Building with conscience.

Technical Hotline

EIFS Finishes for Insulating Concrete Forms (ICFs)

ICFs have become a very popular method of construction because of their strength, thermal insulation properties, and speed of construction. ICFs are foam plastic forms for concrete that take the place of traditional forms in concrete wall construction. They are generally sold as blocks with two foam plastic faces and metal or plastic cross-ties that hold the opposite faces together. By stacking ICF blocks, installing steel reinforcement at designated locations, and pouring concrete in the core between the two faces of foam plastic, a structural load bearing wall system is achieved.

The first generation of ICFs had the cross-ties exposed on the outer surfaces of the blocks and were unsuitable for direct application of EIFS finishes because the cross-ties on the face of the foam were bond breakers and thermal bridges. As such they would potentially cause delamination or discoloration of the finish. Today most ICFs have the cross-ties embedded in the foam plastic. Thus, the exterior foam plastic surface is considered to be a candidate for the direct application of EIFS finishes (base coat, reinforcing mesh and finish coat). However, several potential issues should be considered before making this decision.

Building Code Requirements

Chapter 6, Wall Construction, and Chapter 7, Wall Coverings in the 2021 IRC (International Residential Code) recognize ICF wall construction and should be consulted for prescriptive construction and wall covering requirements. EIFS is also recognized in Chapter 7, although no explicit recognition is given for application of EIFS finishes to ICFs. In some cases, ICF manufacturers or EIFS manufacturers have evaluation reports published by model code evaluation services such as ICC Evaluation Service or Intertek SpecDIRECT that recognize EIFS or EIFS finishes for use over ICF wall construction. These reports should be consulted before commencing construction with ICFs to understand how they must be used to comply with the applicable code.

Possible Effects of Water in Concrete

Freshly poured concrete has a substantial amount of water in it, some of which will leave the concrete by diffusing as water vapor through the foam plastic insulation. The joints between ICF blocks will permit a greater rate of diffusion than the area immediately adjacent. Any finishes applied over the surface may therefore suffer a discoloration at the ICF joints as a result of latent moisture movement that can cause an uneven weathering of the finish. If liquid water seepage occurs through the wall to the exterior, soluble materials from the concrete may leach through the coating and result in surface

deposits and staining of the coating (efflorescence). Furthermore, concrete will cure slowly and retain moisture within the ICF form work for an extended period. Cool and/or damp weather further slows the rate of cure. To minimize the risk of adverse effects on the EIFS finish, measures should be taken to protect concrete from moisture infiltration during construction, and the cure period should be extended well beyond the typical 28 days before applying any EIFS materials.

Planar Irregularities

ICFs may have planar irregularities as a result of poor alignment of forms or other surface irregularities inherent in the ICFs. Such irregularities may not be able to be corrected with thin surface coatings such as EIFS finishes.

Proximity of Cross-Ties to the Foam Surface

In some cases, the cross-ties, although embedded within the foam plastic, are very close to the outer surface of the foam. When the surface of the foam is rasped in preparation for the application of EIFS base coat/mesh and finish coat, the cross-ties can be exposed. As in the case of exterior cross-ties, proximity of the form ties to the exterior can cause delamination or discoloration of the finish.

In light of these substrate limitations, Sto Corp. recommends a minimum 1" (25mm) thick Sto EIF System over ICFs as the best means of finishing the ICF wall surface. If the design or construction professional chooses to directly apply Sto base coat/mesh and finish coat, he/she should carefully review the issues described above, and contact the ICF manufacturer for any special construction requirements to resolve such issues. In either case acceptance of the proposed application should be verified with the local code authority.

Will Sto Warrant its Products When Used over ICFs?

Sto will provide its standard StoTherm® ci system limited warranty when the full system – air and water-resistive barrier, minimum 1-inch (25mm) insulation, base coat, reinforcing mesh and finish coat – are applied over the ICFs.

Sto will provide its standard limited product warranty for direct application of base coat, reinforcing mesh, and finish coat over ICFs. Please note, the Sto warranty does not provide a remedy for telegraphing of form joints, telegraphing, cracking or delamination at form cross-ties, planar irregularities in the wall, nor any other conditions of the substrate that affect the aesthetics or performance of the finish.

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