

TB-0109 — Concrete Resistance to Sulfates: The Benefit of Admixtures

Technical Bulletin

Introduction

Experience has shown that chemical admixtures generally aid in making concrete more resistant to attack by sulfates. This enhancement in durability is realized through the use of air-entraining and/or water-reducing admixtures.

Benefits of Air Entrainment

The purposeful entrainment of air in concrete, using DARAVAIR[®] and DAREX[®] air-entraining agents, protects against sulfate attack in the same manner as it protects against freezing and thawing. The air voids provide microscopic expansion chambers for relief of the pressure that is built up in the concrete by the growth of the sulfate crystals. Air entrainment does not provide permanent protection, but it does delay the deterioration for a period of time depending upon factors such as the concentration of soluble sulfate and the cycles of wetting and drying, which promote the crystal growth.

Benefits of Water Reduction

Water-reducing admixtures, such as WRDA[®], DARATARD[®], MIRA[®], DARACEM[®] or ADVA[®] products, produce low water/cement ratio concretes which develop greater strength and provide greater resistance to deterioration caused by the growth of salt crystals within the concrete mass. Also, properly proportioned mixtures containing water-reducing admixtures can be better consolidated, thus producing denser, less permeable concrete.

Caution with Calcium Chloride

Calcium chloride or admixtures containing high quantities of calcium chloride should not be used in concrete that is to be exposed to sulfate attack. It has been shown that calcium chloride reduces sulfate resistance regardless of the type of cement used.

Conclusion

In addition to producing air-entrained concrete with a moderate water content (not more than 0.45 water/cement), it is also good practice to use Type II cement where mild sulfate attack may be encountered and Type V cement is a must where the attack may be more severe.

gcpat.com | North America Customer Service: 1 877-4AD-MIX1 (1 877-423-6491)

We hope the information here will be helpful. It is based on data and knowledge considered to be true and accurate and is offered for consideration, investigation and verification by the user, but we do not warrant the results to be obtained. Please read all statements, recommendations and suggestions in conjunction with our conditions of sale, which apply to all goods supplied by us. No statement, recommendation, or suggestion is intended for any use that would infringe any patent, copyright, or other third party right.

ADVA, DARACEM, WRDA, DARATARD, and MIRA are trademarks, which may be registered in the United States and/or other countries, of GCP Applied Technologies Inc. This trademark list has been compiled using available published information as of the publication date and may not accurately reflect current trademark ownership or status.

© Copyright 2018 GCP Applied Technologies Inc. All rights reserved.

GCP Applied Technologies Inc., 62 Whittemore Avenue, Cambridge, MA 02140 USA.

In Canada, 294 Clements Road, West, Ajax, Ontario, Canada L1S 3C6.

This document is only current as of the last updated date stated below and is valid only for use in the United States. It is important that you always refer to the currently available information at the URL below to provide the most current product information at the time of use. Additional literature such as Contractor Manuals, Technical Bulletins, Detail Drawings and detailing recommendations and other relevant documents are also available on www.gcpat.com. Information found on other websites must not be relied upon, as they may not be up-to-date or applicable to the conditions in your location and we do not accept any responsibility for their content. If there are any conflicts or if you need more information, please contact GCP Customer Service.

Last Updated: 2018-08-24

gcpat.com/solutions/products/adva-high-range-water-reducers/tb-0109-concrete-resistance-sulfates-benefit