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Hello Readers,

As we approach the end of the calendar year, we want to turn our focus towards breaking down barriers that are limiting the growth and acceptance of modular construction. One of these barriers is the reluctance of the general contractor (GC) community to embrace this process.

This reluctance is not baseless, however. Virtually every aspect of the construction industry was developed with the assumption that the project would be built “onsite.” From procurement, financing, legal considerations, insurance, and subcontractor relationships, everything is written from a site-built perspective.

In this issue, we feature an article addressing contractual considerations between a GC and modular manufacturer. We also spoke with several traditional GCs who have made the switch and now utilize modular construction on their projects.

Lastly, if you are interested in learning more about this industry, we encourage you to join our association or purchase our industry annual statistical reports. MBI has compiled the most comprehensive data available on the commercial modular construction industry in North America. Information about these reports can be found in this publication or on MBI’s website at modular.org.

We want you to consider the MBI is the trusted source and voice of the commercial modular construction industry.

Sincerely,

Devin Duvak

Devin Duvak, Indicom Buildings, Inc.
Chair, MBI Board of Directors
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Amazon invests in a prefab module supplier

Los Angeles-based Plant Prefab targets single- and multifamily construction.

September 25, 2018, John Caulfield, Senior Editor, Building Design & Construction

A fund controlled by the e-commerce giant Amazon is among the entities that invested a total of $6.7 million in the latest round of financing raised by Plant Prefab, a design and prefabrication company with a 62,000-sf factory in Rialto, Calif., which since May 2016 has produced modules for custom single- and multifamily homes.

The sources for Plant Prefab’s Series A funding included Amazon’s Alexa Fund, which provides up to $100 million in venture capital to support voice technology innovation. “Plant Prefab is a leader in home design and an emerging, innovative player in home manufacturing. We’re thrilled to support them as they make sustainable, connected homes more accessible to customers and developers,” stated Paul Barnard, director of the Alexa Fund.

Plant Prefab, which was founded in 2015, claims to be the first home factory in the U.S. that’s focused on sustainable construction, materials, processes, and operations. It also asserts that its patented building system reduces construction time by 50 percent, and construction cost by between 10 percent and 25 percent in major cities.
Initial MBI European Council Meeting a Success

About 25 modular industry representatives attended MBI’s first in-person European Council Meeting. The meeting was held at the Technical University of Munich in Germany, with Professor Thomas Bock serving as host. Professor Bock is the Chair of the University’s Building Construction and Robotic Department.

MBI’s Board of Directors created the European Council to gain further input and engagement from the modular industry in Europe. One participant stated, “My sense is that the industry in Europe is both nascent and fragmented, and that there’s a great opportunity for MBI to become the umbrella organization for the continent and to facilitate collaboration and learning initiatives between like-minded firms across Europe and between Europe and the US.”

The meeting featured six speaker presentations followed by a tour of the University’s robotics laboratory as well as an opportunity for the attendees to network with one another. According to MBI’s Business Development Director Dave Sikora, “the meeting was a great opportunity to get feedback from members and prospective members of MBI as to how the association can best serve the needs of the industry in Europe. We are looking forward to working with this council to help grow the industry in this region.”

If your company has business interests in Europe and you want more information about this council, contact MBI at info@modular.org
Tallest Modular Hotel Tops out at 20 stories in New York City

The modularly-constructed citizenM Hotel recently opened its doors, and opened some eyes as well. Topping out at 20 stories, this project is now the tallest modular hotel in the world. The hotel, located at 185 Bowery, consists of 300 identical modules fabricated from Polish modular manufacturer PolCom. Designed by Stephen B. Jacobs Group, the new hotel is citizenM’s first in the U.S. to use a prefabricated construction system. Don’t expect this record to stand for long.

DMD modular, another Polish modular manufacturer, recently signed a deal to produce the modules for a four-star AC Hotel by Marriott with 25 floors designed by Danny Forster & Architecture. DMD’s CEO, Ewelina Woźniak-Szpakiewicz will be on hand at the Offsite Construction Expo at the Javits Center on December 14th to present her case study of this project.
MBI’s 2018 Permanent Modular Construction Report Now Available

The interest level for modular construction has increased over the past year, driven largely by a lack of skilled labor and high housing costs. MBI has compiled the most comprehensive data and analysis on the North American commercial modular market including regional production and capacity, market share, design considerations, market drivers, the approval process, and definitions. Overall market share for commercial modular construction increased slightly from 3.18 percent for 2016 to 3.27 percent in 2017.

