



Section 03 60 00 Grouting

SIKA SPECIFICATION NOTE: *This guide specification includes test methods, materials and installation procedures for SikaGrout®-328, high performance, precision, grout with extended working time. SikaGrout®-328 is a non-shrink, non-metallic, cementitious precision grout powered by ViscoCrete technology. This grout provides extended working time and exceptional physical performance at fluid consistency. A structural, precision grout, SikaGrout®-328 can be placed from fluid to dry pack. This guide specification should be adapted to suit the needs and conditions of individual projects. It is prepared in CSI Master Format and should be included as a separate section under Division 3 - Concrete.*

Part 1 - General

1.01 Summary

This Specification shall be read as a whole by all parties concerned. Each Section may contain more or less the complete Work of any trade. The Contractor is solely responsible to make clear to the Subcontractors the extent of their Work and coordinate overlapping Work.

1.02 System description

This specification describes grouting of machinery base plates, anchor bolts, pins and dowels with a cement based precision grout.

1.03 Related sections

- A. 03 61 00 Cementitious Grouting
- B. 03 62 13 Dry-pack grouting
- C. 03 62 00 Non-Shrink Grouting
- D. 03 62 13 Non-Metallic Non-Shrink Grouting
- E. 03 01 60 Maintenance of Grouting

1.04 References

The following standards are applicable to this section:

- ASTM C-266 – Time of Set
- ASTM C-939 – Fluidity
- ASTM C-109 – Compressive Strength
- ASTM C-940 - Expansion
- ASTM C-1090 – Shrinkage
- ASTM C-1107 – Standard Specification for Non-shrink Grouts



1.05 Quality Assurance

- A. Manufacturing qualifications: The manufacturer of the specified product shall be ISO 9001 certified and have in existence a recognized ongoing quality assurance program independently audited on a regular basis.
- B. Contractor qualifications: Contractor shall be qualified in the field of grouting with a successful track record of 5 years or more. Contractor shall maintain qualified personnel who have received product training by a manufacturer's representative.
- C. Store and apply materials in accordance with all safety and weather conditions required by manufacturer or as modified by applicable rules and regulations of local, state and federal authorities having jurisdiction. Consult Material Safety Data Sheets for complete handling recommendations.

1.06 Delivery, Storage, and Handling

- A. All materials must be delivered in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers. Damaged material must be removed from the site immediately.
- B. Store all materials off the ground and protect from rain, freezing or excessive heat until ready for use.
- C. Condition the specified product as recommended by the manufacturer.

1.07 Job Conditions

- A. Environmental Conditions: Do not apply material if it is raining or snowing or if such conditions appear to be imminent. Minimum application temperature 45°F (7°C) and rising.
- B. Protection: Precautions should be taken to avoid damage to any surface near the work zone due to mixing and handling of the specified material.

1.08 Submittals

- A. Submit two copies of manufacturer's literature, to include: Product Data Sheets (PDS), and appropriate Safety Data Sheets (SDS).
- B. Submit copy of Certificate of Approved Contractor status by manufacturer.

1.09 Warranty

Provide a written warranty from the manufacturer against defects of materials for a period of one (1) year, beginning with date of substantial completion of the project.

Part 2 - Products

2.01 Manufacturer

SikaGrout®-328, as manufactured by Sika® Corporation, is considered to conform to the requirements of this specification.

2.02 Materials

- A. The material shall be a blend of selected portland cements, specially graded aggregates, admixtures for controlling setting time and water reducers for workability.
- B. The material shall be non-combustible both before and after cure
- C. The material shall be supplied in a factory-blended bag

2.03 Performance Criteria

The grout shall not exhibit bleeding.

The grout shall be segregate.

The grout shall be pumpable through standard grout pumping equipment.

