



PAGEL®/TUDALIT® FINE CONCRETE

PROPERTIES

- **TF 10** (0-1 mm)
Fine concrete made from Portland cement, quartz sands 0-1 mm with continuous particle size distribution, matched to the **TUDALIT®** textile fabric
- Soft elastic thixotropic consistency for **TUDALIT®** textile fabric
- High-performance fine concrete as a matrix for the combination with the textile fabric
- Chloride-free and cementitious
- Shrinkage-free by controlled and even expansion
- Low modulus of elasticity in connection with high bending tensile strength
- Low w/c-value
- Frost and road-salt resistant, waterproof and largely resistant to oil and petrol
- Pumpable and easy to pour using mono-transfer pumps with variable speed gearboxes (ask for machine suitability)
- Can be applied using dense phase wet spraying with MAWO nozzle
Air pressure: ≥ 5 bar
Air volume: ≥ 5 m³/minute
- Complies with **TF10** the requirements of building material class A1 (non-combustible) as specified under EN 13501 and DIN 4102
- General Type Approval DIBt approval number: Z-31.10-182
- Approved article: Method for the reinforcement of reinforced concrete with **TUDALIT®** (Textile- reinforced concrete)
- **The company is certified to DIN EN ISO 9001:2008**



With the trademark **TUDALIT®**, the production and application of textile concrete on the basis of specified quality standards for the components of the innovative composite, the methods of their production, the products developed from or manufactured with the composite and their production processes for reinforcement or repair are protected.

FIELDS OF APPLICATION

- Structural support in the tension zone of reinforced concrete components
- Reduction of layer thicknesses of concrete structures in structural engineering (production of building components and building elements)
- Reduction of layer thicknesses for structural repair work
- For the reinforcement of reinforced concrete components in the hand laminating method and in the MAWO-PAGEL® dense phase wet spraying application method

Moisture class based on concrete erosion from alkali silicic acid reactions

Moisture class	WO	WF	WA	WS
	dry	moist	moist • External supply of alkalis	moist • External supply of alkalis • High dynamic stress
TF 10	*	*	*	*

The aggregates in PAGEL's products comply with the requirements of alkali sensitivity class E1 from non-hazardous sources specified under DIN EN 12620.

Exposure class according to:
DIN 1045-2 / EN 206-1

PAGEL®/TUDALIT®-FINE CONCRETE

	XO	XC	XD	XS	XF	XA	XM
	0	1 2 3 4	1 2 3	1 2 3	1 2 3 4	1 2 3	1 2 3
TF 10	*	****	***	***	****	**	**

Kit components:

- Fine grained concrete:

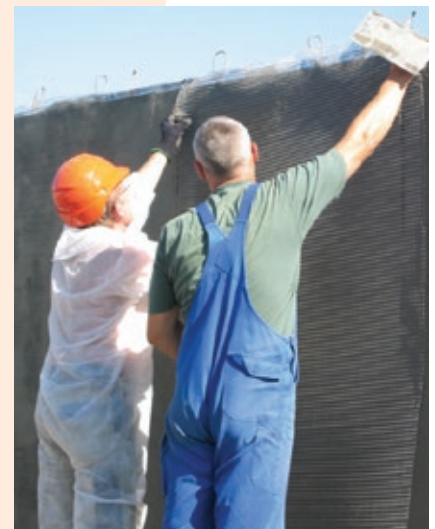
TF 10
PAGEL®/TUDALIT®-CONCRETE

Coated textile reinforcement:

TUDALIT®-BZT1-TUDATEX

or

TUDALIT®-BZT2-V.FRAAS



PAGEL® SPEZIAL-BETON GMBH & CO.-KG is pointing to the fact that the product **TF 10 PAGEL®/TUDALIT®-FINE GRAINED CONCRETE** is a component of the abZ-method for the reinforcement of reinforced concrete with **TUDALIT®** (textile reinforced concrete). If a reinforcement measure shall be performed as a quality assured reinforcement measure with the trademark **TUDALIT®**, the certificates of the **TUDALIT®** components, the verifications of suitability of **TUDALIT®** as well as the die **TUDALIT®**-licence have to be submitted unsolicited to the client.

TF10

as on: 15. November 2017

PAGEL®/TUDALIT® FINE CONCRETE

TF10

TECHNICAL DATA

TYPE	TF 10		
Grain size	mm	0–1	
Coating	mm	3–30	
Amount of water	max.	14	
Consumption (dry mortar)	kg/dm ³	app. 1.9	
Fresh mortar raw density	kg/dm ³	app. 2.187	
Processing time	at +20°C	min	app. 60
Slump flow	5 min	cm	≥ 17
DIN EN 1015-3	30 min	cm	≥ 14
Expansion	24 h	Vol. %	≥ + 0.1
	28 d	Vol. %	≥ + 0.1
Compressive strength	24 h	N/mm ²	≥ 15
	Prisms: 4x4x16 cm	7 d	N/mm ² ≥ 40
	28 d	N/mm ²	≥ 65
Bending strength	24 h	N/mm ²	≥ 3
	Prisms: 4x4x16 cm	7 d	N/mm ² ≥ 6
	28 d	N/mm ²	≥ 8
E-module (static)	28 d	N/mm ²	> 25,000

All test data are guide values, proofed in our German manufacturing plants, - values from other manufacturing plants may vary.

