

Sopro FF 451

Rapid-set flexible adhesive

FF 451



Extra-rapid-set, cementitious flexible tile adhesive, meeting C2 FT S1 requirements to DIN EN 12004, also for fully vitrified stoneware. Suitable for use in conjunction with wall and floor heating and Sopro waterproof membranes. Flexible, sag-resistant and with high crystalline water binding capacity.

- For walls and floors, indoors and outdoors
- C2: tensile adhesion strength $\geq 1.0 \text{ N/mm}^2$
- F: early tensile adhesion strength $\geq 0.5 \text{ N/mm}^2$ after 6 hours
- T: thixotropic – high sag resistance due to fibre reinforcement
- S1: deformability $\geq 2.5 \text{ mm}$
- Working life: approx. 20 minutes
- Walkable and groutable: after approx. 2 hours
- Low-chromate to Regulation (EC) No 1907/2006, Annex XVII
- DGNB: Top quality level 4, Line 8, based on DGNB (German Sustainable Building Council) criterion "ENV1.2 Local Environmental Impact" (2018 version)

Coverage: Approx. 1.3 kg/m^2 per mm coat thickness.



Packaging	Weight	Packages	Pallet weight
Bag	25 kg	40	1000 kg

Use	With earthenware, stoneware and fully vitrified stoneware tiles, mosaic, discoloration-resistant natural stone units, ceramic split tiles and split tile fittings, clinker floor tiles and equivalent materials. For construction of ledges/shelves, lightweight internal walls, aerated concrete block facings to sanitary appliances (e.g. bathtubs) and the like. For full-surface installation of foam, cork, peat, wood-fibre etc. insulation board. For process water tanks, swimming pools, operating theatres, escape routes.
Properties	Excellent contact adhesion, fresh adhesive sag resistance and high water retentivity, resistant to water and freeze-thaw cycles, high early strength.
Suitable substrates	Min. 3-month-old concrete, aerated concrete; cement and lime/cement render; renders made from masonry cement; plane, flush-jointed masonry (no composite masonry); paperless gypsum, gypsum plasterboard and gypsum fibreboard drywall panels; cement screeds; calcium sulphate screeds; board subfloors. As a basic requirement, all substrates shall, be solid, strong and dimensionally stable. Specifications of DIN 18157 shall be observed.
substrate preparation	Substrate shall be clean, solid, strong, dimensionally stable and free from any adhesion-impairing substances. Fill any existing cracks in screed with structurally bonding Sopro SH 649 shaken resin. Level out any gross irregularities using Sopro RAM 3 454 renovation and levelling mortar or Sopro RS 462 repair filler; for floors, use Sopro FS 15 550 floor-levelling compound, Sopro VS 582 self-levelling filler or Sopro FS 5 549 floor-levelling compound. Cement screeds shall be 28 days old and dry. Screeds incorporating Sopro Rapidur [®] B1 rapid-set screed binder are ready to receive tiles after only 12 hours, Sopro Rapidur [®] B3 after 1 - 2 days, and Sopro Rapidur [®] B5 after 3 days. (Self-levelling) calcium sulphate screeds (anhydrite screeds) shall be adequately ground, vacuum-cleaned and primed, and shall exhibit moisture content $\leq 0.5\%$ CM for unheated and $\leq 0.3\%$ CM for heated constructions. Gypsum plasterwork shall be dry, single-coat and shall not be felt-floated or smoothed. Cement and calcium sulphate screeds incorporating heating elements shall be heated up to ensure adequate drying out prior to flooring installation. Floating cement screeds or unbonded cement screeds on separating layer shall exhibit residual moisture $\leq 2.0\%$ CM. Bonded cement screeds may be tiled as soon as they are walkable. When laying natural stone, risk of discoloration due to moisture penetration must be taken into account. All relevant standards, guidelines and recommendations shall apply; workmanship shall comply with good practice.
Priming	- Sopro GD 749 primer: Paperless gypsum wall panels, gypsum plasterboard/joints and filler, gypsum fibreboard; calcium sulphate (anhydrite and self-levelling anhydrite) screeds to receive tiles of size not exceeding 0.2 m ² , board subfloors, gypsum plaster, high- or variable-suction (interior) aerated concrete, cement and lime/cement render, renders made from masonry cement, flush-jointed masonry, concrete; rigid foam board; all strong and uniformly absorbent mineral substrates. - Sopro SG 602 primer-sealer: Cement render, lime/cement render, gypsum plaster, homogeneous, flush-jointed masonry (no composite masonry), concrete, aerated concrete, paperless gypsum panels, gypsum plasterboard and gypsum fibreboard, cement screeds, calcium sulphate screeds (for laying tiles up to max. 1 m ²). For ceramic tiles, natural stone and timber substrates insensitive to moisture. For large-format tiles (of size > 0.36 m ²), use of rapid-set, rapid-drying bedding adhesives is recommended in conjunction with Sopro SG 602. - Sopro HPS 673 bonding primer: All smooth and closed-pore substrates, e.g. existing tile, terrazzo, natural and cast stone coverings; lacquer/varnish coatings; adhesive residue from PVC flooring or carpeting. -Sopro MGR 637 multi-purpose primer/Sopro EPG 522 epoxy primer: Calcium sulphate (anhydrite and self-levelling anhydrite) screeds to receive tiles of size exceeding 0.2 m ² .

