



Redevelopment Project by  
**QUEENSTON QUARRY**  
 RECLAMATION COMPANY LTD.  
 Niagara-On-The-Lake, Ontario

**4 Storey Manor House Project**  
 First **HIGH PROFILE** Residential  
**CONDOMINIUM** Building at QQ Site.



**248 acres**  
**High Profile**

Redevelopment Project.

**Approved for**  
**985 units**

Density PLUS many other buildings

**W**

**IPS™**  
**INTEGRATED PIPING SYSTEM**

**THE AFFORDABLE GREEN**  
**HVAC SOLUTION DEVELOPING**  
**QUEENSTONE QUARRY**  
**LEGACY.**



IPS Rep. - Ontario  
[www.absgoc.com](http://www.absgoc.com)

With Williams IPS system and product the QQ Project will have **UPFRONT** Mechanical Capital Cost Savings of 25% of Mechanical Budget after comparing with Class "C" cost estimates.



**WILLIAMS**

Almost a Century Old  
 Fan Coil Manufacturer-USA.  
[williamsapplied.com](http://williamsapplied.com)

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## History:

Queenston Quarry is located on the Niagara escarpment and was one of the three largest limestone quarries of Canada until stone operations ended in 1978. Its stone was used for years to build many important buildings around Canada.

## Redevelopment

### Project:

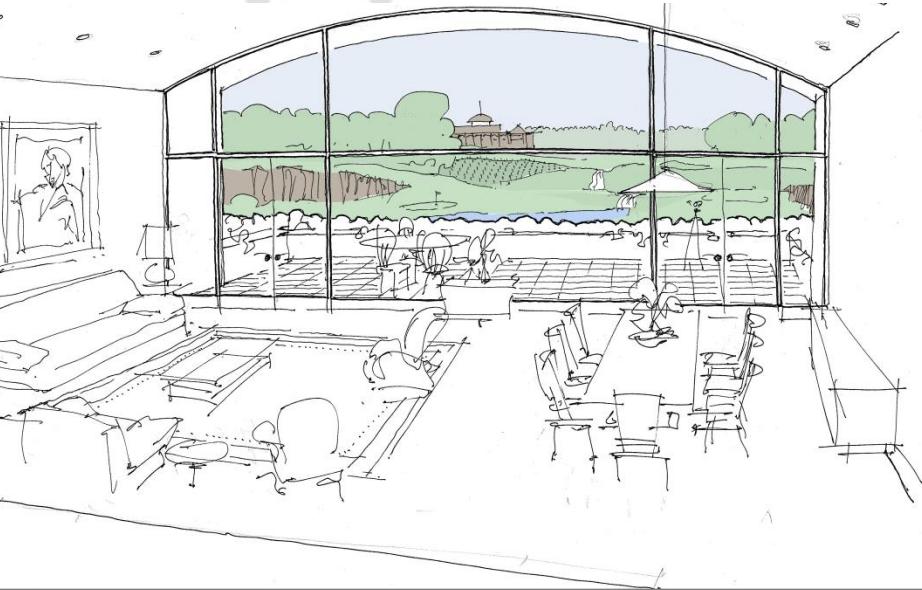
Queenston Quarry will be redeveloped in coming years by Queenston Quarry Reclamation Co., into condominiums, a resort, a golf course, a winery, equestrian fields, and a beach, among other things.

Queenston Quarry current property boundary is around 248 acres and the entire project is approved for 985 units of density plus many other buildings.



QUEENSTON QUARRY  
RECLAMATION COMPANY LTD.

sees merit in IPS Technology.



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# TARGETS HVAC EFFICIENCY.

Tight budgets, increasingly strict environmental regulations and an appetite for innovation have created the ideal conditions for a fresh look at cooling & heating systems. If you haven't yet worked with INTEGRATED PIPING SYSTEM (IPS), there's a good chance you will in the near future.

