

PRODUCT DATA SHEET

SikaGrout®-9500

(formerly MFlow 9500)

Ultra-high strength, high modulus, cement based grout with applied nanotechnology for grouting offshore wind turbine installations

PRODUCT DESCRIPTION

SikaGrout®-9500 is a shrinkage compensated, cement based grout which when mixed with water, produces a homogeneous, flowable and pumpable grout with exceptionally high early and final strength and modulus. Latest best binder packing models and applied cementitious nanotechnology produces a grout with superior technical performance, exceptional rheological properties, and, uniquely, extended open times.

USES

SikaGrout®-9500 has been especially formulated for large scale, pump applications.

- Grouting of wind turbine installations, e.g. foundations, mono-piles, transition pieces of wind towers, where very good fatigue resistance is required.
- Grouting under very harsh conditions, e.g. offshore applications or below water grouting, at temperatures as low as 0°C.
- All void filling from 25mm to 600mm thickness where high strength, high modulus is important (in other applications or where void dimensions of 10 - 25 mm are to be filled contact our technical department).

Contact the Technical Department of your local Sika office regarding any application required not mentioned here.

CHARACTERISTICS / ADVANTAGES

- Certified by Det Norske Veritas (DNV)
- Ultra-high mean compressive strength ≥ 135 MPa.
- Ultra-high modulus for exceptional stiffening properties.
- Very good fatigue resistance.
- Quick return to service and removal of temporary supports due to high early strength build-up. ≥ 60

MPa @ 24hrs at 20°C

- Excellent strength gain at low temperatures @ 0°C at 24hrs
- No segregation or bleeding to ensure consistent final physical performance and to prevent pump blockages
- No wash-out during below water grouting
- Pump able over long distances and large heights.
- Extended pot life of ≥ 4 hours
- Specially graded sands and exceptional flow and low friction increases pump output, reduces installation times and costs as well as reducing pump pressures and wear Dust reduced for ease of handling and safety of workers
- Available in special, watertight big bags for large scale application.
- Meets the requirements of EN1504-6 for anchoring reinforcement bars.

APPROVALS / STANDARDS

DNV-VALIDATION

The certification programme for SikaGrout®-9500, which is the basis for issuing the DNV product certificate, comprised the following main activities:

- Validation and acceptance of test methodology, procedures and extent of testing
- Evaluation and acceptance of the external, independent testing laboratory for testing properties of SikaGrout®-9500
- Witnessing and acceptance of the laboratory tests, and the reporting thereof
- Evaluation and witnessing of mock-up tests, and large scale pumping trials, and the acceptance of the reporting thereof
- Audit, evaluation and acceptance of grout manufacturing equipment and facilities
- Audit, evaluation and acceptance of Sika's internal laboratory with respect to production quality control of SikaGrout®-9500

- Evaluation and acceptance of results of the tests and trials carried out to demonstrate the materials suitability for use in offshore applications, such as grouted connections of monopile foundations for offshore wind turbines or similar.
 - The validation and certification related to the above mentioned activities are carried out in accordance with applicable EN-standards and DNV-OS-C502 (Offshore concrete structures)
- FATIGUE RESISTANCE**
- Certified by DNV-OS-C502. More detailed results are available on request.

PRODUCT INFORMATION

Packaging	SikaGrout®-9500 is supplied in special 25 kg and 1000, 1250, 1500 kg wattertight big bags.
Shelf Life	12 months from date of production
Storage Conditions	Product must be stored in original, unopened and undamaged sealed packaging in dry conditions.
Density	Approximately 2.4 gr/cm ³

