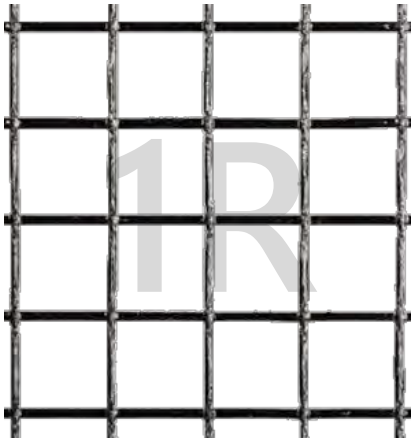
TECHNICAL PRODUCT DATA SHEET

solidian GRID Q47-C-EP-s38-F145 (F01R01)

Symmetrical, bidirectional reinforcement grid (type Q, grid family 1) made of media-resistant carbon fiber composite material for the reinforcement of concrete components with predominantly static loads in accordance with German national technical approval/construction technique permit Z-1.6-308



Material

Fiber material	C (Carbon)	
Impregnation agent	EP (Epoxy resin)	
Color	schwarz	
Surface finish	smooth	
Bending stiffness class	III, stiff	
Validity for concrete strength classes	C30/37 to C70/85	
Chemical resistance of the reinforcement in relation to the exposure classes in accordance with DIN EN 206-1 in conjunction with DIN 1045-2	XD3	Chlorides, except seawater
	XS3	Chlorides from seawater
	XA3	Chemical attack

Geometry and structure

			Unit	Value	Tolerance
	Directions of the fiber strands	longitudinal	[°]	0	± 5°
		transversal		90	± 5°
ϕ_h	Mean value of fiber strand width	longitudinal	[mm]	3,5	± 10%
		transversal		4,2	± 10%
ϕ_v	Mean value of fiber strand height	longitudinal	[mm]	1,9	± 10%
		transversal		1,8	± 10%
ϕ_{nm}	Nominal diameter	longitudinal	[mm]	2,37	-
		transversal		2,37	-
A_{nm}	Nominal cross-sectional area per fiber strand	longitudinal	[mm²]	4,4	-
		transversal		4,4	-
a_{nm}	Nominal cross-sectional area per meter	longitudinal	[mm²/m]	116	-
		transversal		116	-
$A_{f,nm}$	Fiber cross-sectional area per fiber strand	longitudinal	[mm²]	1,81	-
		transversal		1,81	-
$a_{f,nm}$	Fiber cross-sectional area per meter	longitudinal	[mm²/m]	47	-
		transversal		47	-
s	Grid width	longitudinal	[mm]	38	± 3 mm
		transversal		38	± 3 mm
s_l	Clear distance of the fiber strands	longitudinal	[mm]	34,2	± 10%
		transversal		34,9	± 10%
h_G	Grid height (average value of the maximum height)		[mm]	2,3	± 10%
g	Weight per unit area of the non-metallic reinforcement		[g/m²]	309	± 10%
$\kappa_ü$	Degree of coverage of the grid		[%]	18,9	-
r_{min}	Minimum permissible radius of curvature		[mm]	350	-

Material properties

			Unit	Value	Tolerance
ρ	Bulk density of the fiber composite material		[g/cm³]	1,30	-
α	Coefficient of thermal expansion	along the fiber	[10⁻⁶ 1/K]	0,5	-
T_{g0}	Glass transition temperature (DMA)		[°C]	≥ 110	-
	Recommended operating temperature range		[°C]	-20 bis +80	-
	Building material class reinforcement grid acc. to DIN EN 13501-1		[-]	E, normally flammable	-

Mechanical properties

			Unit	Value	Tolerance
$f_{nm,k}$	Characteristic short-term tensile strength related to the nominal cross-sectional area	longitudinal	[MPa]	1.250	-
		transversal		1.250	-
E_{nm}	Young's modulus related to the nominal cross-section	longitudinal	[MPa]	99.000	-
		transversal		99.000	-
$f_{f,nm,k}$	Characteristic short-term tensile strength related to the fiber cross-sectional area	longitudinal	[MPa]	≥ 3.039	-
		transversal		≥ 3.039	-
$E_{f,nm,m}$	Mean Young's modulus related to the fiber cross-sectional area	longitudinal	[MPa]	≥ 247.000	-
		transversal		≥ 247.000	-
$\varepsilon_{nm,uk}$	Characteristic elongation at failure under tensile load of the non-metallic reinforcement	longitudinal	[‰]	≥ 12,6	-
		transversal		≥ 12,6	-
f_{bk}	Characteristic short-term bond strength for anchoring for ≥ C30/37	longitudinal	[MPa]	1,7	-
		transversal		1,7	-
$\tau_{bm,k}$	Characteristic value of the mean bond stress (k_t=0) for ≥ C30/37	longitudinal	[MPa]	7,1	-
		transversal		7,1	-
$F_{nm,k}$	Characteristic tensile force transmission of the non-metallic reinforcement per m width	longitudinal	[kN/m]	145	-
		transversal		145	-

Coefficients

		Unit	Value	Tolerance
α_{Tt}	Coefficient for considering influences from short-term particularly high temperature stress on the tensile strength [1)]	[-]	1,0 bei -20°C ≤ T ≤ 70°C 0,95 bei 70°C < T ≤ 80°C	-
α_{Tb}	Coefficient for considering influences from short-term particularly high temperature stress on the bond behavior [1)]	[-]	1,0 bei -20°C ≤ T ≤ 70°C 0,95 bei 70°C < T ≤ 80°C	-
α_{nmt}	Coefficient for considering durability influences and long-term stresses on the tensile strength	[-]	0,83	-
α_{nmb}	Coefficient for considering durability influences and long-term stresses on the bond strength	[-]	0,83	-

Characteristic values for anchoring and lapping

			Unit	Value	Tolerance
	Applicable reinforcement stress for the anchorage proof	longitudinal	[MPa]	885	-
		transversal		885	-
$l_{b,min}$	Minimum anchoring length	longitudinal	[mm]	42	-
		transversal		42	-
$l_{0,min}$	Minimum lap length	longitudinal	[mm]	63	-
		transversal		63	-
	Minimum lap length for transferring $f_{nm,k}$ in lap joint [2)]	longitudinal	[mm]	700	-
		transversal		700	-

Further key values

		Unit	Value	Tolerance
$c_{min,b}$	Minimum concrete cover from bond requirement [3)]	[mm]	14	-
h_{min}	Minimum component thickness [3)]	[mm]	≥ 30	-
n	Proof of robustness for predominantly static loading (number of tested cycles)	[-]	≥ 200.000	-

Standard goods variety

		Unit	Value	Tolerance
Single grid	Length	[m]	6,0	± 16 mm
	Width		2,30	± 12 mm
Roll in CARGO System CS [4)]	Length	[m]	≤ 130,0	-
	Width		3,0	± 12 mm
Roll in CARGO System CS-U or CS-S [4)]	Length	[m]	≤ 130,0	-
	Width		2,30	± 12 mm
Roll	Length	[m]	≤ 250,0	-
	Width		3,0	± 12 mm

Single grid up to 3,0 m wide on request. The maximum length of the grid as a roll depends on the product type and the type of transport. Please enquire before ordering. Please specify the required length of the grid as a roll when ordering.

Transport and storage

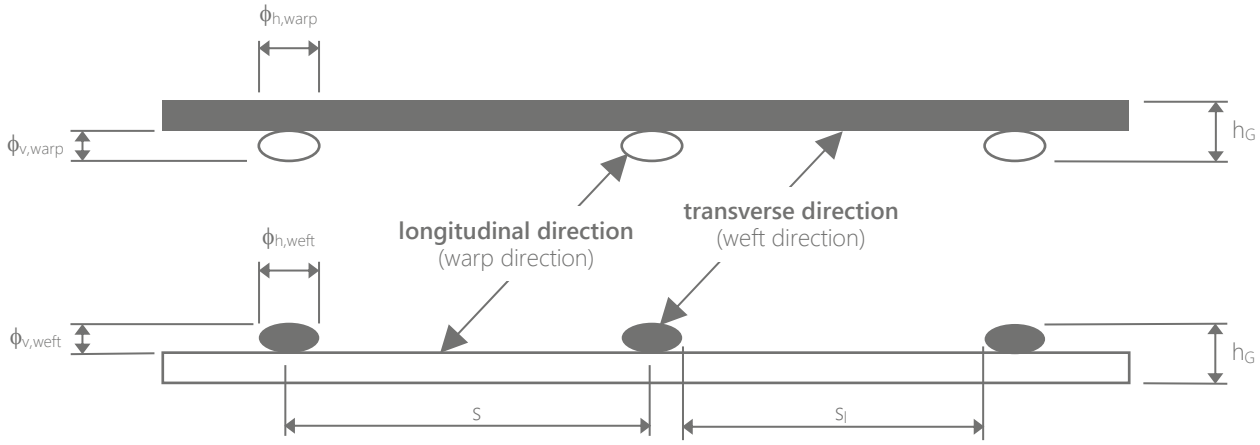
Nonmetallic reinforcements from solidian GmbH must not be damaged during transportation, storage, processing and installation and must not be exposed to temperatures higher than 80°C. They must be stored dry, protected from the weather and without touching the ground. They must be protected from UV radiation and moisture until concreting and be free from bond-reducing im-purities (e.g. grease, soil, loose concrete residues).

