Metalwërks®
Architectural Plate Systems

Installation Guidelines

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1. Overview

In today's fast-paced construction environment, managing lead time expectations is a critical planning exercise for ensuring timely completion of the building envelope. The "dry-in" date must be on the critical path for project completion because delicate interior finishes and MEP components cannot commence until the team is fairly confident the interior conditions can be maintained without weather intrusion. Exterior rainscreen cladding systems must be planned as to avoid prolonged periods of exposure for the AVB component which may be prone to degradation from overexposure. Most systems need to be covered over after 90-120 days.

One of the common misconceptions we experience is the expectation that metal panels like Arcwall™, Omniplate™ and our other wall systems, are standard "metal panels" and should be treated like ordinary, mass-produced metal siding when it comes to schedule planning. In actuality, trimless, finished-edge panels like these are more similar to windows, curtain walls, and precast concrete panels, in that each panel location is precisely identified and dimensioned as it relates to the building structure, openings and adjacent systems. As such, lead times are extended to permit the custom engineering required to precisely size and locate each panel condition and transition – this is pre-engineering at its highest level of detail.

Most projects have a large percentage of custom shapes and sizes which only occur in very discreet locations on the building. These are not modular units, like plywood or corrugated siding, that can be cut and trimmed to size in the field.

One of the key benefits of post-finished aluminum plate systems is that they feature precisely-sized panel units with seamless welded and polished end conditions. In order to achieve these conditions without disrupting the project schedule, a release from approved and coordinated shop drawings is a prerequisite to project success. Those occasions where the customer waits to release production until after field dimensioning precedent trades' work tend to be fraught with animosity, finger pointing and unhappy customers. This acrimony can be avoided by deploying a collaborative coordination process that makes allowances for field tolerances, employs a well-documented dimension control plan, and holds all trades accountable for coordinating their work to this dimension control plan. Only the most professional of trade contractors regularly employ these methods. Those are the most successful and satisfied Metalwërks customers.

2. Planning and Coordination with Adjacent Trades

Quality coordination is a shared duty among all project stakeholders and is essential to a successful project. Metalwërks agrees to provide all reasonable coordination information to the customer on its shop drawings for dissemination with other trades. It is expected that our customers will exercise due diligence in facilitating coordination among the trades and with the project GC/CM. Quality coordination requires our customers to actively participate, with our staff's assistance and guidance, in this coordination program which has been designed for success.

- **Develop and maintain project wide dimensional controls for coordination with adjacent trades in conjunction with the project GC/CM.** A dimension control plan requires adequate benchmark elevations, vertical and horizontal control lines for objectively locating of floor lines, building limit lines, horizontally projecting enclosures or features, windows, doors, and other fenestrations within the building envelope. Ideally these controls should be identified on the shop drawings for all coordinating trades.

- **Prompt notice to the GC/CM on discovery of non-compliant (i.e. "out of tolerance" relative to dimension control plan) work for corrective action by the GC/CM or its other subcontractors.** The Metalwërks Contract Price is predicated on the assumption that the customer is able to release materials for fabrication, and to carry out its work, based on the dimensions and other information indicated in the Contract Drawings, "Approved" or "Approved as Noted" shop drawings. Multiple variations requiring additional custom-made panels to modify the work to accommodate non-compliant as-built, or out of allowable construction tolerance conditions can cause several types of impairments to project performance:

  1) Requires additional engineering time and costs to alter the shop drawings, often after they have already been approved.

  2) Impacts Metalwërks' ability to maintain production efficiency and could result in higher costs to the customer.

  3) Interrupting project flow will cause delays to the work resulting in extended lead times and schedule impacts.

4) Creates out of sequence work events which are disruptive to installation flow, and creates additional labor for re-rigging, layout, shakeout, deliveries, and field setups.

5) Sets the stage for back charges or claims from the GC/CM for subsequent trades for delay impacts.

6) "Delay Impacts" for the project, or adverse effects on other Metalwërks projects already in queue.

7) Can create a separate coating run or batch which may not match the original batch.

