GOLD
Competitive Landscape

Swegon vs. Greenheck, Aaon and Venmar

Swegon

Contents

GOLD FEATURES & BENEFITS

The following section is a refresher on the key features and benefits of the Swegon GOLD air handling unit. This can be helpful when explaining to customers why choose GOLD over another competitor's product. If you have a specific issue or opportunity that you wish to drive home but is not covered here, please contact your RSM or the applications team. They will help you develop a product strategy.

MODELS

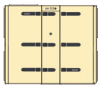
Swegon GOLD units are 100% outdoor air solutions. They are not conventional recirculating air handling units (e.g. Trane MCC AHU with mixing box.) They come in three versions shown here.

GOLD RX
Enthalphy wheel
Indoor or Outdoor
500 to 16,000 cfm

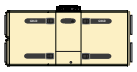
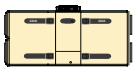
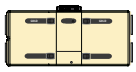
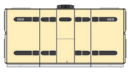
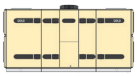
GOLD PX
Sensible plate HX
Indoor or Outdoor
500 to 5,500 cfm

GOLD SD
Single duct
Indoor or Outdoor
500 to 18,500 cfm

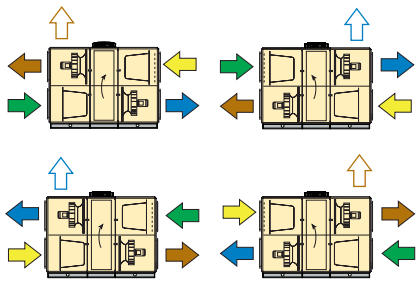
GOLD RX The GOLD RX utilizes an enthalpy wheel for energy recovery. It is available in following sizes:

	RX 05	RX 07/08	RX 11/12	RX 14/20	RX 25/30	RX 35/40	RX 50/60	RX 70/80
								
Width (in)	33	40	48	55	63	78	91	104
Height (in)	40	47	55	62	70	82	93	108
Length (in)	60	64	75	82	87	96	105	123
	RX 05	RX 07	RX 11	RX 14	RX 25	RX 35	RX 50	RX70
Max Aiflow (cfm)	1300	1500	2300	3150	4750	7000	9700	15800
	-	RX 08	RX 12	RX 20	RX 30	RX 40	RX 60	RX 80
Max Aiflow (cfm)	-	2000	2850	4200	5800	8400	13700	16300

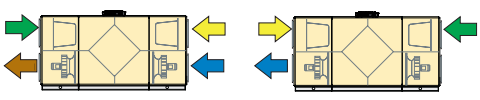
GOLD PX The GOLD PX utilizes a sensible plate for energy recovery. It is available in following sizes

	PX 05	PX 07/08	PX 11/12	PX 14/20	PX 25/30
					
Width (in)	33	40	48	58	66
Height (in)	40	47	55	63	71
Length (in)	80	90	100	111	125
	PX 05	PX 07	PX 11	PX 14	PX 25
Max Aiflow (cfm)	1300	1500	2300	3150	4750
	-	PX 08	PX 12	PX 20	PX 30
Max Aiflow (cfm)	-	2000	2850	4200	5800

RX DUCT CONNECTIONS



PX DUCT CONNECTIONS



Outdoor Air
Return Air
Supply Air
Exhaust Air

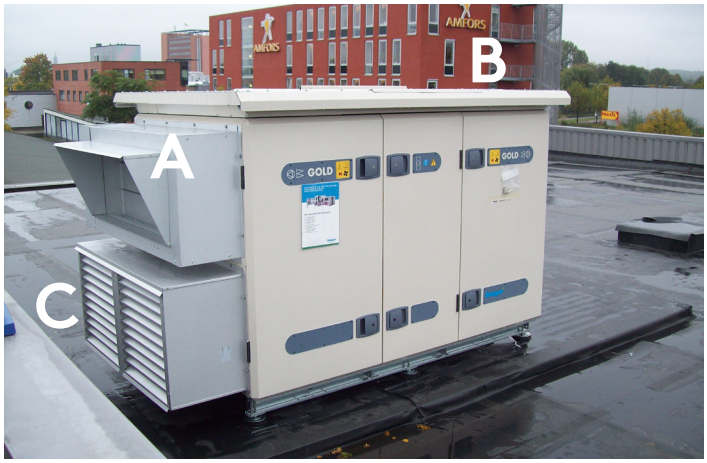
GOLD SD The GOLD SD utilizes a sensible plate for energy recovery. It is available in following sizes

