BUILDING TRUST
CONSTRUIRE LA CONFIANCE

PRODUCT DATA SHEET

Sikacrete®-733 3D

1-part micro-concrete with longer open time for 3D printing

PRODUCT DESCRIPTION

Sikacrete®-733 3D is a 1-part, fibre containing, micro-concrete, with longer interlayer open time and reduced CO_2 footprint for use with 3D concrete printing robot or gantry printers.

WHERE TO USE

For precision concrete printing of 3D objects and components for:
- Buildings
- Civil engineering structures
- Moulds and forms
- Art, craft and visual displays
- The Product is suitable for interior or 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 fibres, 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

Composition / Manufacturing	Portland cement and cement replacement from recycled waste material, selected fillers and aggregates, micro fibres and special additives.
Packaging	25 kg bag 1000 kg bag Refer to the current price list for available packaging variations.
Shelf Life	9 months minimum 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 +10 °C and +25 °C. Always refer to packaging
Appearance / Colour	Grey powder

Maximum Grain Size	~3 mm
Density	2200 kg/l

TECHNICAL INFORMATION

Compressive Strength	Conditioned 24 hours at +23 °C	10 MPa	(EN 196-1)
	Conditioned 28 days at +23 °C	35 MPa	
	Tested with a water addition of 14.0 %.		
Modulus of Elasticity in Compression	Cured 28 days at +20 °C	30 GPa	(EN 13412)
Tensile Strength in Flexure	Conditioned 24 hours at +20 °C	3.0 MPa	(EN 196-1)
	Conditioned 28 days at +20 °C	6.0 MPa	
	Tested with a water addition of 14.0 %.		

APPLICATION INFORMATION

Mixing Ratio	13–14 % water (by weight of powder)	
Yield	~14.7 litres per 25 kg. This figure is theoretical and does not allow for any lost material during the mixing or pumping process	
Layer Thickness	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	+10 °C
	Maximum	+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	+5 °C
	Maximum	+30 °C
Pot Life	+10 °C	~80 minutes
	+20 °C	~60 minutes
	+30 °C	~40 minutes
	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.	
Initial Set Time	+ 5 °C	165 minutes
	+20 °C	90 minutes
	+30 °C	70 minutes
Final Set Time	+ 5 °C	285 minutes
	+20 °C	120 minutes
	+30 °C	95 minutes

BASIS OF PRODUCT DATA

Product properties are typically averages, obtained under laboratory conditions. Reasonable variations can be expected on-site due to local factors, including environment, preparation, application, curing and test methods.
IMPORTANT
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 please contact Sika Technical Services.

ENVIRONMENT, HEALTH & 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

MIXING

STATIC MIXERS
Preconditions
Use a suitable forced action pan mixer for cementitious materials capable of mixing more than a single 25 kg bag per mix.
1. Add the recommended amount of clean water with the powder and mix.
2. Check the corners of the mixer for no dry powder.
3. Mix for a minimum of 2 minutes until the material is homogeneously mixed.
4. Place the material into the pumping equipment.

CONTINUOUS MIXERS
1. Determine the required printing consistency by adjusting the water addition on the equipment as a flow rate in L/h.
2. Check the water content using the pan test heating method or microwave technique (according to Austrian Standard).

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

Printing height	Minimum layer circle time
0.5 cm	25 seconds
1.0 cm	50 seconds
2.0 cm	1 minute 40 seconds

Printing at angles depends on several factors including temperatures and mixing ratio. Do not print Sikacrete®-733 3D for designs with an offset centre 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.
1. Cure the Product in the prescribed ambient conditions with a minimum of 40 % relative humidity to prevent too early drying of printed objects.
2. Do not cure newly printed objects outside in the direct sun or windy conditions.

The standard rules of good concreting practice, concerning production and placing must be followed.

CLEAN UP

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

LOCAL RESTRICTIONS

Note that as a result of specific local regulations the declared data and recommended uses for this product may vary from country to country. Consult the local Product Data Sheet for exact product data and uses.

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 recommendations, or from any other advice offered. The information contained herein does not relieve the user of the products from testing them for the intended application and purpose. 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 or may be downloaded from our website at: www.sika.ca

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