

ICF Containment White Paper

Education Information For Builders, Architects' and Building Owners

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All-Terior Systems, LLC (ATS) has identified and resolved a problem that has plagued the Insulated Concrete Form Industry (ICF) since the beginning. The ICF Industry has achieved great traction in the commercial market over the last ten years. ICF's conform to new standards being released to improve the energy efficiencies of government, commercial and residential structures. The simple designs of ICF blocks enable project managers to shave months off projects compared to traditional construction methods, while building sustainable GREEN structures. The superior insulation value and structural advantages allow ICF manufacturers and contractors to assemble and pour large structures quickly.

Due to the width of ICF forms, window and door jambs create a unique challenge to architects, contractors and homeowners. Often times the very customer ICF manufacturers target lose sight of the benefits offered them because of the inferior "Wooden Bucks" used today. Wooden bucks are used to support openings and generally consist of a treated lumber frame with supporting members to create structural integrity. On most forms, window and door openings can be end capped with a 2x12 of treated or sealed lumber. The wooden buck solution also requires additional lumber to attach the 2x12s onto the embedded studs of the ICF forms, containing the concrete throughout the crucial hours during and after the pour. This wasteful solution to a complex problem is both time consuming and costly, requiring many additional support members, which will be disposed of upon completion. Unfortunately, the wooden buck solution can cost nearly as much as typical construction projects like most traditional stick built homes today.

Additional problems become evident attempting to efficiently connect the wooden bucks into the concrete pour. Many contractors and architects view the ICF construction solution as unacceptable due to the limitations of the lumber spanning large openings. In most municipalities "Wooden Bucks" prevent ICF Construction from being used in commercial buildings. Often wooden bucks are poured and then removed from the structure after the concrete cures. Due to moisture content many openings can't be finished for up to 45 days after pouring the concrete. Additionally wooden jambs are very impractical in states like Florida that have termite infestation at an all time high.

Over the last few years several companies have attempted to resolve the issues surrounding ICF penetrations. Several ICF companies simply install a piece of EPS foam into the opening creating a containment seal for the concrete. With maximum bracing this provides containment but does not address connection issues with finishes or provide any fortification of the opening. Other options include plastic or vinyl lumber systems designed for ICF bucking. These systems usually are comprised of extruded vinyl consisting of three or four hollow chambers about 1.5 inches thick and ordered to a specific width, allowing proper alignment to a manufacture specific ICF block. These extrusions have a containment lip to keep them aligned over the ICF block. After cutting these extrusions to length plastic connectors are used to attach corners together. Most of these systems require a wood or custom bracing solution that is screwed or nailed in place for the concrete pour.

Although this concept has reduced many of the issues surrounding ICF bucking, several key points need to be addressed. Air infiltration; the hollow areas of the vinyl are not sealed and allow air to travel from the exterior to the interior. This changing air temperature can create a condensation area internal to the ICF wall. During extreme weather, temperature changes can affect the strength of the vinyl and cause cracking or attachment systems to become compromised. Security can be compromised due to the weakest link design of this type of system and fire ratings are virtually nonexistent.

Steel bucking solutions have recently appeared in the ICF market place. Many considerations need to be looked at when choosing this type of containment system. The type and gauge of steel determines the strength and life expectancy of a penetration. Stainless Steel is the best option but not financially practical unless exposing the bucking in a lab or hospital environment. Galvanized steel is very practical having a good price point and characteristics desirable for this type of application. A zinc coating is applied to the steel during the manufacturing process that protects against corrosion and eliminates the requirement to paint the steel. Some types of galvanized steel can be painted for aesthetic reasons if exposed. Cold rolled or mild steel is the lowest cost steel however it will red rust faster and requires a coat of paint usually primed from a factory after assembly, with finish coatings applied in the field. Steel sheet goods are measured in gauge. Gauge is a universal standard which determines each steel products thickness, tensile strength and establishes weight. When bends are put in sheet goods they achieve different strengths and characteristics for the applications they are designed for. When steel bucking is used several factors need to be considered. Concrete corrodes and can deteriorate steel over time, it should be either painted or have protective characteristics. Thermal transfer can be an issue if steel is exposed to the elements on either or both sides. To reduce thermal transfer the steel should have protective coatings or be contained with additional finishes.