* DIN EN 196-1-compliant compressive strength testing

Storage: 12 months. Cool, dry, free from frost. Unopened in its original packaging.
Packaging: 25-kg bag, Euro palette 1,000 kg
Hazard class: Non-dangerous goods, observe information on packaging
Giscode: ZP1



NPD: „No Performance Determined“

APPLICATION

SUBSTRATE: Clean thoroughly; remove loose and unsound material such as cement slurry and dirt etc. by blasting it with solid blasting agent, grit or high-pressure water jet blasting or similar until the underlying solid grain structure has been exposed. The substrate must have sufficient tear strength (i.e. > 1.5 N/mm²).
 (The mean surface roughness after the surface preparation procedure is > sr = 1 mm)
 Blast all rust off exposed reinforcement bars until metallicly bright (Sa 2 1/2 in accordance with DIN EN ISO 12944-4).
 Pre-wet the concrete substrate to capillary saturation 6-24 hours before coating.

REINFORCEMENTS: Thoroughly coat all exposed and blasted reinforcing elements with **MS02 PAGEL®-CORROSION PROTECTION** without leaving any gaps (observe information of the technical data sheet **MS02 PAGEL®-CORROSION PROTECTION**).

EDGE FORMWORK: Attach in such a way that it is leak proof and robust.

MIXING: The mortar is supplied ready for use and only needs to be mixed with water. Pour the specified quantity of water mentioned on the packaging with exception of a small residual amount into a clean and suitable mixing device (e.g. compulsory mixer). Add the dry mortar and mix for at least 3 minutes; add the remaining water and mix for another 2 minutes until homogeneity.
 Once ready mixed, apply immediately.

MIXING WATER: Drinking water quality

APPLICATION:

By hand:

TF10 PAGEL®/TUDALIT® FINE CONCRETE is applied onto the surface using a lamination process layer for layer, in the simplest case by the use of a trowel or a spatula. The first layer is brush applied as a bonding bridge - with the same consistency. Fine concrete matrix and textile reinforcement are alternately applied layer by layer. The respective textile reinforcement layer is immediately placed and lightly pressed. The final fine concrete layer is subsequently covered with a layer of fine concrete. The surface of the final layer of fine concrete is made according to requirements.

MAWO-PAGEL-Dense phase wet spraying application

Hold the nozzle preferably at a right angle to the area to be coated. Distance about 50 cm. The first fine concrete layer is applied to support the bonding bridge effect with the full air flow rate. Rebound has to bounce off or to be removed before placing the first textile reinforcement layer. After inserting the textile reinforcement layers, the air supply must be adjusted so that the textile structures are not damaged. The respective textile reinforcement layer is immediately placed and lightly pressed. The final reinforcement insert is covered with a layer of fine concrete. The surface of the final layer of fine concrete is made according to requirements.

CAUTION: The surfaces must be protected from premature water evaporation (from wind, draughts, direct exposure to sun) immediately on completion of the work for a period of 3-5 days.

Suitable finishing methods: Spray with water, cover with jute sheets, thermofolios or moisture-retaining covering sheets,

O1 PAGEL® EVAPORATION PROTECTION. The technical data sheet **O1 PAGEL® EVAPORATION PROTECTION** must be observed when using **O1 PAGEL® EVAPORATION PROTECTION**.

Limit temperatures for application

(substrate, air and mortar temperature): +5 °C to +35 °C
 Low temperatures and cold mixing water will delay strength development, require intensive compulsory mixing and reduce flowability. Higher temperatures will accelerate the process.

PAGEL® Spezial-Beton GmbH & Co.KG is a founding member of the **TUDALIT®** Markenverband e.V. (trade mark association) (www.tudalit.de)



The information provided in this leaflet, is supplied by our consulting service and is the end result of exhaustive research work and extensive experience. They are, however, without liability on our part, in particular with regard to third parties proprietary rights, and do not relieve the user of the responsibility for verifying that the products and processes are suitable for the intended application. The data presented was derived from tests under normal climate conditions according to DIN 50014 and mean average values and analysis. Deviations are possible when delivery takes place. Given that recommendations may differ from those shown in this leaflet written confirmation should be sought. It is the responsibility of the purchaser to ensure they have the latest leaflet issue and that its contents are current. Our customer service staff will be glad to provide assistance at any time. We appreciate the interest you have shown in our products. This technical data sheet supercedes previously issued information. Please find the latest leaflet issues at www.pagel.com.



