BUILDING TRUST

PRODUCT DATA SHEET

Sikacrete®-733 W 3D

1-PART MICRO-CONCRETE WITH LONGER OPEN TIME FOR 3D PRINTING

PRODUCT DESCRIPTION

Sikacrete®-733 W 3D is a 1-Part fiber containing, Micro-Concrete, with longer interlayer open time and reduced CO_2 footprint for use with 3D concrete printing robot or gantry printers.

USES

For precision concrete printing of 3D objects and components for the following:

- Buildings
- Civil Engineering structures
- Molds and forms
- Art, craft, and visual displays
- Interior and exterior use

CHARACTERISTICS / ADVANTAGES

- Contains recycled waste material, to reduce the carbon footprint
- Longer open time, for extended interlayer bonding period
- Fast hardening development after setting, for stacking and building up layers
- Contains fibers, to control plastic shrinkage cracks
- Fast absorbing, suitable for continuous and static mixers
- Easy to use, just mix with water
- Adjustable consistency, for temperature variations
- Thixotropic consistency, to maintain shape after extrusion
- Lower viscosity, for lower pumping pressure
- Low shrinkage, to reduce potential for cracking
- Optimised grading, for smooth appearance
- Reduced dust emissions

PRODUCT INFORMATION

Chemical Base	Portland cement and cement replacement from recycled waste material, selected fillers and aggregates, micro fibers, and special additives.
Packaging	▪ 55 lb bag ▪ 2000 lb Super Sack Refer to the current price list for available packaging variations.
Shelf Life	9 months from date of production
Storage Conditions	The Product must be stored in original, unopened and undamaged sealed packaging in dry conditions. For consistent printing quality it is recommended to store the material at temperatures between 50 °F - 77 °F (10 °C - 25 °C). Always refer to packaging.
Appearance / Color	White powder
Maximum Grain Size	Approx. 0.118 in (3 mm)

TECHNICAL INFORMATION

Compressive Strength		**ASTM C109**
	1 day	1500 psi (10 MPa)
	7 day	6900 psi (47 MPa)
	28 day	7300 psi (50 MPa)
Modulus of Elasticity in Compression		**ASTM C469**
	28 day	4.35 x 10^6 psi (30 GPa)
Flexural Strength		**ASTM C348**
	28 day	1190 psi (8MPa)

APPLICATION INFORMATION

Mixing Ratio	15% – 17% of water by weight of powder	
Fresh mortar density	Approx. 131 lb/ft³ (2.1 kg/L)	
Coverage	Approx. 3.88 US gal per 55 lb bag (14.7 L per 25 kg bag). *This figure is theoretical and does not allow for any lost material during the mixing or pumping process, additional material due to surface porosity, surface profile, variations in level or wastage etc.	
Layer Thickness	Approx 0.23 – 0.78 in (6 – 20 mm) Layer thicknesses are subject to the equipment and printing procedure and it is recommended to make a test to check suitability	
Product Temperature	**Minimum**	50 °F (10 °C)
	Maximum	77 °F (25 °C)
	The material and water temperature plays a significant role in the printing process. Having a constant, or reducing significant variations during application will help maintain a consistent quality of printing.	
Ambient Air Temperature	**Minimum**	41 °F (5 °C)
	Maximum	86 °F (30 °C)
Pot Life	**50 °F (10 °C)**	80 min
	68 °F (20 °C)	60 min
	86 °F (30 °C)	40 min
	Pot life is based on the temperature of the material after extrusion and indicates when the material is starting to stiffen. Agitating the material during this time will prolong the pot life.	

BASIS OF PRODUCT DATA

Results may differ based upon statistical variations depending upon mixing methods and equipment, temperature, application methods, test methods, actual site conditions and curing conditions.

Variation in performance values
Performance values depend on the type of equipment and method of printing and may differ from the declared values. For structural designs printed material characteristics must be verified from the printed element.
For further assistance, contact Sika Technical Services

USES

- 3D concrete printing is a manufacturing process using mixing, pumping and robotic placement to apply the printed concrete. All these factors play a significant role in achieving optimal results of the finished concrete component and therefore pre-trials and tests must be carried out before final manufacturing of the finished components.
- In the event of blockages, rinse equipment and pump lines immediately with clean water.
- Sika is not responsible for deviated performances due to external circumstances beyond our control.
- Continuously monitor the pot life of the mixed material.

- Do not allow mixed material to stand in warm temperatures.
- Keep pump lines wetted and cool.
- Use warm water at low temperatures and cold water at high temperatures to maintain application performance.
- Condensation due to certain curing methods and curing agents may cause some discoloration to the surface appearance.