- **Areas requiring special care or field verification can be left out for production after the bulk of the adjacent areas are built.** These areas are best identified early in the design process with the Metalwërks Sales Engineer or PM to avoid excessive setup costs and delays later in the project. A planned "leave out" area is always more efficient than a last-minute change.

· It is assumed that the other related trades, upon whose work the Subcontractor's Work depends, or to which the Work must be attached, will cooperate in a coordinated effort to promptly provide their own accurate shop drawings.

If Metalwërks is required to delay release for fabrication until after the Subcontractor has field verified as-built conditions or has been directed to modify its work to accommodate non- conforming conditions, these are considered "change events" which add time, cost, and an opportunity for dissent and arguments among the project stakeholders.

3. Phasing and Identifying "Area of Work" Releases

Metalwërks' proposals identify at time of quotation what seems to be logical phasing or areas of work releases to break larger projects up into smaller, more manageable pieces of work. Design and production tasks are estimated in a "by area" or "by phase" method. Unless directed otherwise by our customer, our assumptions, which are stated in the proposal, will identify the number of production phases or releases included in the estimate. Any reasonable request can be accommodated, but breaking up the project into even smaller production releases could add setup, freight, and handling costs to the customer later along the timeline. A recommended best practice is to work with the Metalwërks project manager assigned to your project to identify areas of work and phased releases early in the design process. Even better, you should determine how many areas of work should be included in the estimate during the negotiation with the sales engineer to avoid surprises later in the project.

We don't want to plan the work for you but we do expect your participation and collaboration in planning out the timing and sequence of the work.

4. Clarification of Different Types of Releases into Production

In the business of custom-fabricated construction products, it is important to clarify the varying paths that a project can take, and identify what constitutes a release into production. The purpose of this advisory is to allow the client sufficient advance knowledge of how and, perhaps more importantly, when to release a project into production and the potential impact of waiting until a project's precedent work is completed in order to release our products. Managing the client's expectations and defining when a project is ready to release in production are essential components of professional project management.

Product lead times include the production time for the product in fabrication, any finishing and necessary engineering, and raw material lead times which can be required to adjust for non-conforming conditions – a common occurrence. It is our intent to provide the client the necessary information to plan its work and to provide flexibility for the ramifications of coordinating the work of preceding trades.

It is important early in the process for the client and Metalwërks Project Manager or Project Engineer to plan out the best option for the project being constructed. In our view there are three distinct paths which have varying impacts on a project's cost and schedule after the approval of shop drawings. We believe it is a best practice to have already identified which pathway best suits the project well before shop drawings are returned to Metalwërks. These options will be reflected on the Metalwërks drawing cover sheet to document the selected pathway. Most projects are broken down into distinct areas of work.

One or more of the following scenarios may apply to different elements of this work and should be so identified on returned documents:

1. Release from guaranteed dimensions
In this scenario, the client has an appreciation for the lead time associated with the development of shop fabrication bills of materials. Subsequently, the client chooses to release us to begin our work on receipt of approved, or "approved as noted," shop drawings. Here, Metalwërks and the client together acknowledge the risks of complying with the contract documents and our different roles:

a. Metalwërks acknowledges that it must produce product which fits around the substrate provided, allow for dimensioned openings, and work within the tolerances dimensioned and implied by specifications in the contract documents.

b. The client acknowledges that it must provide information which may be missing from the contract documents or that it may need clarification through the R.F.I. process. Until any outstanding information is available, a release for production may not have been achieved. Additionally, the client acknowledges that it must hold preceding trades responsible for correcting work which is not in compliance with the contract documents by rejecting it and having it corrected prior to the arrival of our products, or prior to mobilizing installation in that area of work.