With the recent demand for more efficient buildings unique designs and large structures are creating new situations for containment of concrete in ICF's. These blind walls and raised parapet applications can be very costly and time consuming for contactors and customers. Any of the applications stated above could be used, but many times failure during the pour or when attaching exterior finishes present problems.

When topping an ICF wall wood is the most common choice, installed with J-bolts, wood is typically installed after the concrete has cured. This sill plate becomes that attachment point for roof trusses and parapet caps. Bolting wide lumber on the centerline makes it vulnerable to cracking and warping.

All-Terior Systems, LLC has designed a solution with all the above problems in mind. The founders have also taken in consideration the difference in abilities from the Commercial Union Contractor to the average homeowner builder. The components of the JAMB-it-ALL™ system can be assembled on site or custom ordered and shipped ready to install. Our revolutionary design will change the way municipalities and architects consider and even support the use of ICF construction for residential and commercial structures.

All-Terior Systems, LLC has invented a product suite marketed as JAMB-it-ALL™. With a versatile multi piece design and adjustable width capabilities, this system is becoming the perfect solution for all ICF manufacturers and block types. Our solution can be used with any width form and any shape of opening. JAMB-it-ALL™ has been designed so it can be manufactured with any material such as Metal, Aluminum, Alloys, Plastics and even Ceramic Fiber. The components can be cut with standard construction tools and methods and assembled on or off job sites. With its multi piece design each section can be installed to any length, with standard lengths of 10 and 12 foot and connection joints providing for easy assembly. On the most common ICF forms, 7 to 15 inches wide, JAMB-it-ALL™ will be comprised of two Edge Jamb (EJ-10x). For assembly the EJ-10x's are screwed together at the required width using a gasket as a thermal break. These sections will be used for each vertical or horizontal section of penetration or containment area. Using the Edge Jamb Corners (EJC-10x), we can assemble penetrations to any shape or design. Each EJ-10x section has an integrated series of tabs allowing the contractor to swiftly attach JAMB-it-ALL™ to the rebar structure installed in the ICF walls. Provided 24 inch galvanized wire ties are used to connect this tab design into the structure itself. In most door and window openings a fastener on each piece staggered every six inches will contain the concrete surrounding the penetration using minimal bracing. Each edge piece will have a two-inch or greater return on the side eliminating the need for additional containment strips, labor and wasted material on the job. When pouring windows an inspection plate or adequate removable section provides a location to vibrate or pump concrete under the sill. This section is reinstalled with a few screws and the pour is continued. When the overall width of the ICF form exceeds 15 inches a third piece can be used with dual fasteners for connecting to rebar. This provides four connection points spaced correctly to support the weight of the concrete pour. Additionally the piece has structural shaping for creating a beneficial connection point down the center of the JAMB-it-ALL™ opening. The standard design provides an interior and exterior stop for installing windows, doors and commercial finishes.

JAMB-it-ALL™ is designed and constructed for most applications from 20 gauge G-60 galvanized American steel. These systems and methods provide secure, fortified, energy efficient penetrations in ICF structures. JAMB-it-ALL™ addresses all of the connection and containment situations realized by the ICF industry and many that not yet been mentioned. Using our entire suite of products including the Universal Top Cap (UTC-300) we can secure and fortify the entire envelope of your ICF project. JAMB-it-ALL™ enables contractors to install standard doors and windows from any manufacturer within days of pouring the concrete. Store front glass can be installed quickly and efficiently with an integrated stop exceeding code requirements. Contact All-Terior Systems, LLC for a complete list of solutions prior to starting your next ICF project.