All values given in accordance with or based on DAfStb guideline "Concrete components with nonmetallic reinforcement", Part 4.

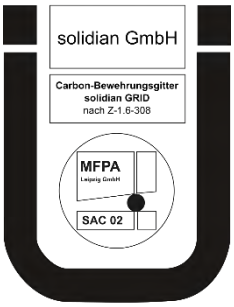
1) To use α_{Tt} = 1 and α_{Tb} = 1: proof required that the temperature loading does not exceed 70°C.
2) For smaller lap lengths, the transferable tensile stresses can be taken from the approval document Table 2, line 10.
3) A component thickness of 30 mm is permissible for components with a single layer of centrally arranged reinforcement grid.
4) The CARGO System CS is a stacking and transport rack for our reinforcement grids. In the CS-U version with additional unwinding device. In the CS-S version with additional unwinding device and cutting device.

Schematic illustration

according to German DAfStb guideline "Concrete components with nonmetallic reinforcement" - Part 2, Fig. 6-1



Confirmation of conformity



As part of the confirmation of the conformity of our construction product in accordance with section 2.3 of the German national technical approval/construction technique permit Z-1.6-308 and for quality assurance, we carry out our own production controls in accordance with section 2.3.2, which are externally monitored by MFPA Leipzig, Germany. The costs for the tests that are required and carried out as part of the approval/permit Z-1.6-308 via the test and monitoring plan are covered in our offer prices for approved grids. If you require additional tests during production, please contact us. We will be happy to provide you with a non-binding quotation.

Country-specific regulations

The use of the product is subject to the respective national regulations at the place of use, in Germany for example the building regulations of the federal states, and the technical provisions based on these regulations. The approval/permit Z-1.6-308 verifies the usability respectively applicability of the subject of regulation in terms of the German state building regulations.
The design is always carried out in accordance with the currently valid German guideline "Concrete components with non-metallic reinforcement" of the German Committee for Reinforced Concrete (DAfStb) and the applicable standards cited in the guideline.

Processing information

All work must only be carried out by trained personnel.
Damaged fiber bundles (resin spalling, brittle areas, etc.) must not be installed, as the specified load-bearing capacity cannot be guaranteed. The specified values of the product only apply when used as intended.
For further information, please refer to the current Technical Information for our solidian reinforcement products.

Ecology and health protection

REGULATION (EC) NO. 1907/2006 - REACH.
This product is an article as defined in Article 3 of Regulation (EC) No 1907/2006 (REACH). It does not contain substances that are released from the article during normal use. A safety data sheet according to Article 31 of the same regulation is not required to place this product on the market, to transport it or to use it. For safe use, follow the instructions from this data sheet. To our current knowledge, this product does not contain any SVHC (Substances of Very High Concern) according to Annex XIV of the REACH Regulation or sub-stances published on the Candidate List by the European Chemicals Agency at concentrations above 0,1% (w/w).

Industrial safety and health

The currently valid legal regulations on occupational health and safety must be observed during all transportation activities. Protective measures, such as wearing cut-resistant gloves, safety goggles and a dust mask, must be observed when working with cutting equipment. The specific handling of fiber reinforced polymers should be based on the respective national technical regulations.

Legal information

The above information is based on our knowledge and experience under normal circumstances, provided that the product has been transported, stored and used or processed properly and in accordance with the information in this product data sheet, the Technical Information for our solidian reinforcement products and the German national technical approval/ construction technique permit Z-1.6-308. The work results that can be achieved with our products depend in particular on their use and processing. The suitability of the product for the specific application must be checked in advance on your own responsibility. The country-specific regulations for the use and application of this product must be observed.
We reserve the right to make changes to the product specifications. Third-party property rights must be observed. In all other respects, our respective terms and conditions of sale and delivery apply. The latest technical product data sheet at the time of purchase of our products applies.

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30 YEARS OF INNOVATIONS EST. 1990
DEVELOPED AND MADE IN EU
CERTIFIED ISO 9001 ISO 14001

TECHNICAL PRODUCT DATA SHEET

solidian GRID Q71-C-EP-s51-F207 (F01R01)

Symmetrical, bidirectional reinforcement grid (type Q, grid family 2) made of media-resistant carbon fiber composite material for the reinforcement of concrete components with predominantly static loads in accordance with German national technical approval/construction technique permit Z-1.6-308

Material

Fiber material	C (Carbon)	
Impregnation agent	EP (Epoxy resin)	
Color	schwarz	
Surface finish	smooth	
Bending stiffness class	III, stiff	
Validity for concrete strength classes	C30/37 to C70/85	
Chemical resistance of the reinforcement in relation to the exposure classes in accordance with DIN EN 206-1 in conjunction with DIN 1045-2	XD3	Chlorides, except seawater
	XS3	Chlorides from seawater
	XA3	Chemical attack

Geometry and structure

			Unit	Value	Tolerance
	Directions of the fiber strands	longitudinal	[°]	0	± 5°
		transversal		90	± 5°
ϕ_h	Mean value of fiber strand width	longitudinal	[mm]	5,0	± 10%
		transversal		5,8	± 10%
ϕ_v	Mean value of fiber strand height	longitudinal	[mm]	2,7	± 10%
		transversal		2,6	± 10%
ϕ_{nm}	Nominal diameter	longitudinal	[mm]	3,35	-
		transversal		3,35	-
A_{nm}	Nominal cross-sectional area per fiber strand	longitudinal	[mm²]	8,8	-
		transversal		8,8	-
a_{nm}	Nominal cross-sectional area per meter	longitudinal	[mm²/m]	173	-
		transversal		173	-
$A_{f,nm}$	Fiber cross-sectional area per fiber strand	longitudinal	[mm²]	3,62	-
		transversal		3,62	-
$a_{f,nm}$	Fiber cross-sectional area per meter	longitudinal	[mm²/m]	71	-
		transversal		71	-
s	Grid width	longitudinal	[mm]	51	± 3 mm
		transversal		51	± 3 mm
s_l	Clear distance of the fiber strands	longitudinal	[mm]	45,4	± 10%
		transversal		46,2	± 10%
h_G	Grid height (average value of the maximum height)		[mm]	3,5	± 10%
g	Weight per unit area of the non-metallic reinforcement		[g/m²]	454	± 10%
$\kappa_ü$	Degree of coverage of the grid		[%]	20,1	-
r_{min}	Minimum permissible radius of curvature		[mm]	350	-

Material properties

			Unit	Value	Tolerance
ρ	Bulk density of the fiber composite material		[g/cm³]	1,30	-
α	Coefficient of thermal expansion	along the fiber	[10^{-6} 1/K]	0,5	-
T_{g0}	Glass transition temperature (DMA)		[°C]	≥ 110	-
	Recommended operating temperature range		[°C]	-20 bis +80	-
	Building material class reinforcement grid acc. to DIN EN 13501-1		[-]	E, normally flammable	-

Mechanical properties

			Unit	Value	Tolerance
$f_{nm,k}$	Characteristic short-term tensile strength related to the nominal cross-sectional area	longitudinal	[MPa]	1.200	-
		transversal		1.200	-
E_{nm}	Young's modulus related to the nominal cross-section	longitudinal	[MPa]	97.000	-
		transversal		97.000	-
$f_{f,nm,k}$	Characteristic short-term tensile strength related to the fiber cross-sectional area	longitudinal	[MPa]	≥ 2.917	-
		transversal		≥ 2.917	-
$E_{f,nm,m}$	Mean Young's modulus related to the fiber cross-sectional area	longitudinal	[MPa]	≥ 243.000	-
		transversal		≥ 243.000	-
$\varepsilon_{nm,uk}$	Characteristic elongation at failure under tensile load of the non-metallic reinforcement	longitudinal	[‰]	≥ 12,4	-
		transversal		≥ 12,4	-
f_{bk}	Characteristic short-term bond strength for anchoring for ≥ C30/37	longitudinal	[MPa]	2,9	-
		transversal		2,9	-
$\tau_{bm,k}$	Characteristic value of the mean bond stress (k_t=0) for ≥ C30/37	longitudinal	[MPa]	5,9	-
		transversal		5,9	-
$F_{nm,k}$	Characteristic tensile force transmission of the non-metallic reinforcement per m width	longitudinal	[kN/m]	207	-
		transversal		207	-

Coefficients

		Unit	Value	Tolerance
α_{Tt}	Coefficient for considering influences from short-term particularly high temperature stress on the tensile strength [1)]	[-]	1,0 bei -20°C ≤ T ≤ 70°C 0,90 bei 70°C < T ≤ 80°C	-
α_{Tb}	Coefficient for considering influences from short-term particularly high temperature stress on the bond behavior [1)]	[-]	1,0 bei -20°C ≤ T ≤ 70°C 0,90 bei 70°C < T ≤ 80°C	-
α_{nmt}	Coefficient for considering durability influences and long-term stresses on the tensile strength	[-]	0,83	-
α_{nmb}	Coefficient for considering durability influences and long-term stresses on the bond strength	[-]	0,83	-