2. Release from field-verified dimensions
The definition of a field-verified condition is that the client has checked the as-built conditions, and subsequently assesses that the work is in compliance with the contract documents and relevant published tolerances. This path is similar to a release from guaranteed dimensions, with the exception that the client wishes to delay the release to ensure that either the work of preceding trades is correctly built, or the client is not confident that the work of preceding trades will be performed correctly.
The client in this case acknowledges that the time it waits for preceding trades to complete its work will delay the release of its products and believes that the risk of waiting is less significant than the risk of producing product which may ultimately need to be replaced later. This option can take two paths:

a. After checking the dimensions of the as-built conditions against the contract documents and project dimension control lines, Metalwërks and the client together will assess whether the product can be released from guaranteed dimensions as reflected in the approved shop drawings or that the work of preceding trades is rejected and will be corrected.

b. If the work of preceding trades is not in compliance and will not be corrected, then this would be considered a change in our scope. In this case, some or all of the work is subjected to a Release from Field dimensions scenario described below.

3. Release from field dimensions:
This path is not to be confused with a "field verify" situation. These changes would require a re-engineering and drawing of the areas in question as well as potential time and material impacts depending on the nature of the changes in the work. A Change Order Request ("COR") will then be issued, ***which estimates the additional time impact to perform the extra engineering work. It also estimates a cost impact since it was assumed that the work of preceding trades will be built in compliance with the contract documents.*** In this scenario, the client acknowledges that the job will be released only after complete field dimensions have been provided by the client in a "build to suit" type of
arrangement.

Further, the client has planned for the loss of time associated with waiting for the completion of preceding trades' work in the execution of its contractual obligations. The deviations from the contract documents will be treated either as:

a. A change order due to non-compliance with contract documents with a time and money impact or,

b. They have already been accounted for in the original estimate and have been addressed in the action plan developed between the client and Metalwërks' Project Manager or Project Engineer.

5. Managing Substrates: Cold-formed Steel Framing – Minimum Thickness Required for Fastener Attachment

When large format metal panel systems are installed over sheathing supported by cold-formed steel studs, the GC/CM/ Architect must ensure that the metal framing system is properly designed and coordinated to resist the point loads imparted from a panel fastener. Quite often, we come up against construction or bid documents which show a stud gauge (18 or 20 gauge) and spacing which may be acceptable to resist the compressive loads imparted from the exterior panel system by the positive wind loads onto the large bearing surface of exterior sheathing, but inadequate to resist the negative pullout

loads applied by the panel fasteners.

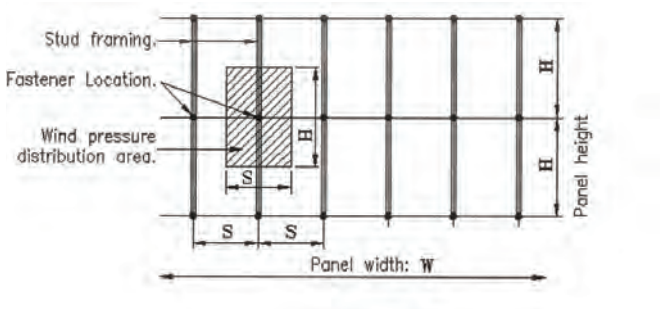
It is important to understand that panel fasteners for plate wall cladding systems are only installed at the perimeter of a panel. These panels can be very large and have surface areas up to 50 SF or larger. Unlike sheathing materials, which can have fasteners drilled throughout the face anywhere there is a vertical stud, a metal panel is only attached along its perimeter, which is usually located along either a horizontal or vertical joint. Therefore, there is a large surface area of each panel resisting the negative wind pressures applied, and that pressure is transferred to a limited number of fasteners which can only be located at each vertical stud along that panel joint. Each fastener is liable to pull out of the stud if the maximum point loads exceed the allowable resistance of fastener connection at the stud. The limiting factors to resist the negative wind loads applied therefore are:

1. **The gauge and tensile ultimate/yield strength (Fu = 65ksi / Fy = 50ksi) of the vertical stud.**
2. **The spacing of the vertical stud.**
3. **The tributary area of the panel (panel height) x the stud spacing.**
4. **The specified wind pressures in the field and corner zones of the surface to be clad.**
5. **The height, importance factor and exposure of the building areas to be clad.**
6. **All of these factors translate to a pullout value the stud must be able to resist in each area of work.**

This value provides the minimum thickness of cold-formed steel framing necessary to provide adequate length of engagement for a fastener. It must be sufficient to resist the allowable tension of the fastener used in a tension connection. This depends on the metal alloy being fastened, the allowable shear stress of the metal, the fastener size and number of threads per inch (N), the internal thread stripping area (TSA(I)), and the length of fastener engaugement (LE).