The grout shall not produce a vapor barrier. Typical Properties of the mixed polymer-modified, portland cement mortar:

1	Yield	0.44 ft ³ (0.01 m ³) per bag at fluid consistency
2	Color	Gray powder
3	Mixing Ratio	Dry Pack - 5.5–6.0 pts (2.6–2.8 L) Plastic - 6.5–7.0 pts (3.1–3.3 L) Flowable – 7.0–7.5 pts (3.3–3.5 L) Fluid – 8.0–8.5 pts (3.8–4 L)
4	Application Thickness	Min: 1/2" (12.7 mm) Max: 6" (152.4 mm)
5	Application Temp	> 45 °F (7 °C)
6	Flowability (ASTM C-1437 ¹ ASTM C-939 ²)	Dry Pack- 10–25 % Plastic ¹ : 100–125 % Flowable ¹ : 124–145 % Fluid ² : 20–60 sec
7	Final set time (ASTM C-266)	Dry Pack- <2 hr Plastic : <6 hr Flowable: <7 hr Fluid : <8 hr



8 Compressive Strength (ASTM C-109)

Dry Pack

- 1 day - 5,000 psi (34.4 MPa)
- 3 days - 8,000 psi (55.2 MPa)
- 28 days - 10,000 psi (69 MPa)

Plastic

- 1 day - 4,500 psi (31 MPa)
- 3 days - 6,500 psi (44.8 MPa)
- 28 days - 8,200 psi (56.5 MPa)

Flowable

- 1 day - 4,000 psi (27.6 MPa)
- 3 days - 6,000 psi (41.4 MPa)
- 28 days - 8,000 psi (55.2 MPa)

Fluid

- 1 day - 3,500 psi (24.1 MPa)
- 3 days - 5,500 psi (37.9 MPa)
- 28 days - 7,500 psi (51.7 MPa)

9 Flexural Strength (ASTM C-293)

Fluid 28 days - 1,300 psi (9 MPa)

10 Splitting Tensile Strength (ASTM C-496)

Fluid 28 days - 650 psi (4.5 MPa)

11 Tensile Adhesion Strength (ASTM C-882 modified)

Fluid 28 days - 2,000 psi (13.8 MPa)

12 Freeze thaw resistance (ASTM C-666)

300 Cycles - 99 %

Note: Tests above were performed with the material and curing conditions @ 71°F – 75°F and 45 - 55% relative humidity.



Part 3 – Execution

3.01 Surface Preparation

Areas to be repaired must be clean, sound, and free of contaminants. All loose and deteriorated concrete shall be removed by mechanical means. Mechanically prepare concrete substrate to obtain a surface profile of CSP 4 or greater (as per ICRI Guidelines) with a new exposed aggregate surface.

3.02 Mixing and Application

- A. Mixing of the portland cement grout: Mix manually or mechanically. Manually mix in a wheelbarrow or mortar box. Mechanically mix with a low-speed (400-600 rpm) drill and jiffy paddle or in an appropriate sized mortar mixer. Add an appropriate quantity of water to the mixing container to achieve the desired consistency. DO NOT OVERWATER While mixing the bag of powder is slowly added to the mixer. Mix to a uniform consistency for a minimum of 2 minutes. Mix temperature should be maintained at 70-75F, thus using cold or warm water accordingly.
- B. Placement Procedure:

Spalls: Within 15 minutes of mixing, pour the grout into the prepared form. Work in a manner to avoid air entrapment. Vibrate the form as required to achieve flow and compaction. Flowable grout must be confined in either the horizontal or vertical direction, leaving a minimum of exposed surface. After the grout has achieved its final set, remove any forms and trim or shape exposed mortar/concrete to the desired profile, if required.