Williams introduced IPS concept in year 2000, since then it has been installed in over 130 projects in the United States & Canada from Salt Lake City, Utah, British Columbia to Edmonton City of Alberta, which is where it started.

Lauded for its energy efficiency, low capital cost and low maintenance post-installation, it's a technology that more & more builders are considering, including the team that built high

## HOW IPS WORKS

IPS™ is a TWO in ONE mechanical system uses domestic water as thermal refrigerant which provides dual function – Domestic water for personal use and Space heating & cooling. The core of IPS™ & its energy efficiency is central plant advantage, Williams IPS fan coils & TWO IN ONE distribution piping system where every gallon of water used by the resident saves energy.

As we know traditional standard 4-pipe fan coil systems require domestic cold water, domestic hot water supply, domestic hot water return, heating water supply, heating water return, chilled water supply and chilled water return for a total of seven pipes. 2-pipe fan coil systems require five pipes; domestic cold water, domestic hot water supply and return – space heating water supply and return. In the cooling season, the heating pipes "changeover" to chilled water. Radiant baseboard systems have five pipes. Water source heat pumps have five pipes. Variable refrigerant adds refrigerant piping and controls plus the cost of electrical.

The Integrated Piping System (IPS™) adds a single pipe for a total of four pipes; a domestic hot water supply & return, along with a domestic cold water supply & return.

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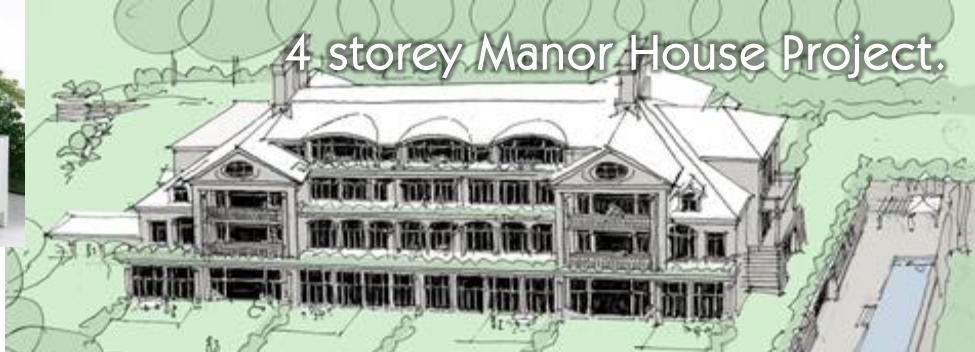


profile "THE DOCKSIDE GREEN COMMUNITY" project in Victoria, BC and now **QUEENSTON QUARRY** team sees value too in IPS technology.

QQ first proposed development comprises a 4-storey condominium building of approximately 59,910 sq. ft floor area with 2 levels of underground parking (33,000 sq. ft) and an outdoor pool. There will be a total of 33 suites in the first building.

This project will be design by ABS team. The project features suite heat recovery units, central geothermal water to water heat pump system integrated with UL & CSA approved domestic water compatible Williams IPS fan coils in each suite to provide space heating & cooling. The Central system will provide approximately

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70 tons of cooling & 1000MBH of heating by an outdoor horizontal geothermal field. Condensing boilers of 1500MBH capacity will be provided to heat up the make water replaced in domestic hot water system & only provide space heating in shoulder seasons, if required. All main pumps will be equipped with integral VFD's, sensor & controller which will control speed of the pump in the event of changes in fluid pressure across pump.

In this project, IPS was chosen because it offers more usable floor space as it require less equipment & piping resulting lower installation cost, fast construction & less system commission time due to less labor required. Other benefits include higher system efficiencies, heat recovery & economizer free cooling (**Reduce, Recycle & Reuse**), considerably low carbon emissions, low maintenance costs & most importantly quiet operation.