Example: a 48" tall x 12'0" wide panel can only be attached along the 12'0" dimension at 16" on center if we are assuming a typical steel stud spacing. If you multiply the typical stud spacing 1.33' (16") x 4'0" x 40 psf wind pressure, the applied load at each fastener is 212 Lbs/ea. This value exceeds the allowable 179 lb. maximum pullout load for that fastener in an 18 ga. stud according to AISI. (See Chart 1 attached)

Chart 1



Conflicting Specification Authorities: In addition to the potential for misunderstanding the design parameters of cold-formed exterior walls used behind aluminum cladding systems, there may be conflicting specification authorities, which govern performance design for the two different spec sections.

1. For example, AISI is one of the governing specifications for cold-formed metal framing specified in Division 5 of the specifications using the CSI format. The maximum panel size allowable for an 18 ga. stud spaced 16" on center is:

   a. 40" tall at 40 psf negative wind pressure.

   b. 32" tall at 50 psf negative wind pressure.

As the wind pressure increases, the maximum panel height must be decreased if the same stud gauge is used, otherwise the stud gauge must be increased.

2. When the governing specification is based on AAMA, which governs most curtain wall (Division 8) and Aluminum panel cladding (Division 7) specs, a 16 ga. minimum stud spaced at 16" on center is allowed. This body requires a higher standard than AISI to allow for field tolerances in risk of stripping out or overdriving self-drilling screws as an added safety factor. This specification covers almost all conditions we expect to encounter over studs and sheathing for a metal wall cladding system and therefore is what we recommend to architects designing exterior wall systems.

   Therefore, unless this project has a small panel size area or low wind pressures specified, common sense dictates it would be safer for all parties to use a minimum 16 ga. stud at 16 inches on center, unless the parties wish to evaluate each condition individually prior to bidding. We have the ability to perform a detail-by-detail analysis of the worst and best case scenarios after the contract has been awarded, but it is impractical to perform this analysis on each project bid.

6. Installation Guide (General Guidelines – Not Product Specific)

1. Review all approved submittals, mock-ups and shop drawings. Contact and review these with a Metalwërks representative prior to installation. Product-specific training on-site or at the Metalwërks plant is available if requested and /or required.

2. Be aware of how the Metalwërks system was released into production. (See "Types of Releases" section)

3. Install panels via job-specific shop drawing details and installation instructions shown on the appropriate shop drawing page for that particular panel system.

4. Receive / Offload material on site. Report missing or damaged panels within 24 hrs of receipt. **Do not install any damaged panels.**

5. Protect panels at all times during offload, storage, and distribution. Cover crates with tarps / plastic when stored on site. Allow for proper airflow thru crates. Store crates at a small angle to allow for accumulated moisture to run off.

6. Field check substrates using column lines, perimeter control lines and benchmarks for compliance to approved shop drawings. If non-compliant areas are discovered, please discuss and collaborate with Metalwërks. Digital images with a measurable reference point are the best remediation tool.

7. Verify if gauge of metal stud substrates (by others) are 16 gauge or thicker. If thinner, then revisions to calcs and shop drawings will be required, in addition to revisions to fabricated panels and framing. Please see section 5 for the importance of 16 gauge material required for our systems.

8. Establish layout panel grid lines and joint lines from those same datum points.

9. When removing panels from crates, lift up and out. Do not slide panels through the crates as they could be scratched or damaged.

10. Use proper fasteners and fastener spacing, embedment, and edge distance as shown on shop drawings and structural calculations.

