



CUSTOM FRP AIR HANDLING UNITS

LIFETIME CORROSION RESISTANT AIR
HANDLING UNITS WITH SUPERIOR
THERMAL PERFORMANCE, WEIGHT, AND
DURABILITY



Why Use Composites for Air Handling Systems?

THREE MAJOR REASONS:

- 1 CORROSION RESISTANCE AND LONGEVITY**
- 2 SUPERIOR LEAKAGE RATINGS AND THERMAL PERFORMANCE**
- 3 FAST RETURN ON INVESTMENT AND EASE OF MAINTENANCE**





CORROSION RESISTANCE AND LONGEVITY

1

Composite construction is significantly more corrosion resistant than even 316 stainless steel construction at a **cost competitive with 304 stainless steel.**

How much better corrosion resistance?

Since the 1950s when the use of fiber reinforced polymers began in marine construction, not a single instance of composite corrosion has ever been recorded. Mechanical components such as fans and ductwork fabricated from fiber-reinforced-polymers have been in service for decades, and have established an industry-wide reputation for corrosion resistance.

C.A.D. can provide air handling systems using an ultra-modern resin-infused fiberglass patented technology that is **factory guaranteed against corrosion for life.**

And, since the corrosion **resistance is an inherent property of the material itself** rather than a surface coating like paint, anodization, or galvanization, the pigmented composite material used in the construction of C.A.D. equipment will **never delaminate or fail even if deeply scratched.**

Compare this to the performance of 304 stainless in coastal environments, where it's not unheard of for this material -- and equipment manufactured from it -- to become severely corroded in as little as two to three years.



SUPERIOR LEAKAGE RATES AND THERMAL PERFORMANCE

The state-of-the-art assembly procedures and patented triple-sealed panel joints used to manufacture C.A.D. Air Handling Systems result in **leakage rates that are 75% to 90% less than even the highest quality custom-built metal units.**

Metal units join panels with a minimal thermal break, often comprised of only a small piece of HDPE or neoprene, and only one external caulking seal against leakage. That single seal is prone to damage when the metal expands and contracts with temperature, or flexes in everyday use. Worse, metal units typically employ metal fasteners such as self-tapping screws, which compromise the unit's air seal and create water and air leakage paths. Not to mention that any metal fastener is prone to rust over time and exposure to the environment.

Because all the components used in the assembly are non-conductive, and because we employ no metal fasteners in joining our panels, we eliminate the thermal bridging that all metal panels inherently exhibit. In place of the metal fasteners, C.A.D. joints are triple-sealed with elastomeric adhesives internally, and caulking sealant externally. This results in a far tighter, more secure, and durable joint. In fact, the external sealant visible from the outside of our units is **not even necessary for air leakage performance, and our air seal would be maintained even if all of the visible caulking were removed.**

These engineering differences show themselves in the overall thermal performance of our systems. Our equipment performs at SMACNA Class 2 leakage rates or better, while competitive units perform at SMACNA Class 6 to Class 15. Depending on the unit configuration, this can mean leakage rate as low as 1/5th of one percent. Yes, that's 0.002% leakage!

In terms of thermal performance, typical applications should see a 5 to 7 percent increase in thermal efficiency due to this reduced leakage.

A typical 30,000 CFM air handler with 75 tons capacity, a surface area of 1,240 sq. ft. and meeting SMACNA class 15 will have a leakage rate of 830 CFM at 10" w.g.

C.A.D. units, at less than SMACNA 2, will leak less than 110 CFM. This translates into over 4 tons of cooling saved at peak cooling, and even more in the heating season.



3

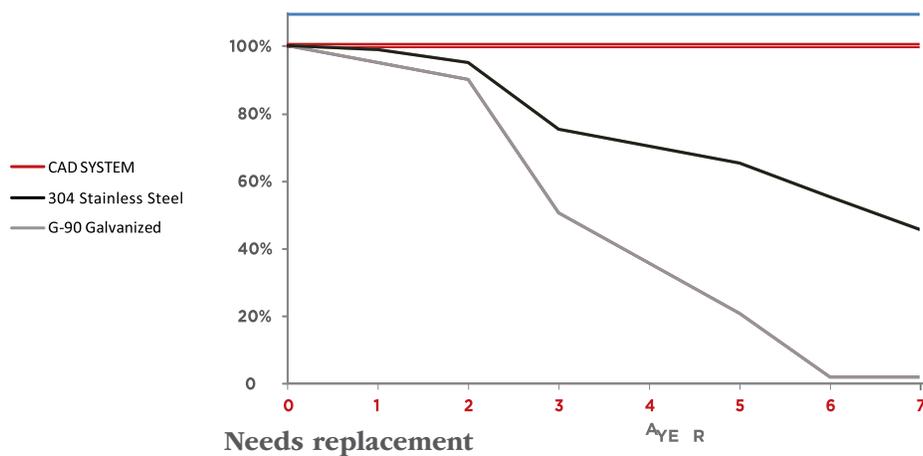
RETURN ON INVESTMENT AND EASE OF MAINTENANCE

Between increased thermal efficiency and the elimination of replacement costs, the return on investment for specifying C.A.D. systems can be as low 3 years in coastal or other challenging environments.