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Technical Data Sheet 0606
 QS-Formblatt 09/16 Rev. 01

as on: 15. November 2017

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as on: 15. November 2017

Data sheet

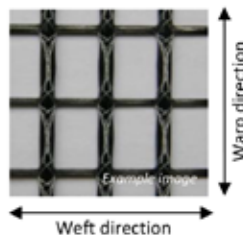
TUDALIT-BZT1-TUDATEX

Product description

TUDALIT- BZT1- TUDATEX is a textile reinforcement (a TUDALIT component), which serves the strengthening of reinforced concrete according to national technical approval No. Z-31.10-182. The textile reinforcement structure is a textile grid made from carbon filament yarns (so-called Heavy Tows), which are connected mechanically at intersections by loop-forming, thin stitching threads (see image).

Textile construction:

	Thread spacing [mm]	Number of rovings per running meter	Carbon material
Warp direction (0°)	12.7	78	TohoTenax 3200 tex, SGL 3300 tex, SGL 3450 tex
Weft direction (90°)	14.0 - 16.0	≥ 62	Toho Tenax 800 tex



The approved coating agent (type Lefasol VLT-1, company Lefatex) is a film-forming dispersion. With a proportion of typically 15% coating agent per unit area of textile reinforcement, the carbon filament yarns are impregnated. Thus, the individual filaments are coated or “glued” to each other, whereby inner bonding of filaments is ensured. The colour of loop-forming stitching threads is white for BZT1 and red for BZT2.

Dimensions⁽³⁾(example)

	Roll	Sheet
Width [m]	2.50	1.25
Length [m]	25.00	6.00

Properties (mean values)

	0°	90°	Rated value 0°	Rated value 90°
Reinforcement cross-section/thread [mm ²]	1.83	0.45	140 mm ² /m	28 mm ² /m
Yarn tensile strength, coated [N/mm ²]	1,700 (1)	1,700 (2)	-	-
Yarn Young’s modulus, coated [N/mm ²]	170,000 (1)	152,000 (2)	-	-

(1) Test according to ISO 3341, wrapping terminals with optical length variation detection, 500 mm free clamping length, test speed 200 mm/min, E-modulus determination in the area of linear increase of the stress-strain-curve
 (2) Test as described in (1), however with 200 mm free clamping length of coated weft threads and a test speed of 80 mm/min, to enable analogue testing of textile reinforcements with a fabric width of 1.20 m and more
 (3) Length and width according to customer’s request



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as on: 15. November 2017



PAGEL®/TUDALIT® - FINE CONCRETE

PROPERTIES

- **TF10** (0-1 mm)
Fine concrete from Portland cement, quartz sands 0-1 mm with continuous grading curve, adapted to the **TUDALIT®**-textile fabric
- soft plastic thixotropic consistency for the **TUDALIT®**-textile fabric
- High performance-fine concrete as matrix for the combination with the textile fabric
- chloride-free and cement-bonded
- shrinkage-free through controlled volumization
- low modulus of elasticity in conjunction with a high bending tensile strength
- low w/c-value
- frost and de-icing salt resistant, watertight and widely resistant to mineral oils and fuels
- pumpable and easy to process with mono-delivery pumps with gear unit (inquire machine suitability)
- suitable for wet spray in dense-flow process with MAWO-nozzle
Air pressure: > 5 bar Air volume: > 5 m³/Minute
- **TF10** meets the conditions of building material class A1 (non-combustible) of EN 13501 and DIN 4102
- National technical approval DIBt (German Institute for Structural Engineering) approval number: Z-31.10-182
- Subject of approval: Process for strengthening reinforced concrete with **TUDALIT®** (textile-reinforced concrete)
- **The company is certified according to DIN EN ISO 9001:2008**



With the brand **TUDALIT®** the production and application of textile-reinforced concrete is protected on the basis of specified quality standards for the components of innovative composite material, the process of its production, the products developed and produced from or with the composite material, its manufacturing process

Scope of application

- constructive strengthening in the tension zone of reinforced concrete components
- Reducing layer thicknesses of concrete structures in construction engineering (production of components and parts)
- Reducing layer thickness in constructive repair measures
- for strengthening reinforced concrete components in hand lamination and in MAWO-PAGEL- dense-flow wet-spraying

TF10

Exposition class allocation according to:
DIN 1045-2 / EN 206-1

PAGEL®/TUDALIT® - FINE CONCRETE

	XO	XC	XD	XS	XF	XA	XM
	0	1 2 3 4	1 2 3	1 2 3	1 2 3 4	1 2 3	1 2 3
TF10	•	••••	••	••••••	••		

Kit components:

- Fine concrete:

TF10

PAGEL®/TUDALIT® - FINE CONCRETE

Coated textile reinforcements:

TUDALIT® -BZT1-TUDATEX

or

TUDALIT®-BZT2-V.FRAAS



Humidity classes related to concrete corrosion as a result of alkali-silica reaction

Humidity class	WO	WF	WA	WS
	dry	humid	humid • Alkali supply from outside	humid • Alkali supply from outside • heavy dynamic load

TF10

The aggregates of PAGEL-products correspond to the alkali sensitivity class E1 from harmless occurrence according to DIN EN 12620.