

CODE

of lightweight concrete, if applicable, and requirements for hole drilling and preparation.

COMMENTARY

- (a) Acceptable anchor installation environment (dry or saturated concrete; concrete temperature range)
- (b) Acceptable drilling methods
- (c) Required hole cleaning procedures
- (d) Anchor type and size range (threaded rod or reinforcing bar)

Hole cleaning is intended to ensure that drilling debris and dust do not impair bond. Depending on the Manufacturer's Printed Installation Instructions (MPII), type of qualified anchor, and on-site conditions, hole cleaning may involve operations to remove drilling debris from the hole with vacuum or compressed air mechanical brushing of the hole wall to remove surface dust, and a final step to evacuate any remaining dust or debris, usually with compressed air. If wet core drilling is used, holes may be flushed with water and then dried with compressed air. Compressed air must be free of oil and moisture. For anchors installed in locations where the concrete is saturated (for example, outdoor locations exposed to rainfall), the resulting drilling mud must be removed by other means. In all cases, the procedures used should be clearly described by the MPII accompanying the product. If the installation procedures are not clearly described, contact the manufacturer. These printed installation instructions, which also describe the limits on concrete temperature and the presence of water during installation as well as the procedures necessary for void-free adhesive injection and adhesive cure requirements, constitute an integral part of the adhesive anchor system and are part of the assessment performed in accordance with **ACI 355.4M**.

- (j) Identification of adhesive anchors installed in a horizontal or upwardly inclined orientation to resist sustained tensile loads.
- (k) Identification of adhesive anchors requiring proof loading in accordance with **ACI 355.4M** or the inspection program established by the licensed design professional.
- (l) Specify certification required for installers of adhesive anchors including adhesive anchors that are installed in a horizontal or upwardly inclined orientation to resist sustained tensile loads.

R26.7.1(l) Adhesive anchors are sensitive to installation orientation. This sensitivity, combined with variability in strength of adhesive anchors subjected to sustained tensile loading, requires installation by certified installers. Certification may also be appropriate for other safety-related applications. Installers can become certified through testing and training programs that include written and performance examinations as defined by the ACI Adhesive Anchor Installer Certification program (**ACI CPP 680.1-17**) or similar programs with equivalent requirements. The acceptability of certification other than the ACI Adhesive Anchor Installer Certification should be determined by the Licensed Design Professional. In addition, installers should obtain instruction through product-specific training offered by manufacturers of qualified adhesive anchor systems.

An equivalent certified installer program should test the adhesive anchor installer's knowledge and skill by an objectively fair and unbiased administration and grading of a written and performance exam. Programs should reflect the