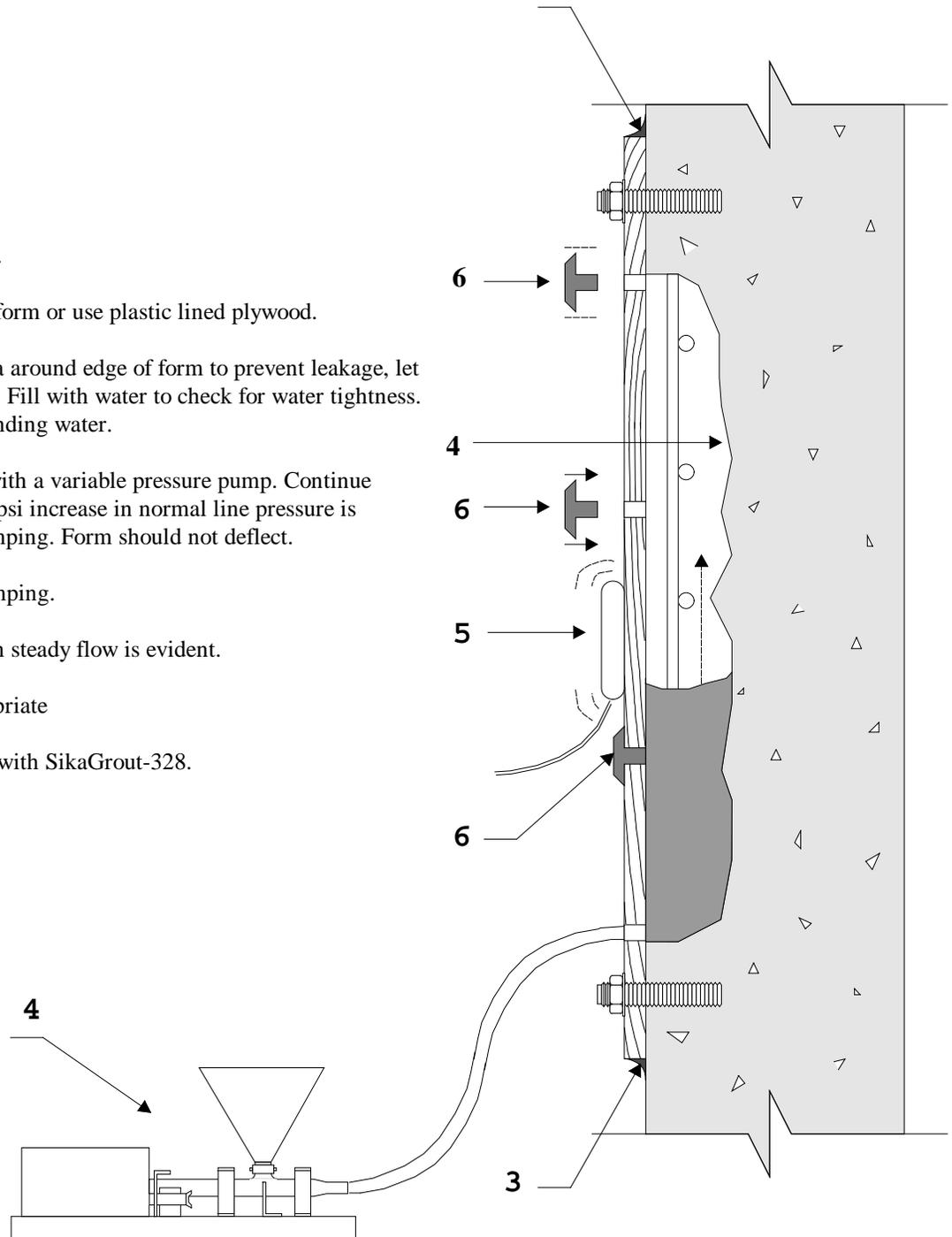
Cracks: Within 15 minutes of mixing pour the grout into prepared crack. Continue pouring until the crack has been completely filled.
- C. Wet cure for a minimum of 3 days or apply a curing compound that conforms to ASTM C-309 as approved by the Engineer.
- D. Adhere to all limitation and cautions for the polymer-modified portland cement coating in the manufacturers printed Product Data Sheet (PDS) and literature.