ENVIRONMENTAL, HEALTH AND SAFETY

For further information and advice regarding transportation, handling, storage and disposal of chemical products, user should refer to the actual Safety Data Sheets containing physical, environmental, toxicological and other safety related data. User must read the current actual Safety Data Sheets before using any products. In case of an emergency, call CHEMTREC at 1-800-424-9300, International 703-527-3887.

APPLICATION INSTRUCTIONS

MIXING

Static Mixers (Small volume quantities)

1. Mix with an electric single or double paddle mixer (<500 rpm) or using a forced action mixer capable of mixing 2 to 3 bags at a time.
2. Add the recommended amount of clean water in a suitable mixing container.
3. Stir slowly, add the powder to the water and mix thoroughly for a minimum of 2 minutes. Check the corners of the mixer for no dry powder. Add more water during the mixing time if necessary to the maximum specified amount to achieve a smooth consistent homogeneous mix.
4. Stir gently if required. Then place material into the pumping equipment.

Continuous Mixer (High volume quantities)

The mixing ratio shall be determined using a pan test heating method or microwave technique (according to Austrian Standard) to determine the equivalent flowrate in US gal/hour (L/hour) on the equipment.

A typical printing consistency is approximately 5 in (130 mm) in a spread-flow test according to EN 13395-1. The vertical print speed must be < 0.47 in/min (1.2 cm/min).

Printing height	Minimum layer circle time
0.19 in (0.5 cm)	25 sec
0.39 in (1.0 cm)	50 sec
0.78 in (2.0 cm)	100 sec

Printing at angles depends on several factors including temperatures and mixing ratio. Do not print Sikacrete®-733 W 3D for designs with an offset center of gravity due to the long open time of the material.

For further assistance, contact your local Sika Technical Services Department

APPLICATION

3D concrete printing is a manufacturing process using mixing, pumping and robotic placement to apply the printed concrete. All these factors play a significant role in achieving optimal results of the finished concrete component and therefore pre-trials and tests must be carried out before final manufacturing of the finished components.

- Use SikaPump® Start-1 to prime pump lines
- In the event of blockages, rinse equipment and pump lines immediately with clean water
- Continuously monitor the pot life of the mixed material
- Do not allow mixed material to stand in warm temperatures
- Keep pump lines wetted and cool
- Use warm water at low temperatures and cold water at high temperatures to maintain application performance
- For operational maintenance, refer to the equipment instructions

CURING TREATMENT

Discolouration of printed objects

Note: Condensation due to certain curing methods and curing agents may cause some discolouration to the surface appearance.

1. Carry out pre-trials with the chosen curing method or agent.
2. Cure the Product in the prescribed ambient conditions with a minimum of 40 % relative humidity to prevent too early drying of printed objects.
3. Do not cure newly printed objects outside in the direct sun or windy conditions.
4. The standard rules of good concreting practice, concerning production, and placing must be followed.

CLEANING OF TOOLS

Clean all tools and application equipment with water immediately after use. Hardened material can only be removed mechanically.

OTHER RESTRICTIONS

See Legal Disclaimer.

LEGAL DISCLAIMER

- **KEEP CONTAINER TIGHTLY CLOSED**
- **KEEP OUT OF REACH OF CHILDREN**
- **NOT FOR INTERNAL CONSUMPTION**
- **FOR INDUSTRIAL USE ONLY**
- **FOR PROFESSIONAL USE ONLY**

Prior to each use of any product of Sika Corporation, its subsidiaries or affiliates ("SIKA"), the user must always read and follow the warnings and instructions on the product's most current product label, Product Data Sheet and Safety Data Sheet which are available at usa.sika.com or by calling SIKA's Technical Service Department at 1-800-933-7452. Nothing contained in any SIKA literature or materials relieves the user of the obligation to read and follow the warnings and instructions for each SIKA product as set forth in the current product label, Product Data Sheet and Safety Data Sheet prior to use of the SIKA product.

SIKA warrants this product for one year from date of installation to be free from manufacturing defects and to meet the technical properties on the current Product Data Sheet if used as directed within the product's shelf life. User determines suitability of product for intended use and assumes all risks. User's and/or buyer's sole remedy shall be limited to the purchase price or replacement of this product exclusive of any labor costs. **NO OTHER WARRANTIES EXPRESS OR IMPLIED SHALL APPLY INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SIKA SHALL NOT BE LIABLE UNDER ANY LEGAL THEORY FOR SPECIAL OR CONSEQUENTIAL DAMAGES. SIKA SHALL NOT BE RESPONSIBLE FOR THE USE OF THIS PRODUCT IN A MANNER TO INFRINGE ON ANY PATENT OR ANY OTHER INTELLECTUAL PROPERTY RIGHTS HELD BY OTHERS.**

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