11. Use proper tools for installation. Suggested tools include but are not limited to:

a. All necessary PPE as specifically required by OSHA and job-specific safety orientation

b. Rotating laser and PL5

c. Drill and bits

d. Nut setter and tips / bits appropriate for fastener used

e. Angle grinder and cut off wheels (only in situations where the panel finish will not be compromised)

f. Circular saw with appropriate blades (only in situations where the panel finish will not be compromised)

g. Jig saw and / or reciprocating saw with appropriate blades (only in situations where the panel finish will not be compromised)

h. 2', 4' and 6' foot levels

i. Framing square, speed square

j. Chalk box, string line

k. Painter's tape (for approved / reviewed field cuts).

l. Tin snips (Left, Center, Right)

m. Isopropyl alcohol and other cleaning solutions as recommended by Metalwërks

n. Power actuated tools and fasteners if required by detail / calcs

o. Power shears and / or nibblers

p. Structural sealants and adhesives as shown on shop drawings and / or calcs

q. Extension cords, batteries for tools

r. Tape measure, pencils, sharpies and other small hand tools as required by installer's trade

12. Use proper man-lift and hoisting equipment:

a. Boom lift, scissor lift, suspended platform (swing stage), ladder, pipe scaffold, as specific site conditions dictate.

b. Use paddings / protection on equipment to prevent panel damage.

c. Use proper fall protection as specifically required by OSHA and job-specific safety orientation.

13. In the event of a field cut panel, the procedures must be reviewed and discussed with a Metalwërks representative prior to any cutting. When cutting, panels must be protected with painter's tape at a minimum.

14. Remove protective peel coats from panels promptly. Do so after each elevation, ''equipment move'', or ''sequence'' is complete. Extended exposure of protective peel coats to the elements could result in irreparable damage to the panel finish.

15. Protection of panels by installer or follow up trades after installation is strongly recommended.

16. Field repair or touch up paint is not typically recommended. Full panel refabrication of damaged or scratched panels is typically recommended. If this is not feasible, mutually agreeable solutions can be developed between the installer and Metalwërks.

7. Metalwërks Storage and Handling Recommendations

Crating

Metalwërks products are normally crated by area of work and elevation or on floors as designated by the customer. These crates are strong wooden skeletons custom built for each portion of the load in varying sizes. These crates are normally about 4-6' wide x 10-20' long depending on the sizes needed for the project. The product is carefully stacked inside these crates with protective film interleaving to protect the panel faces from abrasion during transit. This film is intended to protect the panels during handling at the jobsite as well. Additionally, when Metalwërks produces pre-finished material, the finish is protected by the application of strippable film. The crates are strong enough for hoisting by crane using protective nylon slings placed at the transverse bracing locations or offloading by fork truck.

NEVER USE CABLE SLINGS TO CINCH THE LOADS. THIS CAN CRUSH THE CRATE AND DAMAGE THE PRODUCT.

Special crating can be arranged with your Metalwërks PM or project engineer. Be sure to mark up your project-specific packaging needs on a set of Metalwërks shop drawings for clarity of communication. See image of a typical crate in Figure 1:

Figure 1: Standard crating of Stainless Ameriplate wall panels

Econowall

Shipping and Receiving

Metalwërks normally ships its deliveries flatbed style with over-the-road trailer protection, either with removable sides and tops or, more commonly, tarpaulin covered loads. Metalwërks tends to avoid common carrier shipments in favor of dedicated loads due to a higher level of care in protecting the products. In most cases, the freight costs are prepaid and allowed, although risk of loss for the product transfers to the customer upon loading the truck at the Metalwërks factory or finishing facility. It is also the responsibility of the customer, or an authorized representative of the customer, to sign the Bill of Lading, noting any and all shortages and/or physical damage to the

panels. If you have access to a camera, we suggest taking pictures of any damage including crate numbers to notify Metalwërks as soon as possible to order replacement material.

Note: Any damage and/or shortages must be reported in writing within 24 hours of receipt of shipment. For additional information, see the Metalwërks Terms and Conditions.

Figure 2: Panels prior to loading on a flatbed- crated with shrink wrap protection prior to covering with tarps.