TECHNICAL INFORMATION

Compressive Strength	Determined as part of DNV verification				
	N/mm²	20 °C	12 °C	5 °C	(EN 12190-3)
	1 day	90	40	10	
	3 days	110	105	75	
	7 days	125	125	100	
	28 days	140			
	4 months	160			
	Characteristic compressive strengths (Determined as part of DNV verification):				
	122 N/mm ²		150 x 300 mm cylinders		
	135 N/mm ²		75 mm cubes		
Typical values - Additional test results					
Compressive strength: (75 mm cubes - EN 12390-3)					
N/mm²	20 °C	10 °C	5 °C	2 °C	
1 day	≥ 50	≥ 15			
2 days	≥ 80	≥ 60	≥ 35	≥ 25	
3 days	≥ 95	≥ 85	≥ 65	≥ 45	
7 days	≥ 120	≥ 120	≥ 85	≥ 60	
28 days	≥ 135				
Exposure classes					
XO, XC4, XD3, XS2, XS3, XF3, XA2, WA				(EN 206-1, DIN 1045-2)	
Modulus of Elasticity in Compression	Determined as part of DNV verification				
	GPa	20 °C			(EN 13412)
	28 days	49.9			
Flexural Strength	Determined as part of DNV verification				
	N/mm²	20 °C			(EN 12390-3)
	28 days	20.3			
	Characteristic flexural strength (Determined as part of DNV verification):				
	17.8 N/mm ²		40 x 40 x 160 mm prisms		
	Typical Values - Additional rest results				
	N/mm²	20 °C	2 °C		(EN 196-1)
28 days	≥ 15	≥ 12			

Splitting tensile strength	Determined as part of DNV verification		(EN 12390-6)
	<u>N/mm²</u>	<u>20 °C</u>	
	<u>28 days</u>	<u>8.6</u>	
Pull-Out Resistance	≤ 0.6 mm		(EN 1881)
Shrinkage	Autogenous shrinkage (Determined as part of DNV verification):		(ASTM 1698)
	<u>Age</u>	<u>mm/m</u>	
	after 7 days	- 0.0146	
	after 94 days	- 0.0455	
	after 365 days	+ 0.0006	
Ring test	no cracking after 180 days		(Coutinho-ring)
Capillary Absorption	≤ 0.05 kg/m ² .h ^{-0.5}		(EN 13057)

APPLICATION INFORMATION

Consumption	Approximately 2.2 kg powder is needed for 1 litre of mixed mortar. Or, 1000 kg powder will yield approximately 450 to 465 litre of mixed grout.
Layer Thickness	25 - 600 mm
Product Temperature	0 °C min. / +30 °C max. (grouted connection)
Ambient Air Temperature	0 °C min. / +30 °C max. (grouted connection)
Mixing Ratio	Approx. 75 lt / 1000 kg powder (min. 70 lt- max. 80 lt)
Substrate Temperature	0 °C min. / +30 °C max. (grouted connection)
Pot Life	≥ 4 hours
Setting time	≤ 10 hours

VALUE BASE

All technical data stated in this Product Data Sheet are based on laboratory tests. Actual measured data may vary due to circumstances beyond our control.

FURTHER DOCUMENTS

- Sika Method Statement: SikaGrout®-9500

ECOLOGY, HEALTH AND SAFETY

User must read the most recent corresponding Safety Data Sheets (SDS) before using any products. The SDS provides information and advice on the safe handling, storage and disposal of chemical products and contains physical, ecological, toxicological and other safety-related data.

APPLICATION INSTRUCTIONS

NOTES ON INSTALLATION

- SikaGrout®-9500 has been especially formulated for use in specific applications. As such SikaGrout®-9500 should be installed by experienced fully trained contractors. Full application procedures are available on request.

- Sands or other products that could affect the products properties must not be added.
- SikaGrout®-9500 which will be exposed to strong drying conditions, e.g. mortar which is directly exposed to heavy wind and/or direct sunlight, should be protected using appropriate curing agents.
- Independent test reports are available on request.

MAINTENANCE

CLEANING

Tools and spillages can be cleaned with water while SikaGrout®-9500 is still uncured. Once hardened, the material can only be removed mechanically.

LOCAL RESTRICTIONS

Please note that as a result of specific local regulations the performance of this product may vary from country to country. Please consult the local Product Data Sheet for the exact description of the application fields.

LEGAL NOTES

The information, and, in particular, the recommendations relating to the application and end-use of Sika products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with Sika's recommendations. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any written recommendations, or from any other advice offered. The user of the product must test the product's suitability for the intended application and purpose. Sika reserves the right to change the properties of its products. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request.

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Product Data Sheet

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