In Manor House Project the IPS fan coils will be equipped with thermostat, EC motor fan, 1 circulators, 1 TRAC valve, filter, heating & cooling coils, valves, controller with purge timer per ANSI standard & Four (4) risers: 1 hot water supply, 1 hot water return, 1 cold water supply and 1 condensate drain riser. In addition PEX tubing of size  $\frac{3}{4}$ " will be connected with hot & cold water supply risers using tees with shutoff valves which will run within core slab or concrete slab to distribute water to each plumbing fixtures. PEX tubing cuts installation time by approximately 50% when compared with copper.

#### More Comfort and Improved Indoor Air Quality

Quite Operation – IPS uses Fan coil which do not need noisy compressor, results in quiet & comfort environment in the space.

More Dehumidification – IPS Fan coil uses a low-flow, high-latent coil design, which results in better indoor air quality than traditional HVAC systems and better environment that is free of mild & mold growth.



# Finding Savings with IPS.

## Few Cost Saving Facts of QQ Project:

- Dual purpose Mechanical system with Central heating & cooling plant.
- Replace Suites Air Conditioning (CGC Hybrid unit SKH Models) with IPS Fan coils.
- Relatively Smaller Horizontal Geothermal Field Size.
- Deletion of Radiant Heating (Wall) System.
- Deletion of In Slab Heating
- Deletion of HVAC Boiler with accessories.
- Reduction in HVAC Ductwork
- Deletion of HVAC Distribution Piping c/w insulation
- Less Chemical Treatment & Cleaning required.
- Reduction in Testing, Balancing & Commissioning Scope of work
- Reduction in Control Scope of Work
- Use of PEX piping to be embedded in hollow core slab instead of copper piping connected to each plumbing fixture.
- Use of PEX risers up to and below 2" size instead of Copper.
- Reduce Labor and material.
- Fast Construction.

With the success of IPS projects, we expect more engineers, architects & builders will consider HVAC system featuring IPS based designs.

**LEED friendly Energy Savings:** The huge advantage that usually gets most engineers & architects excited are the appealing ENERGY SAVINGS on projects and certainly geothermal based IPS with HRV's can deliver 20% to 50% more savings versus more traditional HVAC systems. Manor house project expects anticipated operating cost of \$0.7 to \$0.85 per sq. ft which will be easily attainable on this project.

**Capital cost Reduction:** The other huge advantage of IPS is the lower installation cost resulting in fast construction due to simplicity of the IPS system as the labor costs are reduced because the materials going into the building are reduced most of the equipment and piping are eliminated. Manor house project expects upfront HVAC capital cost savings of 25% (\$3.5 per sq. ft) versus Hybrid heat pump system.

**Simple Controls:** The system should work for the total life cycle of the building, if designed and operate properly. IPS™, controls are relatively simple, giving a peace of mind to building operator as they can operate the building proficiently without going into excessive system training, however ABS ESCO provides design assistance, training and after sales support.

**Low Maintenances:** results due to no compressor operation at fan coil level, no water treatment OR use of antifreeze at distribution piping level, no large strainers required, no hydronic balancing or balancing valves needed – System runs on balanced pressure.



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## ► HOW IPS WORKS

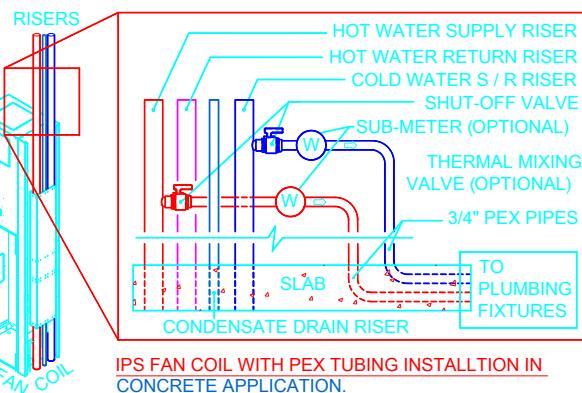
The supply riser is sized for the domestic requirement and the return riser is sized for HVAC. 4 pipe risers can be reduced to 3 pipes or 2 pipes subjected to system temperature requirements. In general, IPS system works on ONE Central Heating & Cooling Plant which uses domestic hot and cold water risers (ONE Piping Distribution System) to provide heating and cooling for space with IPS fan coils as HVAC fixture and the domestic hot/cold water distribution to suite plumbing fixtures via PEX tubing embedded within core slab or concrete layers of a building resulting in complete elimination of central HVAC heating system such as natural gas boilers, pumps, piping, controls etc.; reduces the number of pipes of HVAC cooling system; require relatively smaller mechanical room etc., ultimately reduces the total number of pipes, labor, equipment & space which in the end reduces overall cost of the project.