Flow Rate (CFM) w/ 2" ESP							
Size	Width (in)	Height (in)	Length (in)	Length w/ HW/ CW coils	Length with HW/CW coils and heat Ex	Min	Max
05	33	20	44	87	-	160	1600
07	40	23	47	90	-	160	1600
08	40	23	47	90	-	400	2450
11	48	26	55	101	158	400	2450
12	48	26	55	101	158	400	3500
14	55	36	74	126	155	425	3823
20	55	36	74	126	155	637	5947
25	63	44	78	130	159	637	5947
30	63	44	78	130	159	1062	8496
35	78	48	78	130	159	1062	8496
40	78	48	78	130	159	1593	10620
50	91	56	77	141	170	1274	11894
60	91	56	77	141	170	2124	16992
70	104	56	99	162	198	2124	16992
80	104	56	99	162	198	3186	25488

OUTDOOR APPLICATIONS

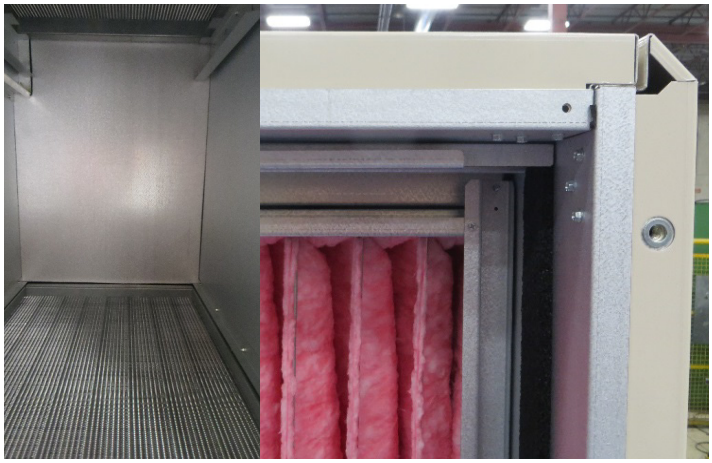
The GOLD unit can be indoor or outdoor. For outdoor applications the unit needs to sit on sleepers or rails and will have horizontal connections. It is not designed to sit on a roof curb with downshot connections.

A. Exhaust air hood B. Roof C. Intake Section



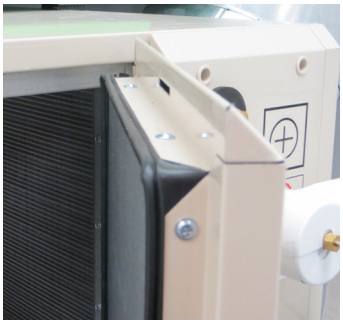
CABINET

- 2" double wall casing | Rigid Construction
- 2" 1.5 lb roxul media R8 | Excellent acoustical performance
- 20 gauge galvalume interior | Isolates insulation for improved IAQ
- 20 gauge prepainted galvanized exterior | Refined appearance, long lasting



DOORS

- All access from one side | Small service area and ease of maintenance
- Keyed access to fan and rotor compartments | Safety and security
- Double acting handles to relieve pressure if needed | Safety



FANS: FEATURES AND BENEFITS

EC FAN MOTORS

- Permanent Magnet Synchronous (EC) Motors
- 10% more efficient than induction motors
  Significant annual energy savings
- Includes motor controller (inverter) to vary motor speed
  Supports VAV and direct fan drive applications