Characteristic values for anchoring and lapping

			Unit	Value	Tolerance
	Applicable reinforcement stress for the anchorage proof	longitudinal	[MPa]	1.020	-
		transversal		1.020	-
$l_{b,min}$	Minimum anchoring length	longitudinal	[mm]	76	-
		transversal		76	-
$l_{0,min}$	Minimum lap length	longitudinal	[mm]	117	-
		transversal		117	-
	Minimum lap length for transferring $f_{nm,k}$ in lap joint [2)]	longitudinal	[mm]	500	-
		transversal		500	-

Further key values

		Unit	Value	Tolerance
$c_{min,b}$	Minimum concrete cover from bond requirement [3)]	[mm]	14	-
h_{min}	Minimum component thickness [3)]	[mm]	≥ 30	-
n	Proof of robustness for predominantly static loading (number of tested cycles)	[-]	≥ 200.000	-

Standard goods variety

		Unit	Value	Tolerance
Single grid	Length	[m]	6,0	± 16 mm
	Width		2,30	± 12 mm
Roll in CARGO System CS [4)]	Length	[m]	≤ 130,0	-
	Width		3,0	± 12 mm
Roll in CARGO System CS-U or CS-S [4)]	Length	[m]	≤ 130,0	-
	Width		2,30	± 12 mm
Roll	Length	[m]	≤ 250,0	-
	Width		3,0	± 12 mm

Single grid up to 3,0 m wide on request. The maximum length of the grid as a roll depends on the product type and the type of transport. Please enquire before ordering. Please specify the required length of the grid as a roll when ordering.

Transport and storage

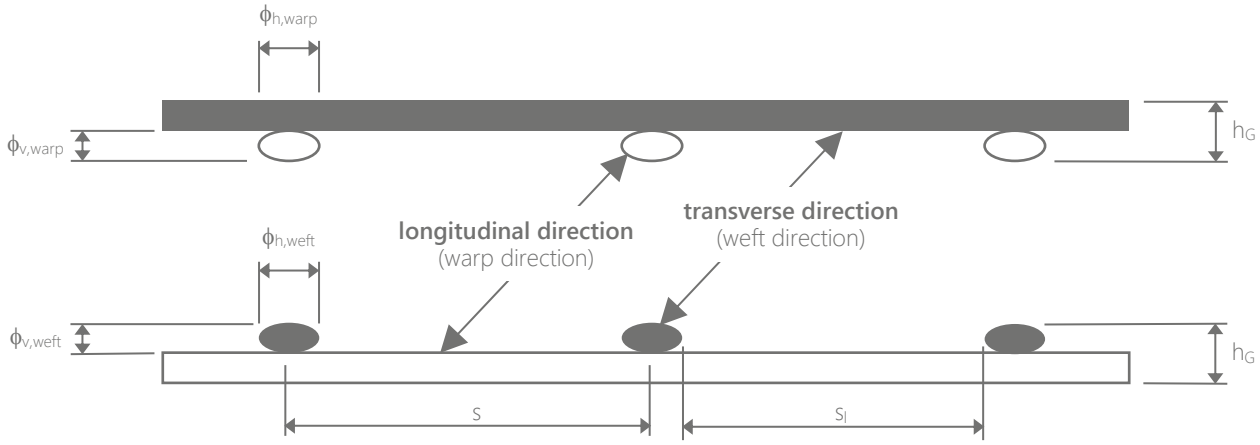
Nonmetallic reinforcements from solidian GmbH must not be damaged during transportation, storage, processing and installation and must not be exposed to temperatures higher than 80°C. They must be stored dry, protected from the weather and without touching the ground. They must be protected from UV radiation and moisture until concreting and be free from bond-reducing im-purities (e.g. grease, soil, loose concrete residues).

All values given in accordance with or based on DAfStb guideline "Concrete components with nonmetallic reinforcement", Part 4.

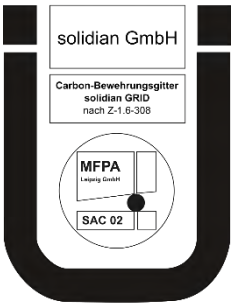
1) To use α_{Tt} = 1 and α_{Tb} = 1: proof required that the temperature loading does not exceed 70°C.
2) For smaller lap lengths, the transferable tensile stresses can be taken from the approval document Table 2, line 10.
3) A component thickness of 30 mm is permissible for components with a single layer of centrally arranged reinforcement grid.
4) The CARGO System CS is a stacking and transport rack for our reinforcement grids. In the CS-U version with additional unwinding device. In the CS-S version with additional unwinding device and cutting device.

Schematic illustration

according to German DAfStb guideline "Concrete components with nonmetallic reinforcement" - Part 2, Fig. 6-1



Confirmation of conformity



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Country-specific regulations

The use of the product is subject to the respective national regulations at the place of use, in Germany for example the building regulations of the federal states, and the technical provisions based on these regulations. The approval/permit Z-1.6-308 verifies the usability respectively applicability of the subject of regulation in terms of the German state building regulations.
The design is always carried out in accordance with the currently valid German guideline "Concrete components with non-metallic reinforcement" of the German Committee for Reinforced Concrete (DAfStb) and the applicable standards cited in the guideline.

Processing information

All work must only be carried out by trained personnel.
Damaged fiber bundles (resin spalling, brittle areas, etc.) must not be installed, as the specified load-bearing capacity cannot be guaranteed. The specified values of the product only apply when used as intended.
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Ecology and health protection

REGULATION (EC) NO. 1907/2006 - REACH.
This product is an article as defined in Article 3 of Regulation (EC) No 1907/2006 (REACH). It does not contain substances that are released from the article during normal use. A safety data sheet according to Article 31 of the same regulation is not required to place this product on the market, to transport it or to use it. For safe use, follow the instructions from this data sheet. To our current knowledge, this product does not contain any SVHC (Substances of Very High Concern) according to Annex XIV of the REACH Regulation or sub-stances published on the Candidate List by the European Chemicals Agency at concentrations above 0,1% (w/w).

Industrial safety and health

The currently valid legal regulations on occupational health and safety must be observed during all transportation activities. Protective measures, such as wearing cut-resistant gloves, safety goggles and a dust mask, must be observed when working with cutting equipment. The specific handling of fiber reinforced polymers should be based on the respective national technical regulations.

Legal information

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We reserve the right to make changes to the product specifications. Third-party property rights must be observed. In all other respects, our respective terms and conditions of sale and delivery apply. The latest technical product data sheet at the time of purchase of our products applies.

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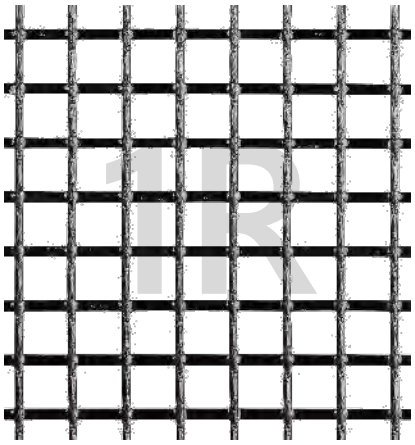
30 YEARS OF INNOVATIONS EST. 1990
DEVELOPED AND MADE IN EU
CERTIFIED ISO 9001 ISO 14001

TECHNICAL PRODUCT DATA SHEET

solidian GRID Q85-C-EP-s21-F262 (F01R01)

Symmetrical, bidirectional reinforcement grid (type Q, grid family 1) made of media-resistant carbon fiber composite material for the reinforcement of concrete components with predominantly static loads in accordance with German national technical approval/construction technique permit Z-1.6-308



Material

Fiber material	C (Carbon)	
Impregnation agent	EP (Epoxy resin)	
Color	schwarz	
Surface finish	smooth	
Bending stiffness class	III, stiff	
Validity for concrete strength classes	C30/37 to C70/85	
Chemical resistance of the reinforcement in relation to the exposure classes in accordance with DIN EN 206-1 in conjunction with DIN 1045-2	XD3	Chlorides, except seawater
	XS3	Chlorides from seawater
	XA3	Chemical attack