Because C.A.D. systems offer up to 30% weight savings vs. steel construction, specifying C.A.D. can create instant savings / ROI on construction due to a decreased need to reinforce the structure and roof of the building and/or to minimize the heavy equipment required to install the unit.

PERFORMANCE OVER TIME

Perfect condition





ADDITIONAL ADVANTAGES OF COMPOSITE AIR HANDLING SYSTEMS

Additional advantages of our composite design include:

- True no-through-metal construction throughout the entire cabinet depth for unparalleled resistance to surface condensation.
- Unlimited salt-spray resistance: FRP has over 50 years (and counting) of real-world salt spray exposure with no detrimental effects
- Corrosion resistance: C.A.D. air handlers are the only products that carry a lifetime warranty against cabinet corrosion.
- Flame Spread / Smoke Developed indices of less than 25/50 when tested according to UL 723
- Acoustic Performance: Tested and certified acoustic performance of the composite skins and cores allows the highest level of acoustic performance. Acoustic software accurately predicts the unit performance based on independently certified results from ASTM E 90 and ASTM C 423.
- UVC inhibited and anti microbial.



C.A.D. products provide benefits to every facet of the construction process:

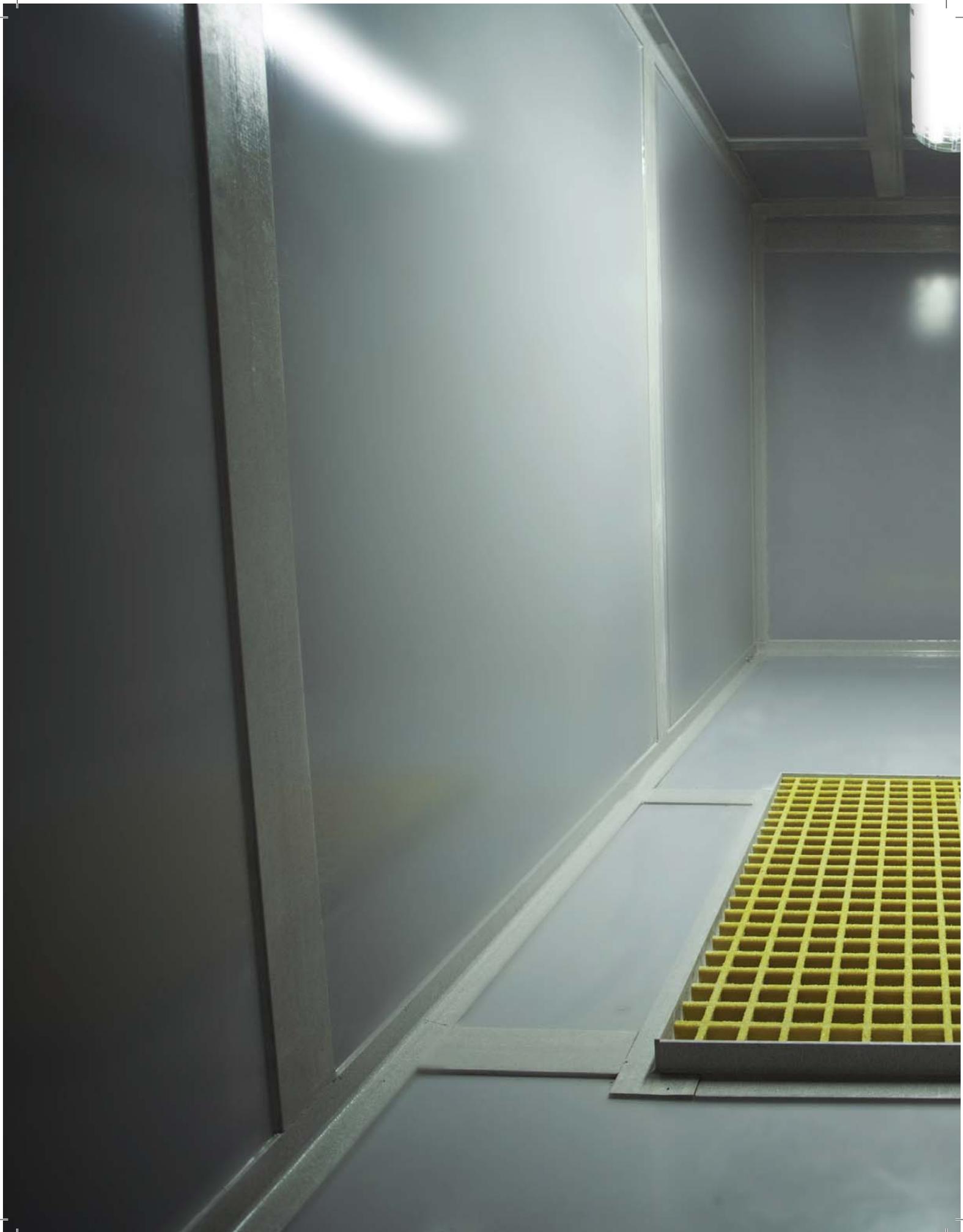
OWNERS:

