MPa 1,80 % 44 GPa
	Substrate: clay Substrate: tuff Substrate: Natural Stone			Conventional limit strain $\varepsilon_{lim,conv}$ Conventional limit strain $\varepsilon_{lim,conv}$ Conventional limit strain $\varepsilon_{lim,conv}$	1,78 % 1,62 % 1,52 %	1,52 % 1,48 % 1,40 %
Tensile strength on bent fabric (for steel fabrics)					Not applicable	Not applicable

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