Application Mix Sopro FF 451 with water to homogeneous consistency. Apply contact layer, pressing down heavily, then apply combed bed with suitable notched trowel (tool angle 45° – 60°). Do not prepare an area of more than approx. 1.5 m². Press tiles firmly into bed, position and align before adhesive skins over. Rake out joints prior to hardening and wash down covering. Do not retemper stiffened mortar by addition of water or fresh material to restore workability. Pretreatment with Sopro MGR 637 multi-purpose primer or Sopro EPG 522 epoxy primer is required when laying large-format tiles with edge length exceeding 60 cm or of size exceeding 0.2 m² on calcium sulphate-based substrates.

Water requirement	Per package		25 kg																	
	Water requirement					6.5 l - 7 l														
Application temperature	From +5 °C to +25 °C (substrate, air, material)																			
Coat thickness	Max. 5 mm in compacted adhesive bed																			
Coverage chart	<table border="1"> <tr> <td>Serration (mm)</td> <td>4</td> <td>6</td> <td>8</td> <td>10</td> <td>12</td> <td>20</td> </tr> <tr> <td>Coverage kg/m²</td> <td>1.3</td> <td>2.0</td> <td>2.6</td> <td>3.3</td> <td>3.9</td> <td>--</td> </tr> </table>						Serration (mm)	4	6	8	10	12	20	Coverage kg/m ²	1.3	2.0	2.6	3.3	3.9	--
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	<p>All stated consumption/coverage rates depend on angle of application with notched trowel and on substrate type and levelness. 20 mm serration corresponds to M1 serration to TKB (German Technical Committee for Construction Adhesives) guidance paper (U-shaped serration).</p>																			
Loadable	After approx. 1 day; in commercial facilities after approx. 2 days, in areas subject to high wet exposure after approx. 3 days, for underwater applications after approx. 10 days, in conjunction with wall and floor heating after approx. 14 days.																			
Maturing time	3-5 minutes																			
Open time	Approx. 30 minutes																			
Shelf life	Shelf life approx. 6 months, subject to storage on pallet in dry conditions in original unopened containers.																			
Specified times	Apply for normal temperature range of +23 °C and 50 % relative humidity; higher temperatures shorten and lower temperatures lengthen these times.																			
Tool cleaning	Wash tools with water immediately after use																			
Tools	Mixing attachment, notched trowel with suitable serration: 3 – 4 mm for tesserae, 4 – 6 mm for wall and floor tiles, 6 – 10 mm for heavy ceramics.																			
Underwater and permanently underwater area	Suitable																			
Walkable / groutable	After approx. 3 hours or after setting of adhesive; take measures to spread loads over floor																			
Wall and floor heating	Suitable																			
Working life	Approx. 30 minutes																			
Test certificates	DIN EN 12004: C2 FT S1 PG-AIV-F (Criteria for Award of National Test Certificates for Liquid-Applied Waterproof Membranes Used in Conjunction with Tile Coverings): (In preparation) PG-AIV-B (Criteria for Award of National Test Certificates for Waterproof Sheet Membranes Used in Conjunction with Tile Coverings): (In preparation)																			
Licence	EMICODE system of GEV (German Association for the Control of Emissions in Products for Flooring Installation, Adhesives and Building Materials): EC1 ^{PLUS} ("very-low-emission-plus") rating																			

Safety precautions

Labelling in accordance with Regulation (EC) No 1272/2008 (CLP).

GHS07

Signal word: Attention

H319 Causes serious eye irritation.

P102 Keep out of reach of children. P103 Read carefully and follow all instructions.

P264 Wash hands thoroughly after handling. P280 Wear protective gloves/protective clothing/eye protection/face protection/ P337+P313 If eye irritation persists: Get medical advice/attention. P501 Dispose of contents/container in accordance with regulations.

Contains Portland cement, Cr (VI) < 2 ppm. Exhibits strong alkaline reaction upon contact with moisture/water; protection required for skin and eyes. All standard precautions for the handling of construction materials/chemicals shall be taken.

Low-chromate to Regulation (EC) No 1907/2006, Annex XVII

GISCODE ZP1

Disposal

Waste treatment methods: The generation of waste should be avoided or minimized wherever possible. Recover if possible.

A waste code (EWC) according to European List of Waste (LoW) cannot be specified, due to dependence on the usage. Contact and send to an authorized waste disposal service. Methods of disposal: Disposal of this product, solutions, packaging and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and nonrecyclable products via a licensed waste disposal contractor.

Do not dispose of waste into sewers.

Hazardous waste: Yes

Disposal considerations:

Do not allow to enter drains or watercourses.

Dispose of product according to all federal, state and local applicable regulations.

If this product is mixed with other wastes, the original waste product code may no longer apply and the appropriate code should be assigned.

Dispose of containers contaminated by the product in accordance with local or national legal provisions. For further information, contact your local waste authority.

Special precautions: This material and its container must be disposed of in a safe way. Care should be taken when handling untreated empty containers.

Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Empty containers or liners may retain some product residues. Do not re-use empty containers.

CE marking

 1211 0767	 Sopro Sopro Bauchemie GmbH Biebercher Straße 74 - 65263 Wiesbaden (Germany) www.sopro.com
04 CEN-CEI(045) :ung EN 12004:2007 + A1:2012 Sopro FF 451 Fast setting, improved, cementitious adhesive for tiling internal and external floors and walls	
Reaction to fire	Class A1/A1s
Bond strength as	
Early tensile adhesion strength	≥ 0.5 N/mm²
Initial tensile adhesion strength	≥ 1.0 N/mm²
Durability for	
Tensile adhesion strength after water immersion	≥ 1.0 N/mm²
Tensile adhesion strength after heat ageing	≥ 1.0 N/mm²
Tensile adhesion strength after freeze/thaw cycles	≥ 1.0 N/mm²
Release of dangerous substances	see SDS

bringing european innovation



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