Geometry and structure

			Unit	Value	Tolerance
	Directions of the fiber strands	longitudinal	[°]	0	± 5°
		transversal		90	± 5°
ϕ_h	Mean value of fiber strand width	longitudinal	[mm]	3,4	± 10%
		transversal		4,2	± 10%
ϕ_v	Mean value of fiber strand height	longitudinal	[mm]	1,8	± 10%
		transversal		1,5	± 10%
ϕ_{nm}	Nominal diameter	longitudinal	[mm]	2,37	-
		transversal		2,37	-
A_{nm}	Nominal cross-sectional area per fiber strand	longitudinal	[mm²]	4,4	-
		transversal		4,4	-
a_{nm}	Nominal cross-sectional area per meter	longitudinal	[mm²/m]	210	-
		transversal		210	-
$A_{f,nm}$	Fiber cross-sectional area per fiber strand	longitudinal	[mm²]	1,81	-
		transversal		1,81	-
$a_{f,nm}$	Fiber cross-sectional area per meter	longitudinal	[mm²/m]	85	-
		transversal		85	-
s	Grid width	longitudinal	[mm]	21	± 3 mm
		transversal		21	± 3 mm
s_l	Clear distance of the fiber strands	longitudinal	[mm]	17,0	± 10%
		transversal		18,0	± 10%
h_G	Grid height (average value of the maximum height)		[mm]	2,1	± 10%
g	Weight per unit area of the non-metallic reinforcement		[g/m²]	512	± 10%
$\kappa_ü$	Degree of coverage of the grid		[%]	32,6	-
r_{min}	Minimum permissible radius of curvature		[mm]	350	-

Material properties

			Unit	Value	Tolerance
ρ	Bulk density of the fiber composite material		[g/cm³]	1,30	-
α	Coefficient of thermal expansion	along the fiber	[10⁻⁶ 1/K]	0,5	-
T_{g0}	Glass transition temperature (DMA)		[°C]	≥ 110	-
	Recommended operating temperature range		[°C]	-20 bis +80	-
	Building material class reinforcement grid acc. to DIN EN 13501-1		[-]	E, normally flammable	-

Mechanical properties

			Unit	Value	Tolerance
$f_{nm,k}$	Characteristic short-term tensile strength related to the nominal cross-sectional area	longitudinal	[MPa]	1.250	-
		transversal		1.250	-
E_{nm}	Young's modulus related to the nominal cross-section	longitudinal	[MPa]	99.000	-
		transversal		99.000	-
$f_{f,nm,k}$	Characteristic short-term tensile strength related to the fiber cross-sectional area	longitudinal	[MPa]	≥ 3.039	-
		transversal		≥ 3.039	-
$E_{f,nm,m}$	Mean Young's modulus related to the fiber cross-sectional area	longitudinal	[MPa]	≥ 247.000	-
		transversal		≥ 247.000	-
$\varepsilon_{nm,uk}$	Characteristic elongation at failure under tensile load of the non-metallic reinforcement	longitudinal	[‰]	≥ 12,6	-
		transversal		≥ 12,6	-
f_{bk}	Characteristic short-term bond strength for anchoring for ≥ C30/37	longitudinal	[MPa]	1,7	-
		transversal		1,7	-
$\tau_{bm,k}$	Characteristic value of the mean bond stress (k_t=0) for ≥ C30/37	longitudinal	[MPa]	7,1	-
		transversal		7,1	-
$F_{nm,k}$	Characteristic tensile force transmission of the non-metallic reinforcement per m width	longitudinal	[kN/m]	262	-
		transversal		262	-

Coefficients

		Unit	Value	Tolerance
α_{Tt}	Coefficient for considering influences from short-term particularly high temperature stress on the tensile strength [1)]	[-]	1,0 bei -20°C ≤ T ≤ 70°C 0,95 bei 70°C < T ≤ 80°C	-
α_{Tb}	Coefficient for considering influences from short-term particularly high temperature stress on the bond behavior [1)]	[-]	1,0 bei -20°C ≤ T ≤ 70°C 0,95 bei 70°C < T ≤ 80°C	-
α_{nmt}	Coefficient for considering durability influences and long-term stresses on the tensile strength	[-]	0,83	-
α_{nmb}	Coefficient for considering durability influences and long-term stresses on the bond strength	[-]	0,83	-

Characteristic values for anchoring and lapping

			Unit	Value	Tolerance
	Applicable reinforcement stress for the anchorage proof	longitudinal	[MPa]	885	-
		transversal		885	-
$l_{b,min}$	Minimum anchoring length	longitudinal	[mm]	42	-
		transversal		42	-
$l_{0,min}$	Minimum lap length	longitudinal	[mm]	63	-
		transversal		63	-
	Minimum lap length for transferring $f_{nm,k}$ in lap joint [2)]	longitudinal	[mm]	700	-
		transversal		700	-

Further key values

		Unit	Value	Tolerance
$c_{min,b}$	Minimum concrete cover from bond requirement [3)]	[mm]	14	-
h_{min}	Minimum component thickness [3)]	[mm]	≥ 30	-
n	Proof of robustness for predominantly static loading (number of tested cycles)	[-]	≥ 200.000	-

Standard goods variety

		Unit	Value	Tolerance
Single grid	Length	[m]	6,0	± 16 mm
	Width		2,30	± 12 mm
Roll in CARGO System CS [4)]	Length	[m]	≤ 130,0	-
	Width		3,0	± 12 mm
Roll in CARGO System CS-U or CS-S [4)]	Length	[m]	≤ 130,0	-
	Width		2,30	± 12 mm
Roll	Length	[m]	≤ 250,0	-
	Width		3,0	± 12 mm

Single grid up to 3,0 m wide on request. The maximum length of the grid as a roll depends on the product type and the type of transport. Please enquire before ordering. Please specify the required length of the grid as a roll when ordering.

Transport and storage

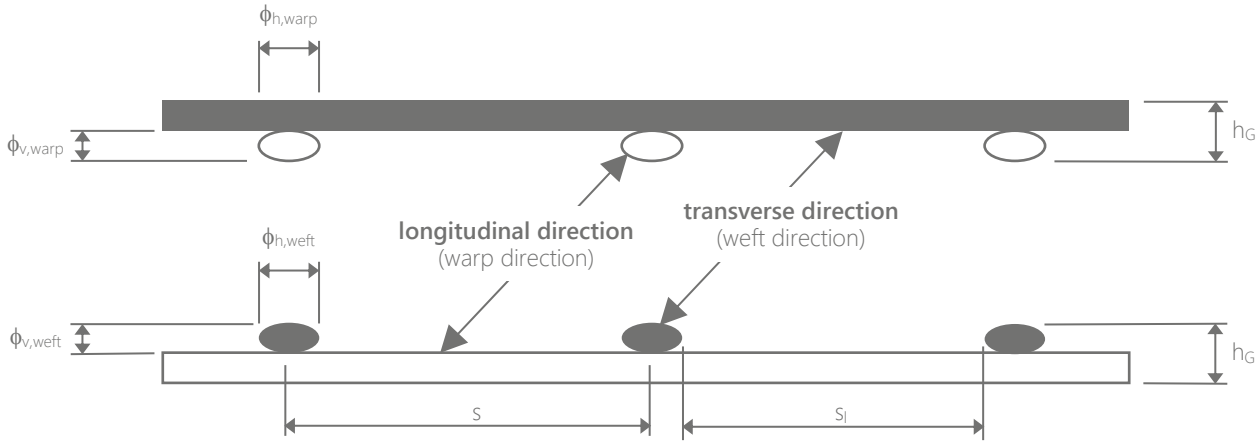
Nonmetallic reinforcements from solidian GmbH must not be damaged during transportation, storage, processing and installation and must not be exposed to temperatures higher than 80°C. They must be stored dry, protected from the weather and without touching the ground. They must be protected from UV radiation and moisture until concreting and be free from bond-reducing im-purities (e.g. grease, soil, loose concrete residues).

All values given in accordance with or based on DAfStb guideline "Concrete components with nonmetallic reinforcement", Part 4.

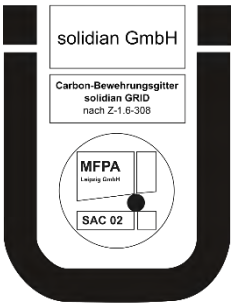
1) To use α_{Tt} = 1 and α_{Tb} = 1: proof required that the temperature loading does not exceed 70°C.
2) For smaller lap lengths, the transferable tensile stresses can be taken from the approval document Table 2, line 10.
3) A component thickness of 30 mm is permissible for components with a single layer of centrally arranged reinforcement grid.
4) The CARGO System CS is a stacking and transport rack for our reinforcement grids. In the CS-U version with additional unwinding device. In the CS-S version with additional unwinding device and cutting device.

Schematic illustration

according to German DAfStb guideline "Concrete components with nonmetallic reinforcement" - Part 2, Fig. 6-1



Confirmation of conformity



As part of the confirmation of the conformity of our construction product in accordance with section 2.3 of the German national technical approval/construction technique permit Z-1.6-308 and for quality assurance, we carry out our own production controls in accordance with section 2.3.2, which are externally monitored by MFPA Leipzig, Germany. The costs for the tests that are required and carried out as part of the approval/permit Z-1.6-308 via the test and monitoring plan are covered in our offer prices for approved grids. If you require additional tests during production, please contact us. We will be happy to provide you with a non-binding quotation.

Country-specific regulations

The use of the product is subject to the respective national regulations at the place of use, in Germany for example the building regulations of the federal states, and the technical provisions based on these regulations. The approval/permit Z-1.6-308 verifies the usability respectively applicability of the subject of regulation in terms of the German state building regulations.
The design is always carried out in accordance with the currently valid German guideline "Concrete components with non-metallic reinforcement" of the German Committee for Reinforced Concrete (DAfStb) and the applicable standards cited in the guideline.