FAN ARRANGEMENT

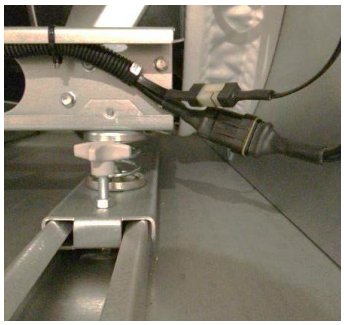
FANS: FEATURES AND BENEFITS

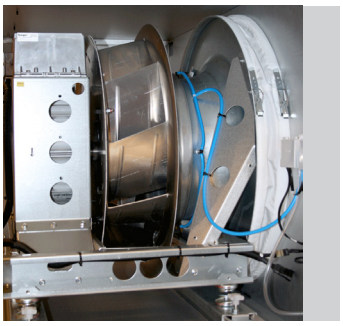
PLENUM FAN

- Direct drive design
  No belts to service or belt power loss
- All aluminum construction
- Special Swegon plenum fan designed for high efficiency in compact footprint
  Excellent energy savings in smallest cabinet size
- Accoustically designed to minimize overall sound power and shift sound to higher frequencies
  Minimize sound level and make it easy to attenuate so units can be located close to point of use
- Fans include airflow stations
  Monitor and control air flow

FAN SERVICEABILITY

- Fans can be accessed from one side with quick connect wiring harnesses, lock knobs and clamps
  Fans can be removed in minutes for service without an electrician
- Parts and full fan assemblies are stocked for fast service
  Minimal inconvenience for customer



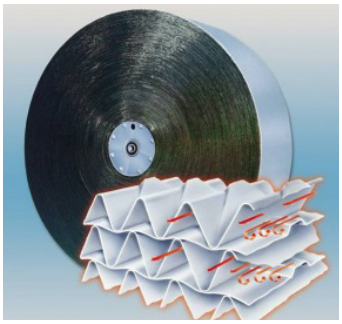


	05	07/08	11/12	14/20	25/30	35/40	50/60	70/80
								
Fan Size (mm) (per air path)	288	288/348	348/422	422/510	510/616	616/744	510/616	616/744
Fan Number	1	1	1	1	1	1	2	2
Power (kW)	1.15	1.15/1.15	1.15/2.4	2.4/3.4	3.4/5.0	5.0/6.5	3.4/6.5	6.5/6.5
Voltage	460/3/60 600/3/60	460/3/60 600/3/60	460/3/60 600/3/60	460/3/60 600/3/60	460/3/60 600/3/60	460/3/60 600/3/60	460/3/60 600/3/60	460/3/60 600/3/60

ENERGY RECOVERY

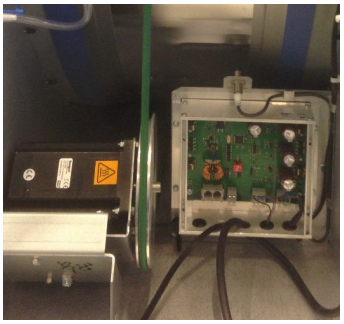
ENTHALPHY WHEEL

- Rotor has total energy recovery
  ASHRAE Std. 90.1 requirement
- Swegon wheel for Passive House certified units (Zeolite coated 4 angstrom on rolled aluminum fin)
  80% efficiency
- AHRI 1060 Certified wheel (Desciccant coated 3 angstrom on rolled aluminum fin)
  80% efficiency



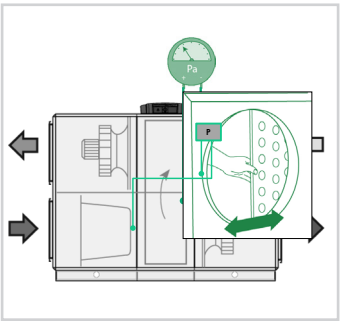
RX ROTOR CONTROL

- Rotors are variable speed from 0.5 to 20 rpm
  Can slow wheel down enough to maintain frost control
- Utilize DC stepper motor with instantaneous torque
  Accurate energy transfer
- Long lasting easily replacable drive belts
  Easy to maintain