Established IPS™ system with more than a decade track record of outstanding performance reveals that with IPS™, approximately on an average, \$15/sq. ft. installed costs & operating costs of \$0.7 to \$0.85/sq. ft. are very attainable versus a more traditional HVAC systems. This also means that IPS™ saves upfront capital cost approximately from \$2000.00 to \$3000.00 or MORE per suite on a typical high rise condominium building and it can be 20% to 60% MORE efficient versus traditional HVAC systems.

**Fan Coil Unit Control:** The fan coils are controlled by individual thermostats that control the fan speed & heating/cooling circulators. Cooling coil has circulator pump and heating coil has TRAC valves. The circulator or TRAC Valve runs based on the call coming from the thermostat. A timer relay in the thermostat opens the circulator and TRAC valve to purge the stagnant water in the coils once per day.

**Code Compliance:** IPS™ fan coil is UL & CSA approved product. IPS system is in full compliance with ASHRAE 188P, municipality & local building codes. It's important to remember that with IPS, potable water for domestic use and water for heating and cooling always remain 100% isolated from non-potable devices via double wall heat exchangers. This means the safety and integrity of the building's potable water system is never compromised in any way. Fresh water introduces to the system daily & water is safe enough to drink as it is always be in motion.

**System Flexibility:** IPS central heating and cooling plant can be efficient chiller, condensing boiler, biomass plant, geothermal system with central water to water heat pumps, air source outdoor heat pumps, solar system, VFD's based domestic water pumps and many more.... IPS™ supplies domestic hot water at 120°F or in some cases 140°F & domestic cold water at 45°F to 50°F to fan coil units & plumbing fixtures located in each room, suite or office. For application where DHW supply temperature is at 140°F, thermostatic mixing valve (TMV) will be provided (by others) either at each fan coil location or near DHW tank to prevent scalding at the plumbing fixtures.

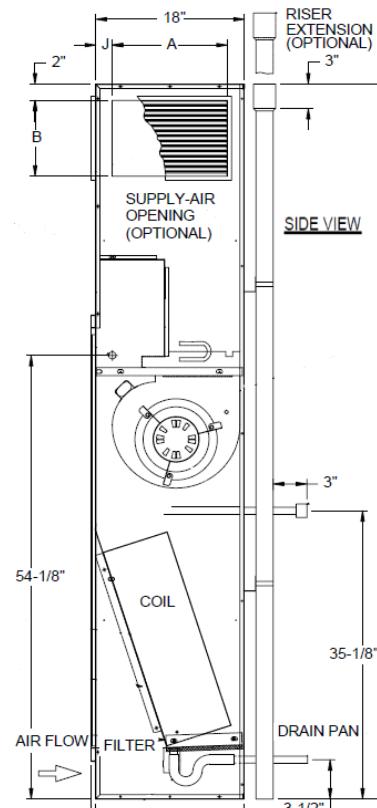
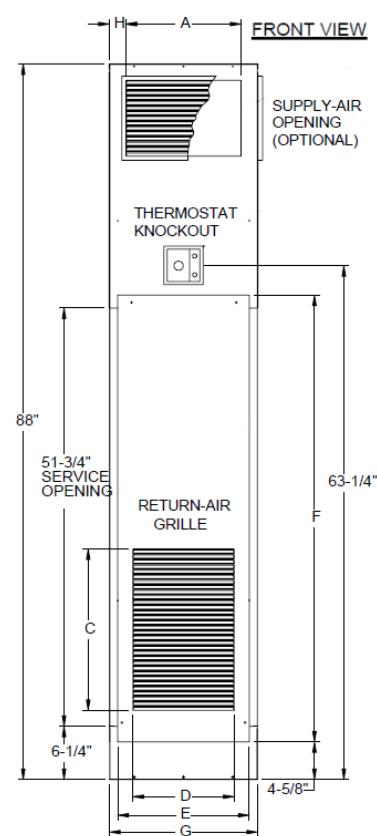


