

PRODUCT DATA SHEET

SikaGrout®-495 HP

Proprietary, non-shrink, very high strength, high flow, cementitious grout specifically designed for bedding / grouting bridge bearings in compliance with the Manual of Contract Documents for Highway Works (MCHW) Specification for Highway Works (SHW) document CC 495 ("*Miscellaneous*"), formerly Series 2600.

PRODUCT DESCRIPTION

SikaGrout®-495 HP is a Proprietary Portland cement based Product giving very high strength, high flow and non-shrink properties. Fully compliant with the Specification for Highway Works (SHW) document CC 495 - Bedding Mortar, the Product has been specifically formulated for securing bridge bearings. The placed grout gives structural support and offers good vibration resistance. Previously marketed as Parex 2601 High Performance Bedding Mortar.

USES

The Product has been specifically formulated to meet the requirements of the Specification for Highway Works (SHW) document CC 495 - Bedding Mortar, with the main function being a high strength bedding mortar used for accurate location of bridge bearing units.

The Product can also be used for the following applications:

- Securing baseplates of metal structural sections.
- Fixing baseplates of metal vehicle restraint system posts.
- Bedding precast concrete structural units.
- Void filling.
- Anchoring dowel bars between precast units.
- Bedding stanchion bases and machine base plates.
- Securing ground anchors.
- Rail and track applications.
- Fixing signage and street furniture.

CHARACTERISTICS / ADVANTAGES

- Specifically designed for bridge bearings.
- Other uses include high-strength fixing of baseplates

of metal structural sections, baseplates of metal vehicle restraint system posts, and precast concrete structural units.

- Fully satisfies the Manual of Contract Documents for Highway Works (MCHW) Specification for Highway Works (SHW) document CC 495: Bedding Mortar.
- Stable Product - does not segregate, bleed, effervesce or trap air.
- Pre-packaged, only requiring the addition of water.
- Good early strength gain (>50 MPa after 7 days).
- Very high ultimate strength (28-day compressive strength >80 MPa).
- Excellent flow characteristics.
- Non-shrink (shrinkage compensated).
- Compatible with other cementitious products (no adverse reactions).
- Can be safely used in contact with steel (low chloride content).
- Low water absorption.
- Resistance to sea water, petroleum products and mild alkali attack.
- Pourable and pumpable.
- Provides exceptional structural support and vibration resistance.
- Total acid-soluble sulfate content (SO₄) less than 5 % of the mass of cement (determined in accordance with BS EN 1744-1).
- Good freeze-thaw stability.
- 28-day compressive strength fully satisfies the requirements of the Midlands Links Specification.
- Supplied with an Inspection Certificate on request.

APPROVALS / STANDARDS

- Complies with the requirements of Corps of Engineers Specification for Non-Shrink Grout CRD C621.
- Fully satisfies the requirements of the Manual of Contract Documents for Highway Works (MCHW) Specification for Highway Works (SHW) CC 495: Bedding Mortar.

PRODUCT INFORMATION

Chemical Base	Portland cement based grout, with selected fillers and aggregates, and synergistic additives. Portland cement complies with BS EN 197-1 and is binder type CEM I.		
Packaging	25 kg bags		
Appearance / Colour	Grey powder		
Shelf Life	6 months from the date of manufacture		
Storage Conditions	<ul style="list-style-type: none"> Store properly undercover in dry conditions in undamaged and unopened original sealed packaging. Material shall not be used more than six months after the date of manufacture. 		
Density	~2250 kg/m ³		
Maximum Grain Size	Declaration D _{max} 1.0 mm	MCHW Requirement ≤2.8 mm	
Total Chloride Ion Content	≤0.05 % (by mass of cement)		(BS EN 1015-17)
Compressive Strength	28 Days >50 MPa	MCHW Requirement ≥50 MPa	(BS EN 12190)
	28 Days ~83 MPa*		(BS EN 12390-1, -2 and -3)
	<p>* : Average of six 100 mm cubes (all >50 MPa, with the difference between the highest and lowest values being 3.6 % of the average), cast without compaction, and cured at +20°C (damp-cured for 24 hours, then water cured). The results of the compressive strength tests at 28 days fully satisfy the requirements of the Midland Links Specification.</p>		
Modulus of Elasticity in Compression	≥20 GPa		(BS EN 13412)
	<p>The elastic stability was determined using three 100 mm cubes. For each test the casting and curing temperatures was at +20°C in accordance with the Standard. At an age of 28 days, the cubes were placed in water at +20°C heated at a uniform rate to +45°C in 24 hours. Upon attaining +45°C, the cubes were sealed in plastic bags and then loaded at a compressive stress of 30 MPa for six hours at temperature of +45°C. For each test, four strain gauges (type PL-15-11, gauge length 15 mm, gauge resistance 120 ± 0.3, gauge factor 2.04) were placed on the four vertical faces of the cube under investigation. In addition, a further strain gauge was placed on a reference cube. These were connected to a transistorised strain gauge instrument (Automation - Peekel N.V. Type T200), and a Channel Switch Box. Measurements were made immediately and 6 hours after loading.</p>		
	Mean Strain (average of 3 determinations) 0.72 %	MCHW Requirement ≤1.0 %	
	NOTE: Each specimen at completion of the loading phase did not exceed 1 %.		
Tensile Strength	≥2.0 MPa		(EN 1542)
	<p>NOTE: Tensile adhesion / adhesive bond strength determined on a reference concrete MC (0.40) slab made comprising of aggregates with a maximum size between 8 and 12 mm, with a sandblasted surface and saturated surface dry. SikaGrout®-495 HP applied at 10 mm.</p>		
Expansion	24 Hours 1.77 %	MCHW Requirement >+0.25 % and <+2.50 % at 24 hours	(ASTM Standard C827)