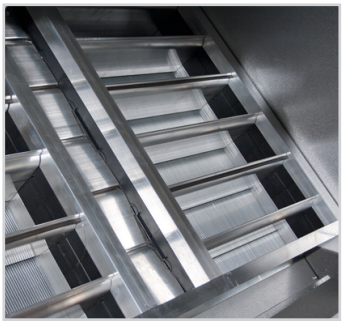
MINIMIZE EATR: GOOD IAQ

- Regulate rotor speed to minimize transfer while optimizing energy transfer
- During economizer mode, wheel runs for 10 seconds every 10 minutes to purge wheel
  Minimizes cross contamination – improves IAQ



RX: PLATE HEAT EXCHANGER

- Sensible crossflow aluminum plate heat exchanger
- Up to AHRI Certified 70% sensible efficiency
  Excellent sensible energy recovery with very low cross contamination (EATR 0.5%)
- Multi passage design for low pressure drop



ENERGY RECOVERY PX

PX: CONTROL

- Heat transfer and defrost control performance by face and bypass dampers
  Optimized heat transfer and defrost cycles
- Dampers open during economizer mode
  Reduced air pressure drop delivers lower operating cost

FILTERS

GOLD

- Standard MERV 13 bag filter
  Exceeds Std 62 filtration requirements
- Optional MERV 8 2” prefilter
  Extends main filter life
- Filter rack will accept V-Style Box filter as well
  Many filter options available

FILTER MAINTENANCE

- Filters are side loaded for ease of maintenance
- Expander lock/sealing pulls filter forward to 4 sided and gasketed frame to minimize air bypass
  Easy to service and improved IAQ
- Digital pressure sensors with filter calibration and automatic alarm limit
  Remote monitoring for filter service

ELECTRICAL AND CONTROLS

ELECTRICAL DISCONNECTS

- All units include factory mounted non-fused disconnect
  Safety requirement and lowest installed cost

IQLOGIC INTERFACE TABLET

- Pioneering touch-screen
  · Simple
  · Intuitive
  · Visual

IQLOGIC UNIT CONTROLLER

- All units include factory mounted and tested IQLogic controls
  Lowest installed cost and highest reliability
- Configurable controls over 75 control algorithms
  Proven, documented sequences
- Plug and play connections
  Easy to add accessories without a controls contractor
- Provides access for Network or BACnet
  Easy, documented, certified, integration

CONTROLS INTEGRATION

COMMUNICATION

- IQLogic can be set up to digitally communicate with other BAS systems and web server
- Standard protocols without extra communication unit (Modbus, Metasys N2, BACnet IP)
  Allows complete integration of GOLD unit with BAS system for monitoring and control at the lowest installed cost
- IQLogic can communicate to web browser via WiFi or hardware
  Allows remote monitoring with any device that has a browser

BACNET

- BTL certified product
- Specific manual available with data points etc.
  3rd party validation ensures that GOLD will integrate into your BACnet project

LISTINGS

Eurovent

AHRI 410 – Coils
AHRI 1060 – Enthalpy Wheel

Passive House Certification

UL 1995/1812

ACCESSORIES

PRE-HEAT COIL SECTION

- Installed upstream of enthalpy wheel
- Winter filters and insulated outdoor air dampers as a special

HEATING AND COOLING SECTION

- Single or two coil options
- Access door
- AHRI Certified coils
- DX, chilled water, hot water, steam
- Preheat or re-heat arrangements
- Double sloped SS drain pan under cooling coils
  Improves IAQ

WATER CONTROL VALVE

- Supplied with unit for field installation
- 2 or 3-way
- Modulating control
- Wire harness to plug into controller
  Plug and play to IQLogic controller for fast installation and commissioning

DAMPERS

- Isolation dampers for outdoor and exhaust air connections
- Cased or uncased options
- Complete with actuator wired to IQlogic controller
  Plug and play to IQLogic controller for fast installation and commissioning
- Aluminum extruded blade low leakage type thermally insulated dampers available