### Easy to install

*Our Green HVAC Systems & Products brings a breath of fresh air to your Energy Savings, Environmental & LEED achievements.*

### Easy to Operate

### Easy to Afford

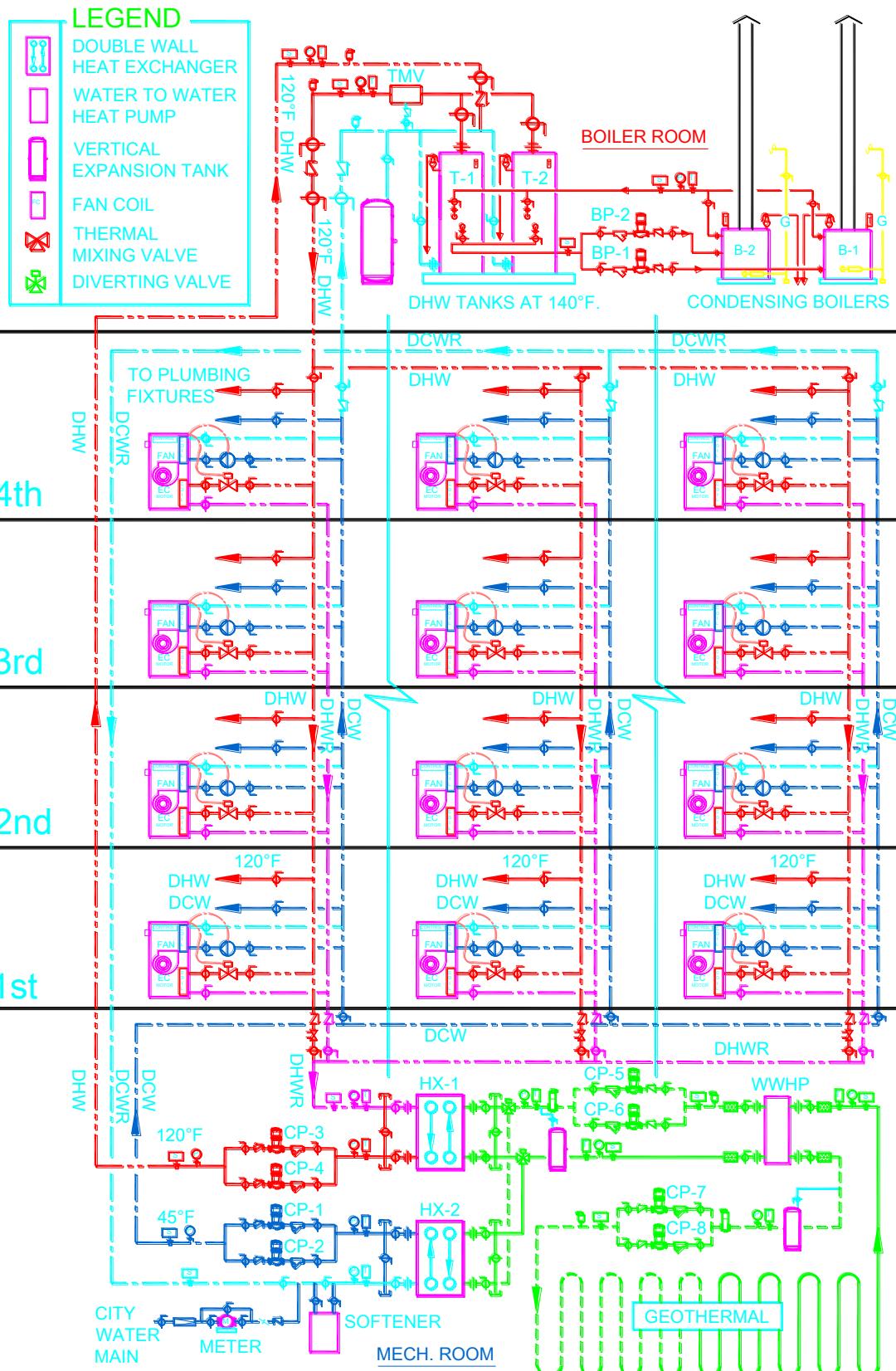


**Easy to Engineered:** Due to adaptive nature of IPS, the system design process is relatively simple & very similar to plumbing design approach. No oversizing due to match loading configuration unlike heat pump which means the project installed cooling / heating capacities are only +5% higher than project block load.

**Application:** Projects such as limited service, suite and extended stay hotels, lodge, resort, senior care, assisted living centers, condominiums, dormitories, apartments, army barracks, commercial offices, schools, MURB's High Rise towers & many more.... are most often ideal for an IPS application.



## Manor House Project – IPS Piping Schematic.



## Sequence of Operation

The Building heating & cooling including DHW & DCW will be provided by a three pipe IPS fan coil system.

### Central Plant for Building Heating & Cooling:

Central plant will consist of geothermal field, water to water heat pumps (WWHP), chilled water loop, hot water loop, domestic cold water loop, domestic hot water loop, double wall heat exchangers, expansion tanks, main circulating pumps with piping, valves & accessories. The geothermal field will only provide space heating and cooling.

**Space Cooling:** When system is in cooling mode, fan coil circulator will supply 45°F water to coil which then return back at 55°F to same riser to mix it with 45°F water. WWHP's maintain DCW loop temperature of 45°F with CP-5, CP-6, CP-7 & CP-8 running to circulate thermal fluid through HX-2, WWHP's & geothermal field. DCW will be circulated throughout the building via two circulating pumps (CP-1 & CP-2).