Offloading of trucks is performed at the site or receiving destination by the customer and is prearranged with the Metalwërks Ops coordinator for time and locations. Equipment needed is up to the customer and conditions of the unloading areas. Some examples include:

Jobsite:

- Rough terrain crane
- Tower or mobile crane with nylon slings
- Blocking for storage on the ground
- Protective tarps for outside storage with blocking on top of crates to promote air circulation around the products

Warehouse or storage yard:

- Forklift for side offloading
- Overhead cranes with skid lifters or nylon slings
- Protective tarps for outside storage with blocking on top of crates to promote air circulation around the products.

Storage:

As noted above, Metalwërks ships its goods in stout, skeletal-framed wooden crates. These crates are assembled with removable sections for taking panels individually from the crates. A screw gun is used to remove wood screws. These crates should be stored off the ground and covered. We recommend the panels stay in the crates in a safe, dry storage area until ready for moving into the work area for installation.

The protective film will protect panel faces until extraction from the crate. These crates must be covered if they are to be stored outside to protect against windblown rain and soils entering the protective layers. The covering should be waterproof, and blocking should be placed between the top of the crates and the protective layer to promote air circulation around the panels. If the protective layer becomes wet and is left on the panel faces for a prolonged storage period, it may adhere to the finished panel faces and become difficult to remove without damaging panel finishes.

IMPROPER STORAGE WILL VOID METALWËRKS WORKMANSHIP AND FINISH WARRANTIES.

For an additional fee, the customer can have the crates individually wrapped with a protective covering such as poly or vinyl film or a breathable air water barrier if extended storage periods are expected. This layer will provide added protection and ventilation, but will still require tarping for outside storage to exclude snow, ice and moisture accumulation.

Figure 3: Metalwërks crated wall panels - properly stored awaiting installation

Handling:
After removing the panels from the crate, care must be taken to ensure the panel finishes are not marred during installation. Panels are shipped with strippable film protection for prefinished panels like Econowall™. Post-finished panels will be interleaved with a microform layer. In either case, the protective film should be removed just prior to final installation. If left in place, the protective film can adhere to panel faces under exterior elements and can damage the finish-voiding of the finish warranty.

When handling the panels, care should be taken so that the finish is not scratched or scuffed. The daily use of clean cotton gloves is recommended and when handling stainless steel panels, Tyvek® protective gloves are recommended. Panels should be carried with the attachment legs oriented skyward in the same manner as they were crated. A handling plan should be discussed with your Metalwërks representative for some of the more fragile, shaped panels. Many panels can be damaged or racked out of tolerance when subjected to careless handling.

Figure 4: Improper handling of a finished panel. Never leave panel faces unprotected in storage.

Large assemblies can be produced in a unitized fashion. These assemblies can be hoisted and placed by crane. Note: Nylon slings are used to avoid damaging the finish. This method is discussed in more detail in Section 9: Unitization.

Figure 5: Large triangular shaped sunshade assembly is hoisted into place.

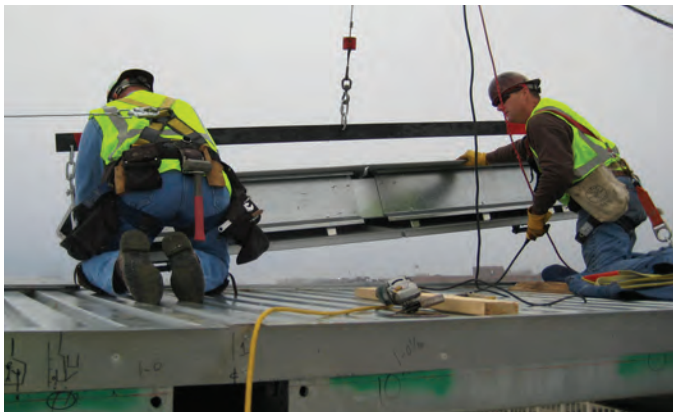


Figure 6: Unitized cornice assembly: Hoisted using wire slings slung though unfinished framing sections inside the unit.