The Modular Building Institute (MBI) is trusted source and voice of the commercial modular construction industry for more than 35 years. Additional information about the North American commercial modular construction industry can be obtained in MBI's PMC Annual Report which is free for MBI members and available for nonmembers to purchase at modular.org

MBI’s 2018 Relocatable Buildings Annual Report Now Available

Demand for relocatable buildings increased in 2017, as demonstrated by the 77.3 percent overall utilization rate, up from 70 percent in 2016. Revenue mix was generated from roughly the same market segments with about two-thirds of the industry revenues coming from relocatable classrooms and construction site offices.

Customers in all these markets will continue to utilize relocatable buildings for their speed, flexibility, practicality, and cost. To obtain more detailed information about the relocatable building sector, including regional analysis, business operations, depreciation, building code requirements, and fleet values, contact the Modular Building Institute. This report is free for MBI members and nonmembers can order the report at modular.org
Making the Leap: From Traditional GC to Modular Builder

The Modular Building Institute estimates there are about 250 modular manufacturers in North America accounting for slightly more than three percent of all new commercial construction starts. With the construction industry gaining momentum, traditional general contractors (GCs) are not finding the labor needed to meet demand.
That’s one reason we are seeing more traditional contractors making the leap and turning to modular construction. In some cases, GCs are contracting with modular manufacturers on “hybrid” projects that incorporate the best of modular and site-built processes. In other cases, contractors are establishing their own prefab divisions as a hedge against this labor shortage.

PCL Constructors, one of the largest general contractors in North America, created its “Agile” division about three years ago to move into the modular construction industry. MBI wanted to find out what drove PCL to this decision.

According to Terry Olynyk, Director of Business Development for PCL Constructors, “The world of construction is rapidly moving towards the digital age and with that [so is] industrialized construction. PCL did not want to stay on the sidelines while this paradigm shift is occurring and wanted to lead the market by being the first fully integrated general contractor with its own modular factory.”

PCL’s strategy when approaching a project is to first ask how much of the project can be built offsite. “Our end goal is to target scopes that reduce the project critical path and gain us valuable time,” Olynyk said. He continued, “Another consideration is the complexity of the scope and challenges we have with hours of work, work location, available sub-trades to perform the work, geographical area. We then assess these constraints against our ability to ship the volumetric spaces and the associated costs. With advanced digital tools combined virtual models we are getting better at decoupling spaces and finding advantages with modular.”

Anthony Zarilli’s transition took place more than 15 years ago while building homes in New Jersey. According to Zarilli, he knew modular home building had the potential to change the future of new home construction when he first started researching it.

It all started when Zarilli, while working alongside his father constructing custom “stick-built” houses, saw an article about modular homes which piqued his interest. After visiting several modular plants and receiving approval to build, he ordered his first modular home. Zarilli set the home in Point Pleasant, New Jersey by himself, and because his real estate agent wasn’t quite sure how to market a modular home, he decided to sell it himself.

Once the home sold, Zarilli repeated the process, but this time in Point Pleasant Beach. While working on that project, people started to take notice. Before he knew it, Zarilli was being asked to build modular homes for others.

“I went from building four homes per year to eight to 12 and it just kept on growing from there,” he said. “That’s really how it all started.” Today, Zarilli Homes is expanding into new markets such as multifamily.

Making the move to modular construction is not without some challenges. Every aspect of the construction industry is considered from the perspective that the materials and labor show up on a specific site and work begins there. Moving construction to an offsite location requires greater coordination and communication among all parties. Everything from insurance to legal consideration to payment schedules need to be discussed and agreed upon in advance (see article on page 19 for more details).
MBI is actively working with other organizations to address many of these site related barriers, including providing more resources in the building codes, a design guideline for architects, and a standard contractual language between general contractors and modular manufacturers.

Chicago-based Skender recently announced plans to open a new Skender Manufacturing facility that will assemble modular building parts for senior housing, multifamily, healthcare, and other commercial buildings in the Windy City. Manufacturing will begin as soon as this November.