Processing information

All work must only be carried out by trained personnel.
Damaged fiber bundles (resin spalling, brittle areas, etc.) must not be installed, as the specified load-bearing capacity cannot be guaranteed. The specified values of the product only apply when used as intended.
For further information, please refer to the current Technical Information for our solidian reinforcement products.

Ecology and health protection

REGULATION (EC) NO. 1907/2006 - REACH.
This product is an article as defined in Article 3 of Regulation (EC) No 1907/2006 (REACH). It does not contain substances that are released from the article during normal use. A safety data sheet according to Article 31 of the same regulation is not required to place this product on the market, to transport it or to use it. For safe use, follow the instructions from this data sheet. To our current knowledge, this product does not contain any SVHC (Substances of Very High Concern) according to Annex XIV of the REACH Regulation or sub-stances published on the Candidate List by the European Chemicals Agency at concentrations above 0,1% (w/w).

Industrial safety and health

The currently valid legal regulations on occupational health and safety must be observed during all transportation activities. Protective measures, such as wearing cut-resistant gloves, safety goggles and a dust mask, must be observed when working with cutting equipment. The specific handling of fiber reinforced polymers should be based on the respective national technical regulations.

Legal information

The above information is based on our knowledge and experience under normal circumstances, provided that the product has been transported, stored and used or processed properly and in accordance with the information in this product data sheet, the Technical Information for our solidian reinforcement products and the German national technical approval/ construction technique permit Z-1.6-308. The work results that can be achieved with our products depend in particular on their use and processing. The suitability of the product for the specific application must be checked in advance on your own responsibility. The country-specific regulations for the use and application of this product must be observed.
We reserve the right to make changes to the product specifications. Third-party property rights must be observed. In all other respects, our respective terms and conditions of sale and delivery apply. The latest technical product data sheet at the time of purchase of our products applies.

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30 YEARS OF INNOVATIONS EST. 1990
DEVELOPED AND MADE IN EU
CERTIFIED ISO 9001 ISO 14001

TECHNICAL PRODUCT DATA SHEET

solidian GRID Q95-C-EP-s38-F278 (F01R01)

Symmetrical, bidirectional reinforcement grid (type Q, grid family 2) made of media-resistant carbon fiber composite material for the reinforcement of concrete components with predominantly static loads in accordance with German national technical approval/construction technique permit Z-1.6-308

Material

Fiber material	C (Carbon)	
Impregnation agent	EP (Epoxy resin)	
Color	schwarz	
Surface finish	smooth	
Bending stiffness class	III, stiff	
Validity for concrete strength classes	C30/37 to C70/85	
Chemical resistance of the reinforcement in relation to the exposure classes in accordance with DIN EN 206-1 in conjunction with DIN 1045-2	XD3	Chlorides, except seawater
	XS3	Chlorides from seawater
	XA3	Chemical attack

Geometry and structure

			Unit	Value	Tolerance
	Directions of the fiber strands	longitudinal	[°]	0	± 5°
		transversal		90	± 5°
ϕ_h	Mean value of fiber strand width	longitudinal	[mm]	4,8	± 10%
		transversal		5,5	± 10%
ϕ_v	Mean value of fiber strand height	longitudinal	[mm]	2,6	± 10%
		transversal		2,5	± 10%
ϕ_{nm}	Nominal diameter	longitudinal	[mm]	3,35	-
		transversal		3,35	-
A_{nm}	Nominal cross-sectional area per fiber strand	longitudinal	[mm²]	8,8	-
		transversal		8,8	-
a_{nm}	Nominal cross-sectional area per meter	longitudinal	[mm²/m]	232	-
		transversal		232	-
$A_{f,nm}$	Fiber cross-sectional area per fiber strand	longitudinal	[mm²]	3,62	-
		transversal		3,62	-
$a_{f,nm}$	Fiber cross-sectional area per meter	longitudinal	[mm²/m]	95	-
		transversal		95	-
s	Grid width	longitudinal	[mm]	38	± 3 mm
		transversal		38	± 3 mm
s_l	Clear distance of the fiber strands	longitudinal	[mm]	32,8	± 10%
		transversal		33,5	± 10%
h_G	Grid height (average value of the maximum height)		[mm]	3,3	± 10%
g	Weight per unit area of the non-metallic reinforcement		[g/m²]	559	± 10%
$\kappa_ü$	Degree of coverage of the grid		[%]	25,2	-
r_{min}	Minimum permissible radius of curvature		[mm]	350	-

Material properties

			Unit	Value	Tolerance
ρ	Bulk density of the fiber composite material		[g/cm³]	1,30	-
α	Coefficient of thermal expansion	along the fiber	[10^{-6} 1/K]	0,5	-
T_{g0}	Glass transition temperature (DMA)		[°C]	≥ 110	-
	Recommended operating temperature range		[°C]	-20 bis +80	-
	Building material class reinforcement grid acc. to DIN EN 13501-1		[-]	E, normally flammable	-

Mechanical properties

			Unit	Value	Tolerance
$f_{nm,k}$	Characteristic short-term tensile strength related to the nominal cross-sectional area	longitudinal	[MPa]	1.200	-
		transversal		1.200	-
E_{nm}	Young's modulus related to the nominal cross-section	longitudinal	[MPa]	97.000	-
		transversal		97.000	-
$f_{f,nm,k}$	Characteristic short-term tensile strength related to the fiber cross-sectional area	longitudinal	[MPa]	≥ 2.917	-
		transversal		≥ 2.917	-
$E_{f,nm,m}$	Mean Young's modulus related to the fiber cross-sectional area	longitudinal	[MPa]	≥ 243.000	-
		transversal		≥ 243.000	-
$\varepsilon_{nm,uk}$	Characteristic elongation at failure under tensile load of the non-metallic reinforcement	longitudinal	[‰]	≥ 12,4	-
		transversal		≥ 12,4	-
f_{bk}	Characteristic short-term bond strength for anchoring for ≥ C30/37	longitudinal	[MPa]	2,9	-
		transversal		2,9	-
$\tau_{bm,k}$	Characteristic value of the mean bond stress (k_t=0) for ≥ C30/37	longitudinal	[MPa]	5,9	-
		transversal		5,9	-
$F_{nm,k}$	Characteristic tensile force transmission of the non-metallic reinforcement per m width	longitudinal	[kN/m]	278	-
		transversal		278	-

Coefficients

		Unit	Value	Tolerance
α_{Tt}	Coefficient for considering influences from short-term particularly high temperature stress on the tensile strength [1)]	[-]	1,0 bei -20°C ≤ T ≤ 70°C 0,90 bei 70°C < T ≤ 80°C	-
α_{Tb}	Coefficient for considering influences from short-term particularly high temperature stress on the bond behavior [1)]	[-]	1,0 bei -20°C ≤ T ≤ 70°C 0,90 bei 70°C < T ≤ 80°C	-
α_{nmt}	Coefficient for considering durability influences and long-term stresses on the tensile strength	[-]	0,83	-
α_{nmb}	Coefficient for considering durability influences and long-term stresses on the bond strength	[-]	0,83	-

Characteristic values for anchoring and lapping

			Unit	Value	Tolerance
	Applicable reinforcement stress for the anchorage proof	longitudinal	[MPa]	1.020	-
		transversal		1.020	-
$l_{b,min}$	Minimum anchoring length	longitudinal	[mm]	76	-
		transversal		76	-
$l_{0,min}$	Minimum lap length	longitudinal	[mm]	117	-
		transversal		117	-
	Minimum lap length for transferring $f_{nm,k}$ in lap joint [2)]	longitudinal	[mm]	500	-
		transversal		500	-

Further key values

		Unit	Value	Tolerance
$c_{min,b}$	Minimum concrete cover from bond requirement [3)]	[mm]	14	-
h_{min}	Minimum component thickness [3)]	[mm]	≥ 30	-
n	Proof of robustness for predominantly static loading (number of tested cycles)	[-]	≥ 200.000	-

Standard goods variety

		Unit	Value	Tolerance
Single grid	Length	[m]	6,0	± 16 mm
	Width		2,30	± 12 mm
Roll in CARGO System CS [4)]	Length	[m]	≤ 130,0	-
	Width		3,0	± 12 mm
Roll in CARGO System CS-U or CS-S [4)]	Length	[m]	≤ 130,0	-
	Width		2,30	± 12 mm
Roll	Length	[m]	≤ 250,0	-
	Width		3,0	± 12 mm

Single grid up to 3,0 m wide on request. The maximum length of the grid as a roll depends on the product type and the type of transport. Please enquire before ordering. Please specify the required length of the grid as a roll when ordering.