3.02 Cleaning

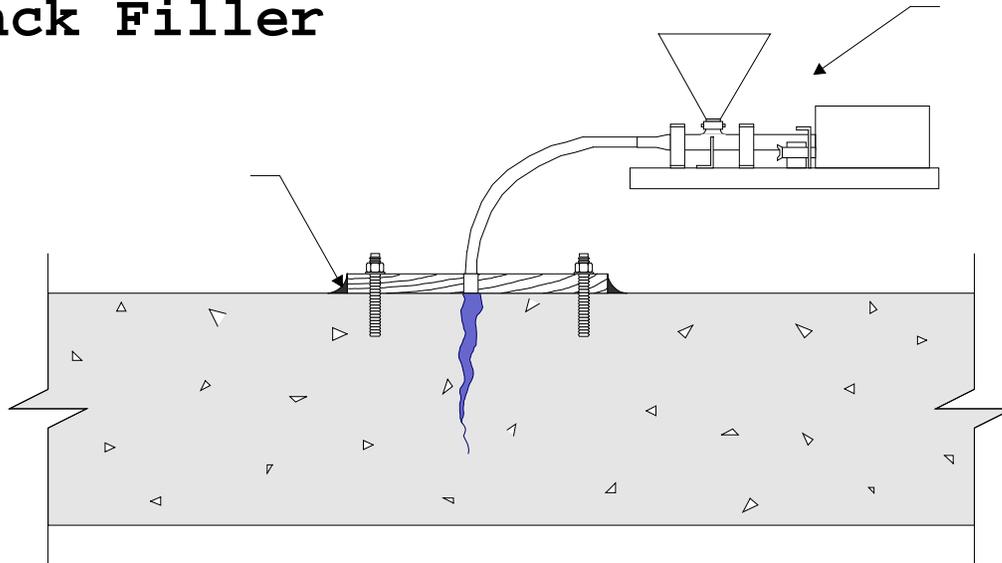
- A. The uncured polymer-modified portland cement mortar can be cleaned from tools with water. The cured polymer modified portland cement mortar can only be removed mechanically.
- B. Leave finished work and work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

SikaGrout®-328 Form and Pump

1. Pre-wet surface to SSD.
2. Apply release agent to form or use plastic lined plywood.
3. Run bead of Sikaflex 1a around edge of form to prevent leakage, let cure, then anchor form. Fill with water to check for water tightness. Let drain to no free standing water.
4. Pump SikaGrout-328 with a variable pressure pump. Continue pumping until a 3 to 5 psi increase in normal line pressure is evident then STOP pumping. Form should not deflect.
5. Vibrate form while pumping.
6. Vent to be capped when steady flow is evident.
7. Strip form when appropriate
8. Dry pack anchor holes with SikaGrout-328.



SikaGrout®-328 Crack Filler



1. Pre-wet surface to SSD.
2. Apply release agent to form or use plastic lined plywood.
3. Run bead of Sikaflex-1a around edge of form to prevent leakage, let cure, then anchor form.
4. Pump SikaGrout-328 with a variable pressure pump. Continue pumping until grout flow is evident at an adjacent port.
5. Cap off original port when steady flow is evident, move to adjacent port and continue pumping procedure until all injectable cracks have been filled.
6. Strip form when appropriate.
7. Dry pack anchor holes with SikaGrout-328.

Concrete Restoration Systems by Sika Corporation, 201 Polito Avenue, Lyndhurst, NJ 07071

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Prior to each use of any Sika product, the user must always read and follow the warnings and instructions on the product's most current Product Data Sheet, product label and Safety Data Sheet which are available online at <http://usa.sika.com/> or by calling Sika's Technical Service Department at 800-933-7452. Nothing contained in any Sika materials relieves the user of the obligation to read and follow the warnings and instruction for each Sika product as set forth in the current Product Data Sheet, product label and Safety Data Sheet prior to product use.

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SikaGrout®-328
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