Baltimore-based general contractor Whiting-Turner has a history of delivering successful modular projects including student housing and hotels. The company touts “prefab and modular” as part of their corporate expertise now. According to their website, “Prefabrication of building systems and components is made possible by the accuracy of the digital submission process. This saves costly rework; reduces waste, installation time and onsite labor; and significantly enhances quality and safety.”

But for many contractors, it’s simply a matter of time before this process is mainstream. Olynyk sums it up this way, “design tools and materials have greatly advanced over the past 20 years. The construction industry has been building the same for over 100 years and is about to change. A significant skilled labor decline has started in North America coupled with the rising cost of labor and productivity falling. The construction industry will soon be forced to look at alternatives that will keep the projects on track. We will soon realize a cost shift where onsite “stick-built” becomes more expensive than modular construction. Lack of construction labor, quality concerns, and project certainty with modular solutions will force the construction industry into a long overdue change.”
Carpenters’ Union Embraces Factory Built Housing to Address Labor Needs in Northern California
“We don’t have a labor shortage, we have an opportunity shortage,” said Jay Bradshaw, Director of Organizing for the Northern California Carpenters Regional Council (NCCRC). Not everyone agrees that the construction industry suffers from a labor shortage. NCCRC represents 37,500 members in 46 northern California counties and feels that labor availability is not the issue. “We have people who want to work, but with housing costs in the area, they are driving three hours to get here because they can’t afford to live in this region,” Bradshaw said.

Labor unions negotiate for higher wages and benefits for workers; higher wages, some argue, lead to higher construction and housing costs; which leads to fewer local available workers; which leads to higher housing costs. The cycle repeats continuously.

NCCRC has decided to address the issue head on – and in a manner not commonly employed by trade unions in the past. The carpenters group felt that it wasn’t in their members’ best interest to try to fight the move towards modular and offsite construction practices, as other trades have done in the past.
“We have a culture and a philosophy at the Carpenters of NorCal that when technology advances happen, we don’t try to fight it,” he says. “We want to be part of it, embrace it, support it, to stay viable in the industry, and to create more opportunities for our members. Not every organization takes that tactic.”

But at the same time, the assembly line manner of construction tasks in a modular factory just didn’t neatly fit the traditional separation of trades, tasks, and wages that are common in organized labor agreements. Bradshaw continued, “Can you imagine if we built cars like this? Materials showing up in a driveway and multiple trades working on their specific part of the project. We’d end up with cars each costing about $800,000! We want to create good middle-class jobs while also trying to add to the inventory of affordable housing or everyone.”

So, NCCRC created what is called a “wall-to-wall contract” with modular factories. The idea is that the workers would be trained to do all aspects of the work, including electrical and plumbing, not just carpentry. And all the work in the factory would be covered by the carpenters’ union.

With a team of 35 full-time recruiters, NCCRC has been successful by targeting underserved populations in the construction industry such as women and minorities. But it’s not just the recruiting that makes this union successful. NCCRC trains its members at a facility near the two factories it currently represents, Factory OS and RAD Urban, each employing about 100 workers.

While the pay rate in the factory is lower than in the field, NCCRC still sees the benefit of this structure. “We’re elevating folks that don’t have opportunities and we’re going to help solve the housing crisis in Northern California,” says Bradshaw. He sees this new technology (modular) as a way to address the housing shortage by making it less costly to build. He says that when developers are able to build more, that means more construction work. Ultimately, that means more people can afford to live and work in the same area.
Contract Drafting for Modular Construction: A Modern Approach to a Traditional Craft

The construction industry has been long recognized as a challenging business. Compressed schedules, shrinking profit margins, and a host of unpredictable market fluctuations and environmental conditions can plague even the most well-planned projects. Because traditional project delivery methods are intrinsically vulnerable to each of these risks, a deliberate and project-specific approach to contracting has always been an essential tool to allocate risk and avoid, or at least mitigate, potential losses.