Transport and storage

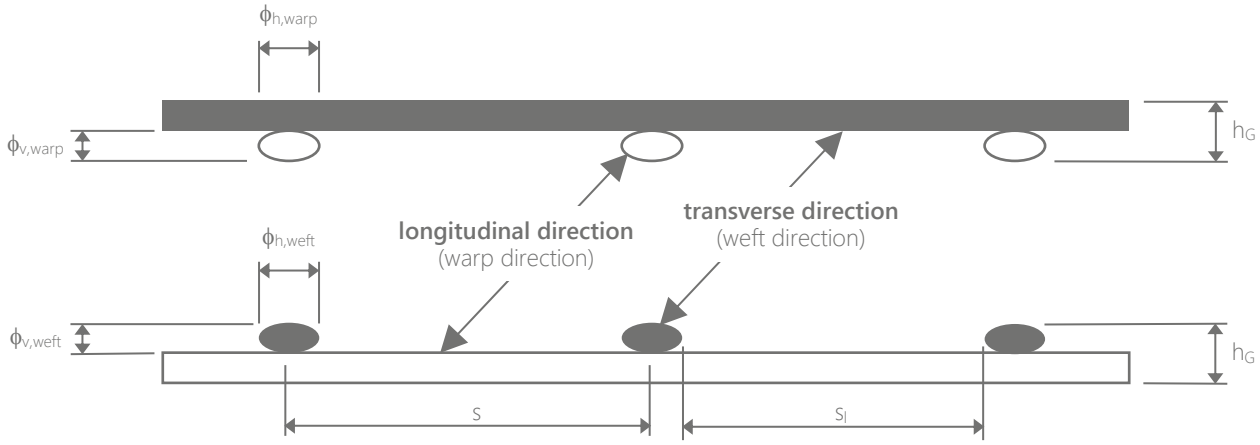
Nonmetallic reinforcements from solidian GmbH must not be damaged during transportation, storage, processing and installation and must not be exposed to temperatures higher than 80°C. They must be stored dry, protected from the weather and without touching the ground. They must be protected from UV radiation and moisture until concreting and be free from bond-reducing im-purities (e.g. grease, soil, loose concrete residues).

All values given in accordance with or based on DAfStb guideline "Concrete components with nonmetallic reinforcement", Part 4.

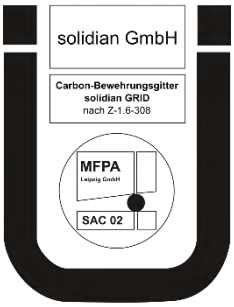
1) To use α_{Tt} = 1 and α_{Tb} = 1: proof required that the temperature loading does not exceed 70°C.
2) For smaller lap lengths, the transferable tensile stresses can be taken from the approval document Table 2, line 10.
3) A component thickness of 30 mm is permissible for components with a single layer of centrally arranged reinforcement grid.
4) The CARGO System CS is a stacking and transport rack for our reinforcement grids. In the CS-U version with additional unwinding device. In the CS-S version with additional unwinding device and cutting device.

Schematic illustration

according to German DAfStb guideline "Concrete components with nonmetallic reinforcement" - Part 2, Fig. 6-1



Confirmation of conformity



As part of the confirmation of the conformity of our construction product in accordance with section 2.3 of the German national technical approval/construction technique permit Z-1.6-308 and for quality assurance, we carry out our own production controls in accordance with section 2.3.2, which are externally monitored by MFPA Leipzig, Germany. The costs for the tests that are required and carried out as part of the approval/permit Z-1.6-308 via the test and monitoring plan are covered in our offer prices for approved grids. If you require additional tests during production, please contact us. We will be happy to provide you with a non-binding quotation.

Country-specific regulations

The use of the product is subject to the respective national regulations at the place of use, in Germany for example the building regulations of the federal states, and the technical provisions based on these regulations. The approval/permit Z-1.6-308 verifies the usability respectively applicability of the subject of regulation in terms of the German state building regulations.
The design is always carried out in accordance with the currently valid German guideline "Concrete components with non-metallic reinforcement" of the German Committee for Reinforced Concrete (DAfStb) and the applicable standards cited in the guideline.

Processing information

All work must only be carried out by trained personnel.
Damaged fiber bundles (resin spalling, brittle areas, etc.) must not be installed, as the specified load-bearing capacity cannot be guaranteed. The specified values of the product only apply when used as intended.
For further information, please refer to the current Technical Information for our solidian reinforcement products.

Ecology and health protection

REGULATION (EC) NO. 1907/2006 - REACH.
This product is an article as defined in Article 3 of Regulation (EC) No 1907/2006 (REACH). It does not contain substances that are released from the article during normal use. A safety data sheet according to Article 31 of the same regulation is not required to place this product on the market, to transport it or to use it. For safe use, follow the instructions from this data sheet. To our current knowledge, this product does not contain any SVHC (Substances of Very High Concern) according to Annex XIV of the REACH Regulation or sub-stances published on the Candidate List by the European Chemicals Agency at concentrations above 0,1% (w/w).

Industrial safety and health

The currently valid legal regulations on occupational health and safety must be observed during all transportation activities. Protective measures, such as wearing cut-resistant gloves, safety goggles and a dust mask, must be observed when working with cutting equipment. The specific handling of fiber reinforced polymers should be based on the respective national technical regulations.

Legal information

The above information is based on our knowledge and experience under normal circumstances, provided that the product has been transported, stored and used or processed properly and in accordance with the information in this product data sheet, the Technical Information for our solidian reinforcement products and the German national technical approval/ construction technique permit Z-1.6-308. The work results that can be achieved with our products depend in particular on their use and processing. The suitability of the product for the specific application must be checked in advance on your own responsibility. The country-specific regulations for the use and application of this product must be observed.
We reserve the right to make changes to the product specifications. Third-party property rights must be observed. In all other respects, our respective terms and conditions of sale and delivery apply. The latest technical product data sheet at the time of purchase of our products applies.

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30 YEARS OF INNOVATIONS EST. 1990
DEVELOPED AND MADE IN EU
CERTIFIED ISO 9001 ISO 14001

TECHNICAL PRODUCT DATA SHEET

solidian GRID R24/95-C-C-EP-s76/38-F72/278 (F01R01)

Symmetrical, bidirectional reinforcement grid (type Q, grid family 3) made of media-resistant carbon fiber composite material for the reinforcement of concrete components with predominantly static loads in accordance with German national technical approval/construction technique permit Z-1.6-308

Material

Fiber material	C (Carbon)	
Impregnation agent	EP (Epoxy resin)	
Color	schwarz	
Surface finish	smooth	
Bending stiffness class	longitudinal	II, mid
	transversal	III, stiff
Validity for concrete strength classes	C30/37 to C70/85	
Chemical resistance of the reinforcement in relation to the exposure classes in accordance with DIN EN 206-1 in conjunction with DIN 1045-2	XD3	Chlorides, except seawater
	XS3	Chlorides from seawater
	XA3	Chemical attack

Geometry and structure

			Unit	Value	Tolerance
	Directions of the fiber strands	longitudinal	[°]	0	± 5°
		transversal		90	± 5°
ϕ_h	Mean value of fiber strand width	longitudinal	[mm]	3,1	± 10%
		transversal		5,5	± 10%
ϕ_v	Mean value of fiber strand height	longitudinal	[mm]	1,8	± 10%
		transversal		3,1	± 10%
ϕ_{nm}	Nominal diameter	longitudinal	[mm]	2,37	-
		transversal		3,35	-
A_{nm}	Nominal cross-sectional area per fiber strand	longitudinal	[mm²]	4,4	-
		transversal		8,8	-
a_{nm}	Nominal cross-sectional area per meter	longitudinal	[mm²/m]	58	-
		transversal		232	-
$A_{f,nm}$	Fiber cross-sectional area per fiber strand	longitudinal	[mm²]	1,81	-
		transversal		3,62	-
$a_{f,nm}$	Fiber cross-sectional area per meter	longitudinal	[mm²/m]	24	-
		transversal		95	-
s	Grid width	longitudinal	[mm]	76	± 3 mm
		transversal		38	± 3 mm
s_l	Clear distance of the fiber strands	longitudinal	[mm]	72,8	± 10%
		transversal		32,5	± 10%
h_G	Grid height (average value of the maximum height)		[mm]	3,0	± 10%
g	Weight per unit area of the non-metallic reinforcement		[g/m²]	381	± 10%
$\kappa_ü$	Degree of coverage of the grid		[%]	18,0	-
r_{min}	Minimum permissible radius of curvature		[mm]	350	-

Material properties

			Unit	Value	Tolerance
ρ	Bulk density of the fiber composite material		[g/cm³]	1,30	-
α	Coefficient of thermal expansion	along the fiber	[10^{-6} 1/K]	0,5	-
T_{g0}	Glass transition temperature (DMA)		[°C]	≥ 110	-
	Recommended operating temperature range		[°C]	-20 bis +80	-
	Building material class reinforcement grid acc. to DIN EN 13501-1		[-]	E, normally flammable	-