Restrained Shrinkage / Expansion	Bond Strength After Test ≥2.0 MPa	(BS EN 12617-4)
Reaction to Fire	EuroClass A1	(EN 13501-1)
Capillary Absorption	≤0.5 kg·m ² ·h ^{-0.5}	(BS EN 13057)
Carbonation Resistance	dk ≤ reference concrete MC(0.45)	(BS EN 13295)
Mixing Ratio	6.00 litres of water per 25 kg bag NOTE: Potable water from a water company's supply shall be used for mixing. If this is unavailable, the Contractor shall ensure that the water complies with the guidance given in BS EN 1008. Where testing is necessary, the sulfate content of the water shall be tested in accordance with Test No. 1 in TRL Report 447. The water shall not be used if the sulfate content exceeds 1.4 g of sulfate (as SO ₄) per litre. Water shall NOT be sourced from the sea, estuaries nor tidal rivers.	
Yield	25 kg yields ~13.5 litres of grout	
Layer Thickness	10 mm minimum / 350 mm maximum	
Product Temperature	+5°C minimum / +35°C maximum	
Ambient Air Temperature	+5°C minimum / +35°C maximum	
Substrate Temperature	+5°C minimum / +35°C maximum	
Pot Life	Up to 60 minutes, if agitated after mixing.	
Flowability	Temperature	Efflux Time* (ASTM Standard C939-02)
	+5°C	118.5 seconds
	+20°C	125 seconds
<p>* Average of two results. NOTE: Tests completed at temperatures of +5°C and +20°C within 15 minutes of commencement of mixing. Average efflux time of water: 8.2 seconds. The maximum difference in efflux time measured at lower and upper test temperatures satisfies the MCHW requirement (≤60 seconds).</p> <ul style="list-style-type: none"> ▪ The flow characteristics of the bedding mortar were assessed using the apparatus and method of pouring specified in the Specification (LT2 using the apparatus detailed in Figure 1.77 of CC 495) at the two required temperatures (i.e. +5°C and +20°C). ▪ The Specification requires the mortar to rise at least 10 mm above the underside of the top plate at all positions, without signs of segregation, bleeding, effervescence or air inclusions. ▪ The specification requirements were fully satisfied for flow between glass plates at +5°C and at +20°C. 		
Setting time	~220 minutes	

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

An Inspection Certificate is available on request for each Batch, which details the following information:

- Aspect.
- Product temperature.
- Water efflux time (calibration).
- Flow cone test (in accordance with ASTM C939).

- Compressive strengths at 7 and 28 days (three determinations in accordance with BS EN 12390-3).
- Average compressive strength at 7 and 28 days (from the three determinations completed in accordance with BS EN 12390-3).
- Short term expansion at 16 to 24 hours.

Preworks laboratory (LT) type tests have been independently determined and the Test Report is available on request detailing:

- LT1: Calibration of flow of bedding mortar product, temperature sensitivity using the Flow Cone Test Method in ASTM C939.
- LT2: Flow between glass plates using the apparatus detailed in Figure 1.77 of CC 495.

- LT3: Compressive strengths at 28 days in accordance with BS EN 12390-1, -2 and -3 (included, although required for designed cementitious bedding mortars, not proprietary bedding mortars like SikaGrout®-495 HP).
- LT4a: Elastic stability of hydraulic bedding mortar in accordance with BS EN 12390-2.