However, with the recent boom in offsite prefabrication and modular construction, traditional construction contracting can create the potential for ambiguities and project losses not contemplated within the four corners of the traditional contract. A failure to identify these changing risks, and adapt one’s contracts accordingly, exposes project owners, contractors and suppliers alike to a myriad of otherwise preventable liabilities. Therefore, to better protect a company’s interests in a landscape of increasing modular builds, a similarly modern approach to contracting is now necessary.
Here are a few factors to consider before contracting your next modular build:

I. Applicable Law: Common Law or UCC?

Construction contracts are typically interpreted as service agreements that implicate common law legal doctrine, while largely ignoring the fundamental reality that construction of any type requires the provision of goods, most commonly governed by Articles 2 and 9 of the Uniform Commercial Code (UCC). In other words, traditional construction contracts contemplate contractors and subcontractors as performing a service at the project site, and, from a legal perspective, provide little guidance for a modular build that arguably involves the buying and selling of goods (i.e. modular elements or “modules”) to be incorporated into the finished building.

In disputes concerning both UCC and common law, courts have applied the “Predominant Factor” test to determine which law applies. In short, if the provision of goods is the predominant factor under the contract, the UCC applies and the party to the contract is considered a manufacturer. If, however, the provision of services is the predominant factor under the contract, the common law applies and the party to the contract is considered a subcontractor.

Although each determination will depend upon the factual circumstances and how your contract is structured, provision of services is the prevailing view among courts. Therefore, unless you structure your contract accordingly, modular builders will likely be viewed as subcontractors and common law will apply.

Nevertheless, because modular construction is a hybrid transaction involving traditional construction services and the provision of modules manufactured at offsite locations, understanding the basic distinction in legal authorities is essential to avoiding potential pitfalls found in key contractual provisions. Once understood, it is easy to see why a modular build contract requires greater clarity than that which is commonly utilized on traditional construction projects.

One area of contracting that lacks such clarity in the context of modular construction is the preservation and transferring of security interests. Under a traditional construction contract, security interests are traditionally governed by the statutory lien law of the state in which the project is located. While every state’s lien law is different, they all share the same fundamental purpose of creating a statutory security interest for parties which have performed labor on, or provided materials or equipment to, a particular project. The security interest created pursuant to a lien law typically continues to run with the labor and materials after they are provided to the project (subject to statutory timing requirements) and is not extinguished merely by their subsequent incorporation into the building being constructed.

Conversely, Article 9 of the UCC extinguishes security interests in manufactured goods according to entirely different standards. Although the UCC does not recognize a security interest in ordinary building materials incorporated into improvements to real property, UCC § 9-334 does recognize security interests in “goods that are fixtures or ... goods that become fixtures.” Thus, the extent and duration of one’s security interest in modules may depend on a mutual understanding as to whether: (i) the modules constitute fixtures, and (ii) if/when the modules being incorporated into a building cease to be fixtures.

Further complicating matters, the UCC also extinguishes security interests according to the “buyer in ordinary course” standard. Specifically, UCC §§9-320(a) states, “[A] buyer in ordinary course of business...takes free of a security interest created by the buyer’s seller, even if the security interest is perfected and the buyer knows of its existence.” Designed to expedite the continual flow of commerce, if applied to modular construction, Article 9 of the UCC could strip a modular manufacturer of any remaining interest in the modules (e.g., outstanding payment) after a project owner has paid the prime contractor and incorporated the modules into finished building.
Because case law concerning modular construction is limited, the best defense to each of the above issues is a carefully crafted contract that makes clear not only the parties’ intent as to whether the UCC applies, but further provides detailed language concerning the extent of lien waivers and termination of security interests running with modules to be incorporated into the building being constructed.

II. Impact of State Law

Using a traditional or standard form construction contract on a modular build can also expose project owners and modular contractors alike to the implications of local laws and ordinances not otherwise accounted for. Failing to thoroughly review and account for the possible impact of contracting where the project and modular contractor are in different states can have significant consequences concerning both statutory and administrative law.

For example, modular construction contracts may invoke differing statutes of limitation and repose. Neglecting to educate yourself of conflicting statutes and failing to draft modular construction contracts with appropriate choice of law provisions can have potentially fatal implications on the viability of a subsequent claim. Moreover, further conflict may be found in determining which in-state statute applies if there exists ambiguity in which type of action may be appropriately brought (e.g., breach of construction contract or breach of a contract for the sale of goods under the UCC).

