

## CRAZING

Crazing is defined as fine and random cracking extending through the surface, normally less than one millimeter in depth. It can appear along or perpendicular to the length, in polygonal shapes or as random "map cracking."



Crazing has been a concern since concrete has been in existence. The appearance of small cracks on the surface, especially when filled with water or dirt, can be alarming since it is assumed that the fissures are running through the entire cross section the concrete. But in general, crazing does not affect the structural integrity of the concrete and should not by itself be cause for rejection. All cement based products and many natural stones are susceptible to crazing.

There are many theories as to the causes of crazing, but typically it is due to differential contraction between the surface and interior sections of the concrete. Crazing can be caused by any factor which causes surface tension in excess of interior tension.

Conditions due to manufacturing include improper curing, a surface film richer in cement and fines than the body of the concrete and plastic shrinkage cracking. A producer, careful in proportioning mix designs and watchful of compaction techniques and curing methods, can minimize the likelihood of crazing. Manufacturers of Cast Stone who experience crazing should review their mix designs and production process and pay particular attention to the design and installation details during the shop drawing submission process.

Crazing can also be caused by design and installation factors which unusually cause high amounts of vapor transmission, excessive wetting and drying or inadequate ventilation in a wall assembly. There is also some evidence that atmospheric carbonization can cause crazing as well.

Common installation problems which can cause or enhance crazing include:

1. The use of through-wall flashing without or lack of sufficient weep holes
2. Use of Cast Stone without a ventilated wythe
3. Use of Cast Stone below grade or at planter type areas without a proper moisture barrier
4. Failure of joint sealant materials which allow water penetration
5. The use of mortar joints where soft sealant joints should be used
6. Lack of sufficient control joints.

Design professionals should ensure that the wall section details provide adequate ventilation and drainage behind Cast Stone and above flashing. Sealant joints should be used in accordance with CSI specifications and wherever thermal movement is likely.



Since crazing is only on the surface, the visual appearance of the cracks can usually be minimized by cleaning the affected areas with a mild acid solution. Severe cases of crazing may require application of a silane/siloxane sealer, following cleaning, to penetrate the cracks and to keep dirt from settling into the surface.

This Technical Bulletin addresses generally accepted practices, methods and general details for the use of Architectural Cast Stone. This document is designed **only as a guide** and is **not** intended for any specific application or project. It is the responsibility of design and construction professionals to determine the applicability and appropriate application of any detail to a specific project based on professional judgment, specific project conditions, manufacturer's recommendations and solid understanding of product characteristics. The Cast Stone Institute makes no express or implied warranty or guarantee of the techniques or construction methods identified herein. Technical references shall be made to the edition of the International Building Codes for the location of the structure, the latest edition of the TMS 402/406 Masonry Standards document and TMS 404, 504, 604 Standards for Design, Fabrication and Installation of Architectural Cast Stone.

The Cast Stone Institute (CSI) is a not-for-profit organization created to advance the design, manufacture and use of Architectural Cast Stone. To further this goal, the CSI continually disseminates information to targeted construction industry audiences through presentations, programs and technical publications.

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