LIMITATIONS

- Do NOT exceed maximum water addition.
- Use only clean, potable water for mixing.
- Do NOT use vibrating pokers.
- If mixing with a drill and paddle:
 - The drill shall be high torque, slow speed (i.e. 200 to 500 rpm) with a suitable grout stirrer.
 - Use a clean, rigid mixing vessel - flexible containers (e.g. 'gorilla tubs') are unsuitable.
 - Add the appropriate quantity of clean, potable water to the mixing vessel first and gradually add the powder to the water, mixing continuously.
 - Keep the mixing head in the material - refrain from lifting in and out, as this will introduce air.
 - Once all powder has been added, mix until homogeneous (i.e. at least 3 minutes).
 - Do NOT try and mix too many bags at a time! Most drills and paddles are only capable of mixing one bag at a time. Large volumes require specialist machinery.
 - Once fully mixed, leave the grout to de-gas for 1 to 2 minutes before use.
- Use only on clean, sound substrates (concrete shall be soaked to saturated surface dry (SSD) condition).
- Avoid application in direct sun and / or strong wind.
- Pour or pump continuously from one side only (keep header boxes / hoppers topped up for the duration of the application).
- Keep exposed surfaces to a minimum.
- Do NOT add additional water during the surface finishing, as this will cause discoloration and / or cracking.
- Protect freshly applied material from freeze-thaw action.
- If applying in cold conditions (i.e. at 0°C to +5°C) the application area should be covered (e.g. use of a heated tent system) to create a micro-climate, which should then be heated to ~+20°C for a minimum of 2 days prior to application. Store the Product, water and equipment in this environment until also at ~+20 °C.
- Following application and if applied in cool conditions, or if cold conditions are expected, the use of insulating blankets or heated curing blankets is recommended for at least 72 hours to protect the fresh grout from cold temperatures and frost.
- To avoid cracking in warm temperatures, keep bags cool and use cold water.
- When the ambient temperature is warm, protect the working area from direct sunlight with temporary shelters or canopies. Do NOT expose equipment, materials or application to direct sunlight.
- When working in warm conditions and if being used, cover hoses with white membranes (or similar) to reflect heat and keep the hoses cool (or, if possible, do NOT use black / dark coloured hoses).

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.

SUBSTRATE QUALITY

Concrete, Mortar and Stone:

Surfaces must be sound, clean, free from ice, oils, grease, standing water and any loose or friable particles and any other surface contaminants. The concrete 'pull-off' bond (tensile adhesion) strength should be >1.0 MPa.

Steel and Iron:

Clean, free from oil or grease, rust and scale, etc.

SUBSTRATE PREPARATION

Substrate Preparation:

The substrate should be prepared by suitable mechanical preparation techniques such as high pressure water jetting, breakers, blastcleaning, scabblers, etc. The concrete substrates should be pre-soaked with clean water continuously for 2 to 6 hours to ensure a saturated surface dry (SSD) condition throughout the operation. Immediately before pouring the grout, remove all excess or standing water from within any formwork, cavities or pockets.

Shutter / Formwork:

All formwork should be of adequate strength, treated with release agent and sealed to prevent leakage. Sealing can be achieved by using Sikaflex® -11FC+ sealant beneath or around formwork and between joints. Ensure formwork includes outlets for extraction of the pre-soaking water. A header box / hopper should be constructed on one side of the formwork so that a grout head of 150 to 200 mm can be maintained during the grouting operation.

MIXING

Measure the appropriate amount (6.00 litres per 25 kg bag) of clean, potable water (if necessary, warm water to achieve a temperature between +15 and +20°C) into a clean, suitable mixing vessel for each complete unit of SikaGrout®-495 HP to be used. Flexible mixing vessels (e.g. 'gorilla tubs') are unsuitable - rigid vessels shall be used. Slowly add the powder to the water whilst continually mixing. Mechanical mixing should be carried out using either a high torque, slow speed (i.e. 200 to 500 rpm) drill with an appropriate grout stirrer, or a grout mixer set on slow speed for small mixes. The use of a drill and paddle (in most circumstances) is only suitable for mixing one bag at a time. For larger mixes, use forced action type mixers (NOT concrete tumble mixers which do NOT apply sufficient shear, NOR high speed or colloidal mixers, as these may cause thixotropy, leading to loss of flow). **This Product is NOT suitable for mixing by hand.** If using a drill and paddle, keep the mixing head in the material - refrain from lifting in and out, as this will introduce air. It is of utmost importance that the Product is mixed

thoroughly to the desired consistency (i.e. for at least 3 minutes). Fresh grout should be allowed to stand until the air entrapped by mixing has been released before application (typically 1 to 2 minutes).

APPLICATION

After the Product has been allowed to de-gas (which typically takes between 1 and 2 minutes), pour the mixed grout from one side of the formwork through the header box / hopper, ensuring continuous grout flow during the complete grouting operation to avoid trapping air. Keep header boxes / hoppers topped up for the duration of the application. Continue until the grout appears at the opposite side of the grouting area to the header box / hopper. Use steel banding or chains to assist flow where necessary. The grout should be placed within 10 minutes of mixing, or 60 minutes if kept mobile with an agitator prior to placing. Do NOT disturb once grouting has been completed. For large volume placement, grout mixers and pumps are recommended (e.g. Putzmeister SP11 TMR).

CURING TREATMENT

After the grout has initially hardened, remove formwork and trim edges whilst 'green'. Placed grout, which is exposed, should be cured in accordance with good concrete practice. Protect the fresh material from premature drying using an approved curing method (e.g. curing compound such as Sikafloor® ProSeal, moist geotextile membrane, hessian, polythene sheet, under water, etc.). In cold weather, apply insulating blankets or heated curing blankets to protect the Product and maintain a satisfactory constant temperature.

CLEANING OF TOOLS

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

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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