III. Trade Licensing Requirements, Labor Agreements, and OSHA

Application of trade licensing requirements and labor agreements can also be the source of dispute on a modular construction project. In particular, certain construction trades or labor groups with a rightful claim to certain scopes of work at one location may not apply or be recognized at the opposite site of manufacturer or installation. Failure to draft modular construction contracts according to the jurisdictional reach of applicable trade licenses and labor agreements can lead to debilitating labor disputes and/or work stoppages.

Special consideration should also be afforded to jurisdictional issues concerning worker health and safety. Specifically, parties and their counsel need to understand whether a modular manufacturing site and the project site may be subject to different OSHA state plans, or even different industry standards (e.g. 29 CFR 1926 – Construction Industry Standard; 29 CFR 1910 – General Industry Standard). It is important to understand the difference and draft modular construction contracts accordingly.

IV. Transfer of Liability and Risk of Loss

Contract drafting in the context of modular construction also demands close attention to the transfer of liability and risk of loss in the event modules are damaged or destroyed while in transit from manufacturing locale to the project site. As a general rule, if a modular builder is considered a UCC merchant (i.e. manufacturer selling modules/goods), the risk of loss passes to the buyer upon receipt. Conversely, if the modular builder is not considered a merchant (i.e. subcontractor performing services), the risk of loss passes to the buyer on tender of delivery. Other important transportation considerations include, time, and cost associated with customs and international shipping, truck weight and height limitations, storage, and insurance. Each of these considerations require thorough investigation and careful management of the risk from the point of manufacture through final delivery to the project site.

V. Delivery Issues

Delivery in modular construction does not conform to the same requirements of standard construction contracts
by requiring a Certificate of Occupancy or Certificates of Substantial/Final Completion. For that reason, modular construction contracts must establish a protocol for when and how delivery of modules is to be accepted. Any protocol concerning delivery of modules to the project site must specify survey and inspection procedures, as well as any testing, final sign-off or acceptance procedures.

Of course, the above topics discussed are only a few of the many contractual issues that could befall a prefabrication or modular construction project and offer only a prospective view of the changing legal landscape. For that reason, and because there is little precedence concerning the particulars of commercial modular construction, contractors must ensure thorough “flow-down” of all terms and provisions contained in the prime contract to sufficiently allocate the risk and avoid, or at least mitigate, any foreseeable loss. While modular construction offers the potential for great savings in time and money, it offers equal risk of loss if undertaken haphazardly.

About the Author

Ronald Ciotti is an attorney with Hinkley Allen in Manchester, NH. His practice focuses on all aspects of the construction industry, including contractual disputes, lien work, bond claims, construction design and defect claims, bid disputes, litigations and dispute resolution.
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02
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03
“GREENER, FASTER, SMARTER”
Explore the message beyond the slogan

04
NETWORK
with more than 700 builders, developers, contractors, architects, dealers and equipment/service suppliers.

05
INDUSTRY EXPERTS
cover topics like best practices, lean construction, the integration of modular and site built, passive house, LEED, net zero and more.
The project consisted of six, two-story attached townhomes to be used as a desperately needed housing solution for Yale First Nation. Each module was prefabricated at Metric Modular’s Agassiz facility and the modules were approximately 32 feet long and 14 feet wide. After bad experiences with previous onsite builders cutting corners and building poor quality homes, we were able to provide six high-quality housing units for the community. The design of the building allowed each tenant to have a private outdoor space, while still maintaining the feeling of community. As a Passive House, the building was specifically placed on site to take advantage of solar gains and area views.
To meet rigid Passive House standards, each module specification included:

- Efficient building shape – using a ratio known as the ‘Shape Factor’ (the ratio of the buildings surface area divided by its volume) the heat loss from a building envelope is minimized.

- Superinsulation – incorporation of the correct levels of insulation performance depending on the climate zone.

- Advanced windows – using triple glazed units, with two low-e coatings, argon gas fill and insulated frames and spacers.

- Airtightness – prevention of air infiltration and protection against moisture damage.

- Thermal bridge-free construction – preventing an area of the building which has a significantly higher heat transfer than the surrounding materials, resulting in an overall reduction in thermal insulation of the building. Passive House standards reduce energy costs by up to 80 percent, drastically increase occupant comfort and reduce the GHG emissions of the building by 80 percent during occupancy.