SOUND ATTENUATOR

- Galvanized construction
- Standard length in ProUnit
- Option of working with Vibro-Acoustics for a custom selection
  Custom noise control solution to meet building requirements

GENERAL ACCESS SECTION

- Access section
- Humidifier section
  IQLogic can operate third party humidifiers
- Wraparound heat pipe
- Fixed face and bypass coil

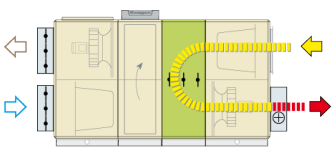
ELECTRIC HEAT

- SCR controlled
  Ensures close discharge temperature control
- Seperate power connection

FINAL FILTER SECTION

- Installed as last component in airstream
  Ensures any dirt introduced in AHU does not enter building for very high IAQ

AIR RECIRCULATION SECTION



UNIQUE SELLING POINTS (USP)

FOOTPRINT

The GOLD unit is designed to be placed in tight locations. All access can be achieved from one side reducing the required service area around the unit. The fans, wheel and casing have all been developed to reduce the length of the unit without sacrificing performance or creating sound issues.

ENERGY EFFICIENCY

The GOLD unit uses market leading energy recovery devices. The enthalpy wheel used in GOLD RX unit have 80% plus efficiency – 25% better than required by AHSRAE 90.1. In addition, the control algorithms embedded in the GOLD IQLogic controller take full advantage of the equipment's capabilities. For example, using the GOLD's frost control algorithm can increase the annual energy recovery by more than 15% over conventional control algorithms. The fans are optimized for the GOLD's cabinet. They are driven by direct drive (no belt losses or service issues) EC motors that are 10% to 20% more efficient than conventional induction motors. The example below shows GOLD's advantages over Greenheck.

LOW SOUND

The GOLD unit is purpose designed to be placed close to point of use. This is common in Europe due to space constraints and demanding fan power requirements. To achieve this, the GOLD unit is design to be quiet. The cabinet uses Roxul insulation because of its sound absorbing properties. The fan wheel design shifts the sound energy to higher frequencies where the cabinet and ductwork can attenuate it often without additional sound attenuators.

INTEGRATED CONTROLS

DOAS units are complicated to operate. They require advanced control algorithms for reliable, high performance operation. Swegon builds over 10,000 unit per year all with the same controls and have been doing so for 20 years. The controls in the GOLD unit are well proven. There are over 75 algorithms in the IQLogic controller so the unit can be configured to meet almost any application.

It is not that the controls are factory mounted (although it is much more cost effective to factory mount controls) it is the pre-engineered, validated and reliability built into the controls that counts.

PASSIVE HOUSE CERTIFIED

Passive house projects are on the rise in North America. Passive House started in Germany and Swegon has been closely connected to the program since its start. Swegon helped Passive house develop a commercial test standard for DOAS units. Swegon is the only Passive House DOAS unit built in North America.

CERTIFIED COMPONENT
Passive House Institute

INTEGRATION WITH VRF

Swegon GOLD units integrate easily with VRF HVAC systems. Factory mounted controls are critical as there will not be a conventional BAS system. The flexibility of the IQLOgic controls allows the GOLD unit to use VRF as the heating and cooling source while providing the DOAS solution necessary for every VRF project. For more information refer to the GOLD Application Sheets for Mitsubishi and LG VRF systems.