Figure 7: Each panel or assembly is identified with a permanent ID number which corresponds to its location on the building and is coordinated in the shop drawings.

8. Product Category General Guidelines:

(Distinguish the types of systems deployed on your project. System performance requires different sorts of field treatment as reflected in the approved shop drawings and installation details.)

Rain Screen Wall Systems
A rain screen wall system is intended to act as an architecturally-pleasing shield for the building enclosure to shed the bulk of the elements away from the primary Air Water Barrier which is located at the drain plane within the rain screen wall cavity. This drain plane is located to define the exterior vs. interior of the building enclosure. Some moisture is permitted to enter the wall cavity through the system joints, but is intended to drain away on the drain plane inside the wall cavity and weep to the exterior.

There is an open cavity behind the rain screen's outer layer which allows any penetrating moisture to drain down inside the cavity and weep out to the exterior at predetermined weep points. The cavity inside the rain screen wall assembly defeats wind driven air pressure differentials and promotes drying using gravity and the air flow behind the rain screen's decorative outer leaf. A successful rain screen wall system is architecturally pleasing, flexible in design details, integrates flashing and seals to adjacent systems, weeps to drain to the exterior, and minimizes penetration of moisture and wind driven rain to the cavity. (Arcwall, Arcwall Advanced, Econowall, Ameriplate).

Barrier Wall Systems
A barrier wall system acts as the primary building seal separating the exterior elements from penetrating to the interior conditioned space. The most popular forms of barrier walls are:

a. Wet-sealed systems: Field caulked at panel joints and perimeter conditions to repel any moisture from entering the wall system. These systems are designed with dimensional joints that lend themselves to efficient face sealing between wall units. (Omniplate 1500)

b. Dry set barrier walls: Rear sealed panel units are supplied with shop or field-installed gaskets that seal on the back side of the wall and resist any moisture penetration, but without the use of field applied exterior sealants which will degrade over time. These systems require installation over a continuous substrate to allow compression between rear sealing gaskets and a network of backup flashing behind the panel joints. These systems conceal the joint seals from damaging UV radiation and the battering of wind driven rain, ice, and snow. (Omniplate 2510).

c. Other (Column and Beam Cladding, Canopy Cladding, Custom Enclosures): Building designs commonly express the building's 'bones' or underlying structure by leaving columns, beams, floor lines, and canopies exposed to view. These structural elements can be enclosed with architectural metal to create a contrasting or complementary design scheme with other elements on the building façade. As a part of its scope, Metalwërks, unlike most other wall system suppliers, regularly provides these custom-shaped and 3D components, in addition to the framing required to attach these elements back to the primary structure.

9. Unitization

On many projects, fabrication and construction of the building structure has commenced prior to the completion of the exterior façade design. Job sites, particularly in

urban centers like New York, Boston, and Philadelphia can be cramped, and extra space to lay out and stage materials prior to installation is at a premium. All trades are under pressure to top out the structure, begin the secondary supports for the envelope, get dried in, and commence interior fit out to be ready for occupancy. As a result of these pressures, the industry has adapted to accommodate modern demands on construction and onsite teams. In many cases, the solution is unitization.

Unitization can help decrease field labor costs since large assemblies and loose components are fabricated and assembled in the factory. Metalwërks can work with you to determine when this is the most economically viable construction option. Additionally, by including multiple supports and building envelope components into the unitized assembly, coordination and mitigating the risks of tolerance accumulation across multiple disciplines can be managed better, and unsafe rigging conditions can be made safer.

A unitized system is fabricated, assembled and glazed – if a curtain wall assembly - in a factory setting before arriving where it needs to be attached to the building. Anchor clips are installed on the building structure to receive pre-assembled units with pre-located receivers mounted to the façade units. These anchor clip/unit interfaces must be designed and fabricated from the appropriate materials and methods to accommodate building tolerances of the building structure, resist corrosion or degradation from the elements, align the units, and permanently affix the units while allowing for drift, live loads, dead loads and thermal expansion and contraction.

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