As this was our second Passive House project, we were able to save our customer money through the experience we gained during the previous project. We also utilized the three Certified Passive House Consultants on staff rather than hiring expensive outside consultants. Our experienced design, production and site teams were able to prevent building envelope issues before the modules arrived onsite. We were able to reduce the number of pre-tests and consultants’ visits, while still achieving an above average building envelope airtightness test result. We completed most of the roof construction offsite in order to reduce site work, preinstalling the exterior building envelope (siding), and pre-fabricating porch elements. Previous winter energy bills for the Yale First Nation were in excess of $250 for one month. The energy bill they received after over a month of occupancy was under $20. This on-going savings will make drastic and lasting impact to the economics of this community.
Repurposed for a Second Life: Renovated Reuse Case Study

The original 24’x64’ building was built by Modern Building Systems in 1996 to serve as daycare facility for the Northwest Regional Educational Service District (ESD) in Forest Grove, Oregon. In 2016 the building was no longer needed and donated to the local Habitat for Humanity chapter by Modern Building Systems. They purchased and removed the building at no cost to the ESD. It then was
transformed into a beautiful newly renovated daycare facility for Family Nurturing Center to expand services as a satellite campus in Phoenix, Oregon. The building now houses daycare services for 28 children and families.

The newly renovated daycare space is comprised of two classrooms, men’s and women’s restrooms, an office space, and kitchen. Modern worked with Family Nurturing Center board member and architect, Brian Westerhout to redesign the building to fit the needs and desires of the daycare. Additional walls were installed near the restroom and hallway area between the classrooms was widened to allow for greater accessibility. Old windows were replaced by large 8/0 x 6/0 premium vinyl windows to bring in more sunlight into the room. While the upgrades of marmoleum flooring and casework adds additional visual appeal throughout the building. The new exterior features include: bright custom colors of fiber cement siding and trims. Roofing and welded hollow metal doors were upgraded as well.

Materials from the original builder were used whenever possible. By utilizing the original structure as much as possible, the result was less construction and demolition waste in the landfill. Basically, the client recycled a whole modular building. A brand new high-efficient gas Bard mechanical unit was installed on the building to upgrade the building.

The Family Nurturing Center is a nonprofit that is part of Oregon’s innovative and comprehensive response to support children and families in crisis and therefore operates on razor thin budgets. Modern, long with local contractors, gave discounts and donations to help make this project a reality. By utilizing a used building and renovating it, the client saved thousands of dollars compared to a new building to the same design and specifications.
MBI and ICC Collaborate to Develop New Guideline for Modified Shipping Containers

Guideline for the Safe Use of ISO Intermodal Shipping Containers Repurposed as Buildings and Building Components

The repurposed intermodal shipping container industry is a multibillion-dollar market. There are currently more than million shipping containers in use around the world today. These containers are now regularly being repurposed and converted into International Residential Code (IRC) and International Building Code (IBC) occupancy uses. As a “building material”, the applications are widely diverse as is the extent to which the container is used as a structural building element.

For industry participants, the main drivers of this segment are as follows: availability, safety and security, strength and durability (extremely hard to damage), designed for mobility, stackable, and speed of construction or installation.

Well-intentioned design professionals, builders and owners attracted by the idea of repurposing these containers have greatly publicized their use. The positive aspects of container conversion and the greater public awareness for recycling and everything eco-friendly has generated a lot of attention.

These drivers and factors have led to a broad array of applications and therefore different industry segments. These emerging segments are categorized as follows:

- Single-unit versus multi-unit
- Temporary versus permanent

Due to benefits such as environmental friendliness, availability, strength, and/or speed of construction, these containers are now regularly being repurposed and converted into uses and occupancies regulated by the International Residential Code (IRC) and International Building Code (IBC). The applications are widely diverse as are the extent to which the container is used as a structural building material. State and local jurisdictions are now reacting to the growing trend and are slow in terms of the appropriate regulations to apply and how best to achieve a reasonable level of code compliance. A patchwork of regulations has emerged, creating...
potentially conflicting and duplicative requirements.