Mechanical properties

			Unit	Value	Tolerance
$f_{nm,k}$	Characteristic short-term tensile strength related to the nominal cross-sectional area	longitudinal	[MPa]	1.250	-
		transversal		1.200	-
E_{nm}	Young's modulus related to the nominal cross-section	longitudinal	[MPa]	99.000	-
		transversal		97.000	-
$f_{f,nm,k}$	Characteristic short-term tensile strength related to the fiber cross-sectional area	longitudinal	[MPa]	≥ 3.039	-
		transversal		≥ 2.917	-
$E_{f,nm,m}$	Mean Young's modulus related to the fiber cross-sectional area	longitudinal	[MPa]	≥ 247.000	-
		transversal		≥ 243.000	-
$\varepsilon_{nm,uk}$	Characteristic elongation at failure under tensile load of the non-metallic reinforcement	longitudinal	[‰]	≥ 12,6	-
		transversal		≥ 12,4	-
f_{bk}	Characteristic short-term bond strength for anchoring for ≥ C30/37	longitudinal	[MPa]	1,7	-
		transversal		2,9	-
$\tau_{bm,k}$	Characteristic value of the mean bond stress (k_t=0) for ≥ C30/37	longitudinal	[MPa]	7,1	-
		transversal		5,9	-
$F_{nm,k}$	Characteristic tensile force transmission of the non-metallic reinforcement per m width	longitudinal	[kN/m]	72	-
		transversal		278	-

Coefficients

			Unit	Value	Tolerance
α_{Tt}	Coefficient for considering influences from short-term particularly high temperature stress on the tensile strength [1]	longitudinal	[-]	1,0 bei -20°C ≤ T ≤ 70°C 0,95 bei 70°C < T ≤ 80°C	-
		transversal		1,0 bei -20°C ≤ T ≤ 70°C 0,90 bei 70°C < T ≤ 80°C	-
α_{Tb}	Coefficient for considering influences from short-term particularly high temperature stress on the bond behavior [1]	longitudinal	[-]	1,0 bei -20°C ≤ T ≤ 70°C 0,95 bei 70°C < T ≤ 80°C	-
		transversal		1,0 bei -20°C ≤ T ≤ 70°C 0,90 bei 70°C < T ≤ 80°C	-
α_{nmt}	Coefficient for considering durability influences and long-term stresses on the tensile strength		[-]	0,83	-
α_{nmb}	Coefficient for considering durability influences and long-term stresses on the bond strength		[-]	0,83	-

Characteristic values for anchoring and lapping

			Unit	Value	Tolerance
	Applicable reinforcement stress for the anchorage proof	longitudinal	[MPa]	885	-
		transversal		1.020	-
$l_{b,min}$	Minimum anchoring length	longitudinal	[mm]	42	-
		transversal		76	-
$l_{0,min}$	Minimum lap length	longitudinal	[mm]	228	-
		transversal		117	-
	Minimum lap length for transferring $f_{nm,k}$ in lap joint [2]	longitudinal	[mm]	700	-
		transversal		500	-

Further key values

		Unit	Value	Tolerance
$c_{min,b}$	Minimum concrete cover from bond requirement [3]	[mm]	14	-
h_{min}	Minimum component thickness [3]	[mm]	≥ 30	-
n	Proof of robustness for predominantly static loading (number of tested cycles)	[-]	≥ 200.000	-

Standard goods variety

		Unit	Value	Tolerance
Single grid	Length	[m]	6,0	± 16 mm
	Width		2,30	± 12 mm
Roll in CARGO System CS [4]	Length	[m]	≤ 130,0	-
	Width		3,0	± 12 mm
Roll in CARGO System CS-U or CS-S [4]	Length	[m]	≤ 130,0	-
	Width		2,30	± 12 mm
Roll	Length	[m]	≤ 250,0	-
	Width		3,0	± 12 mm

Single grid up to 3,0 m wide on request. The maximum length of the grid as a roll depends on the product type and the type of transport. Please enquire before ordering. Please specify the required length of the grid as a roll when ordering.

Transport and storage

Nonmetallic reinforcements from solidian GmbH must not be damaged during transportation, storage, processing and installation and must not be exposed to temperatures higher than 80°C. They must be stored dry, protected from the weather and without touching the ground. They must be protected from UV radiation and moisture until concreting and be free from bond-reducing im-purities (e.g. grease, soil, loose concrete residues).

All values given in accordance with or based on DAfStb guideline "Concrete components with nonmetallic reinforcement", Part 4.

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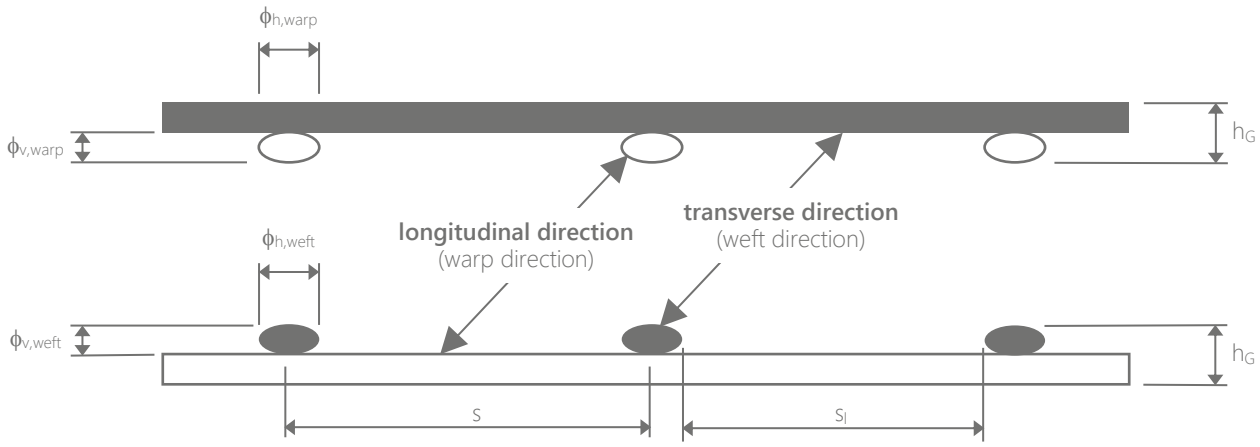
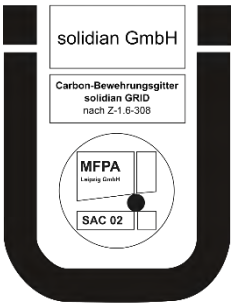
Schematic illustration

according to German DAfStb guideline "Concrete components with nonmetallic reinforcement" - Part 2, Fig. 6-1



Confirmation of conformity



As part of the confirmation of the conformity of our construction product in accordance with section 2.3 of the German national technical approval/construction technique permit Z-1.6-308 and for quality assurance, we carry out our own production controls in accordance with section 2.3.2, which are externally monitored by MFPA Leipzig, Germany. The costs for the tests that are required and carried out as part of the approval/permit Z-1.6-308 via the test and monitoring plan are covered in our offer prices for approved grids. If you require additional tests during production, please contact us. We will be happy to provide you with a non-binding quotation.

Country-specific regulations

The use of the product is subject to the respective national regulations at the place of use, in Germany for example the building regulations of the federal states, and the technical provisions based on these regulations. The approval/permit Z-1.6-308 verifies the usability respectively applicability of the subject of regulation in terms of the German state building regulations.
The design is always carried out in accordance with the currently valid German guideline "Concrete components with non-metallic reinforcement" of the German Committee for Reinforced Concrete (DAfStb) and the applicable standards cited in the guideline.

Processing information

All work must only be carried out by trained personnel.
Damaged fiber bundles (resin spalling, brittle areas, etc.) must not be installed, as the specified load-bearing capacity cannot be guaranteed. The specified values of the product only apply when used as intended.
For further information, please refer to the current Technical Information for our solidian reinforcement products.

Ecology and health protection

REGULATION (EC) NO. 1907/2006 - REACH.
This product is an article as defined in Article 3 of Regulation (EC) No 1907/2006 (REACH). It does not contain substances that are released from the article during normal use. A safety data sheet according to Article 31 of the same regulation is not required to place this product on the market, to transport it or to use it. For safe use, follow the instructions from this data sheet. To our current knowledge, this product does not contain any SVHC (Substances of Very High Concern) according to Annex XIV of the REACH Regulation or sub-stances published on the Candidate List by the European Chemicals Agency at concentrations above 0,1% (w/w).

Industrial safety and health

The currently valid legal regulations on occupational health and safety must be observed during all transportation activities. Protective measures, such as wearing cut-resistant gloves, safety goggles and a dust mask, must be observed when working with cutting equipment. The specific handling of fiber reinforced polymers should be based on the respective national technical regulations.

Legal information

The above information is based on our knowledge and experience under normal circumstances, provided that the product has been transported, stored and used or processed properly and in accordance with the information in this product data sheet, the Technical Information for our solidian reinforcement products and the German national technical approval/ construction technique permit Z-1.6-308. The work results that can be achieved with our products depend in particular on their use and processing. The suitability of the product for the specific application must be checked in advance on your own responsibility. The country-specific regulations for the use and application of this product must be observed.
We reserve the right to make changes to the product specifications. Third-party property rights must be observed. In all other respects, our respective terms and conditions of sale and delivery apply. The latest technical product data sheet at the time of purchase of our products applies.