The long term longevity of composite construction ensures the greatest payback on investment. Owners who are looking for a durable solution with an extended service life now have an option backed by a lifetime warranty against cabinet corrosion.

- Replaceability of components is critical for product longevity and air quality. C.A.D. air handlers are engineered so that all metal components, such as coils or filter gauges, are replaceable during routine maintenance.
- C.A.D. air handlers are constructed with true no-through-metal construction throughout the entire depth of the cabinet walls, creating

the most energy efficient cabinet with the highest possible resistance to surface condensation.

- High resistance to impact: Composite structures resist impact damage much better than steel. With our patented triple-sealed joint design, and patent-pending composite panels, the consequences of a panel breach are minimal.
- No cabinet coatings: paint, anodization, and galvanization are all surface treatments that will eventually allow corrosion to penetrate and lead to failure. C.A.D. air handlers use pigmented composite material that will never delaminate and fail as paint or other coatings will, even if deeply scratched.





CONTRACTORS:

The lightweight but ultra-strong construction often will allow smaller secondary or even mobile cranes to rig the equipment. Metal units weighing up to 30% more will often require the use of a higher capacity crane, making scheduling and rigging more costly and delaying installation.

- 3D modeling software that generates both submittal drawings and assembly drawings from the same model ensures consistent accurate dimensions. CAD/CAM manufacturing ensures the highest level of drawing accuracy.
- Resistance to denting means less field repair work and warranty claims.
- Surface color is provided by integral pigmentation of the composite, with zero risk of corrosion if scratched. No surface prep is required for field touch ups, and will not reduce the corrosion resistance of the cabinet.





ENGINEERS:

Consulting engineers can finally specify a product that provides superior durability at a competitive cost to their clients. The Engineers' customers, the Owners and Contractors, will benefit from the decision to specify C.A.D. air handling systems.

- Lightweight composite construction allows for lighter structural construction and cost, allowing significant cost savings for the building structure.
- Composite construction allows engineers to specify products that will withstand almost any chemical or harsh saline environment. Fiber Reinforced Polymers have long been used in the mining and wastewater treatment industries where even 316 stainless steel construction is not acceptable, and now C.A.D. air handlers offer the same technology for the entire air distribution system.

OUR PRODUCT

Our custom designed air handling systems are built using our patented composite double-wall panels, consisting of dual outer layers of Fiber Reinforced Polymer stiffened with structural honeycomb, and a polyurethane-insulated core.

Outer shell fabricated using our proprietary FRP formula

Honeycomb stiffener

Polyurethane insulation

Honeycomb stiffener

Inner shell fabricated using our proprietary FRP formula



These composite panels are laminated using blended resins to create air handling systems with extreme corrosion resistance, lightweight construction, extremely low leakage, and unmatched installed thermal performance.

These properties combine to offer our customers the highest quality package available, for a price that sets a new standard in value.

What About Strength and Flame & Fire Resistance?

Pound for pound, **our composite panels are more resilient than steel, more rigid than steel, and easily field repairable.** A C.A.D. air handling system is every bit as structurally sound as a metal unit. Our units carry independent structural certification and can be seismically certified for any specific application. FRP, like metal, is a structural design element with tested and certified design characteristics. All performance parameters required for structural engineering with FRP structural sections are available.

When it comes to fire resistance, we have certified our panels according to NFPA standards. The Flame Spread / Smoke Developed indices are less than 25/50 when tested according to UL 723 and ASTM E84; results which meet the requirements for building applications.

How Much Weight Can Be Saved, and How Does That Save Money?