Despite the inconsistency at either the state or local levels, many design professionals, builders and owners have been able to demonstrate that projects utilizing containers complies with the general intent of the codes and are being approved throughout the country by code officials.

This new guideline is intended to help state and local jurisdictions—as well as owners, architects, builders and engineers— in their assessment as to how to design, review and approve such shipping containers as a building element.

To obtain a copy of the guideline, visit the ICC Bookstore here: https://shop.iccsafe.org/
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• Moisture resistant
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• Superior acoustic insulation


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The Comfort Zone: SPVU Efficiency Changes

SPVU (single package vertical unit) is a category acronym for a HVAC unit, but better known to us in the commercial modular industry as a wall mount unit. AHRI (Air Conditioning, Heating, and Refrigeration Institute) is the trade association, representing manufacturers of HVACR and water heating equipment, that certifies efficiency, establishes HVAC standards, and provides HVAC industry advocacy. AHRI provides the testing standards to determine HVAC unit efficiency, and lists the efficiency for use by mechanical engineers, state code officials, energy consultants, and all of us HVAC end users. However, be careful, “testing to” the AHRI standard is not the same as being listed by AHRI as meeting the standard. A unit could be tested to the AHRI standard and not be listed by AHRI.

On Sept 23 2019, the minimum efficiency in the United States for SPV-AC (air conditioners) will increase to a minimum 11 EER for units under 65,000 btuh cooling, and to 10 EER for 65,000 btuh cooling to 240,000 btuh cooling. SPV-HP (heat pumps) cooling will be the same as ACs and their COP (coefficient of performance) must be 3.3. These are federal regulations that the entire United States will be required to comply with. All SPVU units manufactured on or after Sept 23, 2019 will be required to meet this regulation as their minimum. All SPVU units manufactured before Sept 23, 2019 will be legal to sell, install, and use. Further all types of commercial HVAC units that fall under EPACT will have their own efficiency increase requirement.

Most of our 50 states currently have 9 EER as their minimum efficiency while a handful of our 50 states have codified 10 EER as their minimum efficiency during their most recent code cycle update. The transition for those 9 EER states to the new 11 EER minimum efficiency will see the biggest change in units and pricing.

We often hear of HVAC units rated in SEER (Seasonal Energy Efficiency Ratio). SEER is considered more of a residential rating under AHRI standard 210/240 as it takes into consideration seasonal use operation and regional zones. AHRI standard 210/240 (SEER) fall under the Dept of Energy, the National Appliance Energy Conservation Act enacted in 1987, for regulation of home appliances.

SPVUs are commercial units rated in EER under AHRI Standard 390 used for commercial and continuous operation and fall under the DOE’s Energy Policy Act (EPACT).

Both SEER and EER are rating methods like vehicle MPG (miles per gallon). What output do we get for the energy consumed. The simpler of the two calculations, EER, is how many btuh of cooling are produced per watt of energy at a specific indoor and outdoor condition.

SEER has a more complicated formula taking into consideration regional weather conditions and climate...
zones. EER data is used in the mathematical calculation to obtain SEER. We might consider a SEER to be a fluffed up EER.

An additional new term IPLV (integrated part load value) is the rating used for multi stage compressor units. IPLV is similar to an average EER based on a formula from the AHRI standards. Two stage cooling and heating units are generally more efficient because they balance the unit output closer to the building load.

Between now and Sept 2019, the SPVU manufacturers are working with intensity to upgrade their product lines to the new 11 EER/3.3 COP standard. Somewhere along the line will be current (future non-compliant) unit phase out, and new 11 EER unit phase in. Can they squeeze more efficiency out of the same cabinet size? It may be too soon to tell; however, you can be sure that needs to be the goal for fleet SPVU replacement.

This National efficiency increase should hold off most states from enacting even higher minimums on their next code cycle, however there will surely be other HVAC related changes forthcoming.

Washington state requires heat pumps with economizers for all applications except wireless cellular buildings. California will require Merv 13 filters and may have a ventilation rate change in all HVAC Jan 2020. Also, California currently requires an economizer in any HVAC unit above 54,000 btuh cooling when using the Title 24 prescriptive method. Colorado has adopted IEEC 2015 and IMC 2018 effective Jan 2019. Oh, how do we keep it all straight.

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