

TECHNICAL BULLETIN

SikaGrout®

Causes and Solutions for Cracking in Grouts

Overview

Cementitious and epoxy grouts are used in a variety of industrial applications. Construction and installation conditions on a project often result in departure from recommended means and methods documented in the product literature. One common result of such field deviations is cracking. This document will address various causes of cracking in grouts and provide guidance for making informed decisions about the overall condition of the grout. Methodologies for crack repair will also be presented to ensure the long-term serviceability of the installed equipment.

Understanding Cracking

The most common type of observed cracking in grouts are thin (i.e. <20 mils), vertically-oriented cracks on the shoulders (Figures 1, 2). There are many root causes for such cracking; the more common are as follows:

1. Large shoulders

- Shoulders are primarily used to allow access to the void to be grouted and for air/pressure release. Shoulder widths should be kept to the minimum required for clearance (typically less than 4"). Wider shoulders are a common cause for cracking in grouts due to unrestrained expansion.

2. Expansion Joints

- More aptly called control joints, expansion joints provide physical breaks between successive pours for large baseplates. Not only do they break a large application into smaller pours, they limit the amount of potential cracking in the grout. While overall size and volume of the pour will dictate the spacing of such joints, 4 – 6' is a typical spacing. A lack of expansion joints in large pours will likely result in cracking.

3. Sharp corners

- Terminal perimeter edges of grouts should be chamfered at 45° to limit stress-related cracking
- Encapsulating the perimeter of a thick baseplate can also result in cracking. While the grout should extend above the bottom of the baseplate, it should be limited to 1/4 - 1/2 inch.

4. Curing

- Cementitious grouts must be cured. Shrinkage can occur while the grout is still plastic in windy, dry or hot conditions. Application of an evaporation retarder will minimize cracking under these conditions. Hardened cementitious grouts should be cured using wet rags or burlap overnight (at a minimum). An ASTM C309 or C 1315 curing compound can also be applied.
- Epoxy grouts do not require curing; however, windy, dry or hot conditions during installation could result in cracking

5. Form release

- While use of form release is important to ensure ready removal of formwork, it is also important to ensure cracking does not occur as a result of differential restraint being imposed on the grout during its cure
- The above-described scenarios are all situations where the cracking is likely to pose no concern regarding the long-term performance of the grout. Moreover, such cracks typically do not extend under the baseplate, particularly once the anchor bolts are torqued. There are other situations where cracking is a concern and must be addressed. Horizontal cracking at or below the epoxy/foundation bondline poses a serious concern. Often the result of thick pours with large, exposed shoulders, such cracking must be addressed. In some cases, equipment/ grout removal and replacement will be necessary.

6. Anchor Bolts

- Anchor bolts should be isolated from the grout to ensure they can stretch when torqued. Grease, foam, tape and shrink wrap are commonly used to isolate the bolts. If not isolated, cracking can occur at the anchor bolts.



Figure 1: Figure 1: Shoulder cracking on SikaGrout® 928 installation



Figure 3: Shoulder cracking on SikaFlow® 648 installation



Figure 3: Westward 4BY75 Grease Gun



Figure 4: SealBoss P 3003-2C Injection Pump

Solutions for Crack Repair

Sikadur® crack repair kit can be used for filling minor cracks. For existing cracks in an aged grout that may contain water and/or oil, MasterFlow® 647 should be used with a structural paste or gel such as Sikadur® Injection Gel.

In general, small, vertically oriented cracks can be repaired, if desired, by injection. In such cases, the crack surface should be blown out with oil free compressed air and sealed using a structural epoxy paste or gel (e.g. Sikadur® Injection Gel), injection ports such as Zerk fittings should be fixed over the crack on 4-6" centers. A low viscosity, structural epoxy resin (e.g. Sikaflow 647) can then be injected into the crack using a grease gun (Figure 3) or a plural component pump (Figure 4).

Note that this product is a 2.5:1 mix ratio and most plural component pumps cannot be used.

Health , Safety and Environmental

Read, understand and follow all Safety Data Sheets and product label information for this product prior to use. The SDS can be obtained by visiting usa.sika.com, e-mailing your request to Technical Service or calling 1(800)433-9517. Use only as directed. For medical emergencies only, call ChemTrec® 1(800)424-9300.

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