**Space Heating:** When system is in heating mode, fan coil TRAC valve will vary the flow to match the heating demand & supply 120°F water to coil which then return back at 100°F in separate riser to central system. WWHP's maintain DHW return loop temperature to 120°F with CP-5, CP-6, CP-7 & CP-8 running to circulate thermal fluid through HX-1, WWHP's & geothermal field. The DHW will be supplied via two circulating pumps (CP-3 & CP-4) to DHW storage tanks where it can pick up the 120°F make up water which then finally circulates throughout the building. During shoulder seasons space heating will be provided by DHW boiler system, if needed.

**DHW Heating:** Two gas fired condensing boilers B-1 & B-2 sized for 100% DHW heating and 50% space heating with pumps (BP-1 & BP-2) piped reverse return to an insulated storage tanks to maintain DHW tank at 140°F to prevent legionella pneumophila. DHW will mix to 120°F with a thermostatic mixing valve at central plant level to prevent scalding at the plumbing fixtures. Heating economizer occurs at no additional cost when water returned from DCW system directly used as make-up to DHW system.

**Pumps:** will be equipped with integral VFD's, sensor & controller to control the speed of the pump in the event of changes in fluid pressure across the pump. DHW & DCW pumps are LEAD & LAG pumps to maintain system head & demand flow requirements. When any pump fails alternator shall start the other pump automatically & give an alarm indication.

"RE-ENGINEERING COMFORT"

**IPS™**

**INTEGRATED PIPING SYSTEM**

 **WILLIAMS**



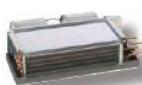
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**IPS-BUILDING**  
**LEGACY.**



Horizontal Series



High Performance Horizontal Series



High Performance Vertical Series



Vertical Stack Series

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