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30 YEARS OF INNOVATIONS EST. 1990
DEVELOPED AND MADE IN EU
CERTIFIED ISO 9001 ISO 14001

TECHNICAL PRODUCT DATA SHEET

solidian GRID R95/24-C-C-EP-s38/76-F278/72 (F01R01)

Symmetrical, bidirectional reinforcement grid (type Q, grid family 3) made of media-resistant carbon fiber composite material for the reinforcement of concrete components with predominantly static loads in accordance with German national technical approval/construction technique permit Z-1.6-308

Material

Fiber material	C (Carbon)	
Impregnation agent	EP (Epoxy resin)	
Color	schwarz	
Surface finish	smooth	
Bending stiffness class	longitudinal	III, stiff
	transversal	II, mid
Validity for concrete strength classes	C30/37 to C70/85	
Chemical resistance of the reinforcement in relation to the exposure classes in accordance with DIN EN 206-1 in conjunction with DIN 1045-2	XD3	Chlorides, except seawater
	XS3	Chlorides from seawater
	XA3	Chemical attack

Geometry and structure

			Unit	Value	Tolerance
	Directions of the fiber strands	longitudinal	[°]	0	± 5°
		transversal		90	± 5°
ϕ_h	Mean value of fiber strand width	longitudinal	[mm]	5,1	± 10%
		transversal		3,8	± 10%
ϕ_v	Mean value of fiber strand height	longitudinal	[mm]	3,1	± 10%
		transversal		1,8	± 10%
ϕ_{nm}	Nominal diameter	longitudinal	[mm]	3,35	-
		transversal		2,37	-
A_{nm}	Nominal cross-sectional area per fiber strand	longitudinal	[mm²]	8,8	-
		transversal		4,4	-
a_{nm}	Nominal cross-sectional area per meter	longitudinal	[mm²/m]	232	-
		transversal		58	-
$A_{f,nm}$	Fiber cross-sectional area per fiber strand	longitudinal	[mm²]	3,62	-
		transversal		1,81	-
$a_{f,nm}$	Fiber cross-sectional area per meter	longitudinal	[mm²/m]	95	-
		transversal		24	-
s	Grid width	longitudinal	[mm]	38	± 3 mm
		transversal		76	± 3 mm
s_l	Clear distance of the fiber strands	longitudinal	[mm]	33,4	± 10%
		transversal		72,8	± 10%
h_G	Grid height (average value of the maximum height)		[mm]	3,3	± 10%
g	Weight per unit area of the non-metallic reinforcement		[g/m²]	350	± 10%
$\kappa_ü$	Degree of coverage of the grid		[%]	17,4	-
r_{min}	Minimum permissible radius of curvature		[mm]	350	-

Material properties

			Unit	Value	Tolerance
ρ	Bulk density of the fiber composite material		[g/cm³]	1,30	-
α	Coefficient of thermal expansion	along the fiber	[10^{-6} 1/K]	0,5	-
T_{g0}	Glass transition temperature (DMA)		[°C]	≥ 110	-
	Recommended operating temperature range		[°C]	-20 bis +80	-
	Building material class reinforcement grid acc. to DIN EN 13501-1		[-]	E, normally flammable	-

Mechanical properties

			Unit	Value	Tolerance
$f_{nm,k}$	Characteristic short-term tensile strength related to the nominal cross-sectional area	longitudinal	[MPa]	1.200	-
		transversal		1.250	-
E_{nm}	Young's modulus related to the nominal cross-section	longitudinal	[MPa]	97.000	-
		transversal		99.000	-
$f_{f,nm,k}$	Characteristic short-term tensile strength related to the fiber cross-sectional area	longitudinal	[MPa]	≥ 2.917	-
		transversal		≥ 3.039	-
$E_{f,nm,m}$	Mean Young's modulus related to the fiber cross-sectional area	longitudinal	[MPa]	≥ 243.000	-
		transversal		≥ 247.000	-
$\varepsilon_{nm,uk}$	Characteristic elongation at failure under tensile load of the non-metallic reinforcement	longitudinal	[‰]	≥ 12,4	-
		transversal		≥ 12,6	-
f_{bk}	Characteristic short-term bond strength for anchoring for ≥ C30/37	longitudinal	[MPa]	2,9	-
		transversal		1,7	-
$\tau_{bm,k}$	Characteristic value of the mean bond stress (k_t=0) for ≥ C30/37	longitudinal	[MPa]	5,9	-
		transversal		7,1	-
$F_{nm,k}$	Characteristic tensile force transmission of the non-metallic reinforcement per m width	longitudinal	[kN/m]	278	-
		transversal		72	-

Coefficients

			Unit	Value	Tolerance
α_{Tt}	Coefficient for considering influences from short-term particularly high temperature stress on the tensile strength [1]	longitudinal	[-]	1,0 bei -20°C ≤ T ≤ 70°C 0,90 bei 70°C < T ≤ 80°C	-
		transversal		1,0 bei -20°C ≤ T ≤ 70°C 0,95 bei 70°C < T ≤ 80°C	-
α_{Tb}	Coefficient for considering influences from short-term particularly high temperature stress on the bond behavior [1]	longitudinal	[-]	1,0 bei -20°C ≤ T ≤ 70°C 0,90 bei 70°C < T ≤ 80°C	-
		transversal		1,0 bei -20°C ≤ T ≤ 70°C 0,95 bei 70°C < T ≤ 80°C	-
α_{nmt}	Coefficient for considering durability influences and long-term stresses on the tensile strength		[-]	0,83	-
α_{nmb}	Coefficient for considering durability influences and long-term stresses on the bond strength		[-]	0,83	-

Characteristic values for anchoring and lapping

			Unit	Value	Tolerance
	Applicable reinforcement stress for the anchorage proof	longitudinal	[MPa]	1.020	-
		transversal		885	-
$l_{b,min}$	Minimum anchoring length	longitudinal	[mm]	76	-
		transversal		42	-
$l_{0,min}$	Minimum lap length	longitudinal	[mm]	117	-
		transversal		228	-
	Minimum lap length for transferring $f_{nm,k}$ in lap joint [2]	longitudinal	[mm]	500	-
		transversal		700	-

Further key values

		Unit	Value	Tolerance
$c_{min,b}$	Minimum concrete cover from bond requirement [3]	[mm]	14	-
h_{min}	Minimum component thickness [3]	[mm]	≥ 30	-
n	Proof of robustness for predominantly static loading (number of tested cycles)	[-]	≥ 200.000	-

Standard goods variety

		Unit	Value	Tolerance
Single grid	Length	[m]	6,0	± 16 mm
	Width		2,30	± 12 mm
Roll in CARGO System CS [4]	Length	[m]	≤ 130,0	-
	Width		3,0	± 12 mm
Roll in CARGO System CS-U or CS-S [4]	Length	[m]	≤ 130,0	-
	Width		2,30	± 12 mm
Roll	Length	[m]	≤ 250,0	-
	Width		3,0	± 12 mm

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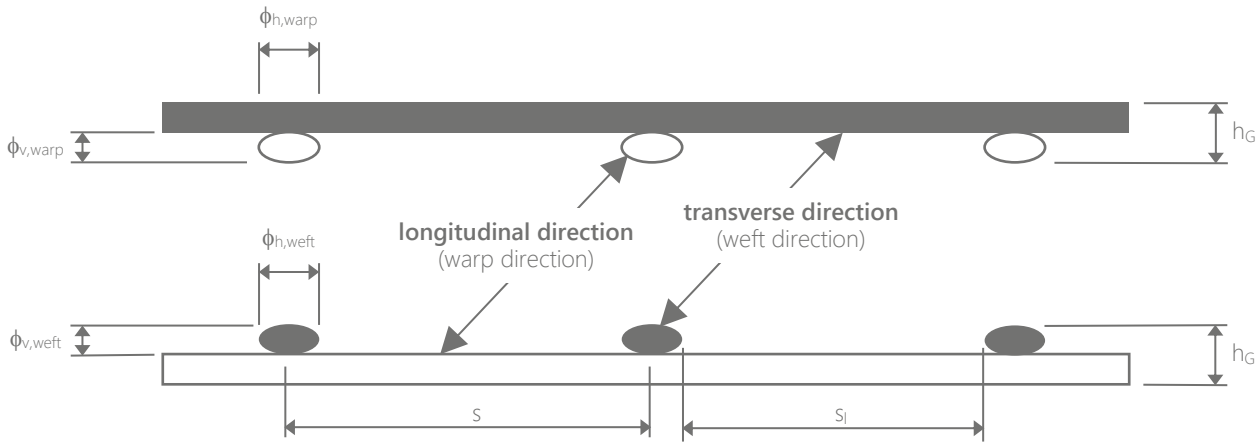

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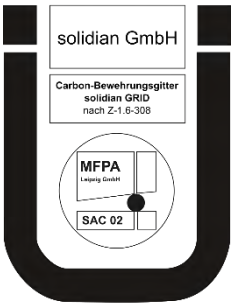

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