When you specify a C.A.D. Air Handling System, you can **expect to save 10 to 30% off the system weight when** compared to a steel unit. The final weight savings depends on the unit configuration and its internal components.

For new construction, this can have a major cost savings in respect to the building structural design. In many situations, the structural savings on reduced beam size, quantity, and weight can more than offset the minimal added expense of FRP

The lighter weight of an FRP system can be advantageous in retrofit projects, where replacement equipment can be heavier or larger than the original equipment because of the requirements to meet the latest standards. FRP equipment may be a good solution to meet current codes for ventilation or energy recovery on a retrofit project where the original structure and ductwork cannot be modified.

How Many of These Systems Have You Installed?

To date we have installed hundreds of composite air handling systems, with 100% satisfaction and performance records. The C.A.D. composite technology is a fully proven and tested technology. There has never been an incidence of corrosion or any other type of failure of the FRP cabinet construction. And there never will be.

ABOUT C.A.D. CORPORATION

C.A.D. has taken FRP technology to the next level, and has become the first air handling unit manufacturer to fabricate equipment using fiber-reinforced-polymer (FRP) construction. From the fully insulated walls and floor, right down to the FRP structural base-rail, the entire structure of our equipment is fabricated using advanced composite polymers. Our patent-pending product has been tested and certified to meet all North American job site requirements.

OUR MISSION

We offer the most corrosion resistant, lightest, and most airtight Air Handling equipment on the market today, using the most advanced techniques and products available in today's high-tech composites industry.

OUR COMMITMENT

Our product will create new standards for quality and performance; exceeding all others by offering:

- The most corrosion resistant systems available, backed up by factory warranties
- The most airtight assembly in the industry
- Superior thermal performance using true no-thru-metal construction
- Independently certified to meet all performance requirements of the HVAC industry



Ilya Meldrum



Marco Giglio

ILYA MELDRUM

R&D DIRECTOR

I was a Professor of Building Systems Engineering Technology at Vanier College, having earned my Degree in Building Engineering at Concordia University in Montreal. In short, I was a building engineer, teaching future engineers how to specify, design, and work with HVAC systems. Before beginning my teaching career I spent almost two decades in the HVAC industry, leaving my position with the Carrier Corporation as Sales and Marketing Manager for Racan Carrier in 2011.

The truth about Air Handling Systems is this: there had been nothing new under the sun for almost half a century. Lots of evolutionary improvements, but nothing really revolutionary.

Then I met my future partners in Composite Air Design, who introduced me to the concept of composite construction and I knew that this WAS revolutionary. There was nothing else like it on the market and the performance was an order of magnitude better. And the fiberglass construction was basically immune to corrosion.

That's when I began learning all I could about composite construction and, due to my professional qualifications and belief in C.A.D.'s potential, I was invited on board to lead the research and development effort at C.A.D.

Since then, all of the tests we've run, the hundreds of installations we've performed, and customer reviews we have received have only confirmed my belief in CAD's ability to revolutionize the industry.

Ilya Meldrum

MARCO GIGLIO

PRODUCTION AND ENGINEERING MANAGER

I graduated from Concordia University in Building Engineering in 1996. Worked for Racan Carrier Corporation in sales, covering the greater Montreal trade area. In 2004, I was hired by Ingenia as an Applications Engineer and then promoted to Engineering Manager, where I directed and oversaw the design and manufacture of custom air handling units. During this time I created standardization of documents, improved quality control practices, and managed the development of custom air handling selection software that provided 3D scaled drawings of new systems.

I joined the Composite Air Design team as an engineering manager in 2014, where I continued to design custom air handling units, but this time in FRP rather than steel. Once I got comfortable with this new material I saw the incredible potential in FRP air handling units, I approached the owner and president of C.A.D. and asked if I could be the production manager as well as the engineering manager. For me, the two roles go hand in hand and they must work together to achieve a product that will satisfy the customer's needs.

As the engineering and production manager at Composite Air Design, I strive to create a well-engineered product, manufactured through lean manufacturing processes. This combination results in a high quality low cost product and lends itself to continuous improvement in system design, performance, and manufacturing.

Marco Giglio

Like we did, you probably have questions – the kind of questions that engineers are trained to ask. So as fellow engineers in the field, we personally invite you to send them to us, and we promise to get you straightforward, engineering-quality answers.

Because once your questions are answered, we are sure you'll end up seeing in C.A.D. exactly the potential and the benefits that we see and that we deliver to our other customers.



CONTACT INFORMATION

Contact your local Composite Air Design sales representative for more information and assistance with specifications or selections. Ensure that your investment will be factory guaranteed against corrosion for life.

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**All this at a price competitive
with 304 stainless steel.**