EXAMPLE: THE WHEEL ANALYSIS AND RESULTS

	Greenheck ERCH-90	Swegon GOLD RX-60
Enthalpy Wheel Efficiency %	72.7	83.1
Required cooling kBtu/h %	422	392 8% Savings
Fan BHP		
Supply	11.82	8.64
Exhaust	12.21	7.22
Electrical Service (460V)		
Breaker Size (A)	60	50
MCA	47.9	44.49

*Based on 10,000 cfm

PROJECTS

LAVENDER ST., Austin, TX

MASSENA, NV, Aarschot, Belguim

JOHNSON AND JOHNSON, La Louviere, Belgium

BENGT DAHLGREN BUILDING, Gothenburg, Sweden

HARVARD MEMORIAL CHURCH, Cambridge, Massachusetts

HORNEPAYNE PUBLIC SCHOOL, Hornepayne, Ontario

Greenheck vs. Swegon
COMPETITIVE ANALYSIS

Swegon

PRODUCT SPECIFICATIONS

Product Model:	**Greenheck ERCH**
Construction Overview:	• 1" thick walls • Solid exterior and solid interior panels • 1.5 lbs/cu.ft. media • Removable access doors with hinged access and SS hinges and quarter turn latches • G90 galvanized • Paint options • Internally isolated fans

HOW GOLD COMPETES

GOLD	ERCH	Benefit
Direct Drive EC motor	Belt driven AC motor	At least 10% more efficient
Plenum fan	DWDI forward curve fan	More versatile design allowing a smaller footprint
Standard Inverter	Optional VFD	Standard VAV or CV control
80+% wheel efficiency	70+% wheel efficiency	Reduces the cooling load on average by 7–8%
Pre-programed and configurable controls	Optional controllers to allow for unit control and BAS integration	Reduces start up time and allows user flexibility

Unit	0	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000	10500	11000	11500	12000	12500	13000	13500	14000	14500	15000	15500	16000	16500	17000	17500	18000	18500	19000	19500	20000
GOLD	05			07	08	11	12	14	20		25	30			35			40/50					60					70					80								
ERCH	20				45				55			90																														

STRATEGY: WHEN TO BID

1

Good match-up, if there are:
- Water coils
- Indoor units

2

Tough sell:
- Integral DX and gas heat
- Rooftop curb mounted

3

What we can work with:
- Outdoor units, but not curb mount
- They are side-by-side, we are over under on air paths
- We have 460/3/60 and 575/3/60
- 208/3/60 requires a transformer

4

What to promote:
- Direct drive plenum fans: look at the BHP!
- Higher efficiency wheel: may reduce cooling load by 7-8%
- Quieter unit
- Painted unit with high-end Euro look
- We provide full integrated controls with touchpad
- We have proven BAS integration
- We provide inverters with air flow stations

VALUE ENGINEERING

Our better wheel will reduce additional mechanical cooling requirement
- Downsize mechanical cooling by as much has 7-8%

We may have a smaller electrical service for electrical savings

If VRF project, tie the GOLD unit into VRF heatpumps

Try to group units to a larger size (beyond Greenheck's range)

Push integrals controls
- Easy commissioning
- Easy to integrate into BAS

ENGINEER SALES: SIDE-BY-SIDE TECHNICAL COMPETITIVE ADVANTAGES

	SWEGON GOLD AIR HANDLING UNIT	GREENHECK ERCH UNIT
CABINET	The GOLD cabinet is 2 inches thick with high density mineral wool media. It meets ASHRAE 90.1 with an R value of 8. It is 2.8lbs/ft3 which gives it superior acoustics properties allowing it to be extremely quiet.	Greenheck uses fibreglass insulation which also meets ASHRAE 90.1, however it only has a density of 1.5lbs/ft3 which results in higher radiated noise levels.
FANS/ MOTORS	Swegon Gold uses EC direct drive motors with a Swegon designed and built plenum fan.	Greenheck uses a double width, double inlet forward curved fan with an AC motor and VFD. On average the EC motor will be at least 10% more efficient. See attached detailed analysis.
WHEEL	Swegon uses a 3A molecular sieve desiccant wheel. Our wheel is a one piece 10" deep wheel that is wound on a central hub. We average 80% efficiency and better. It is all aluminum.	Greenheck uses a segmented 3" deep plastic wheel that averages 70% efficiency. For a more detailed look at the impact of the wheels efficiency.
CONTROLS	The Swegon controller is sold with all GOLD series products. That means we sell it with over 10,000 units worldwide. The controller is configurable and comes pre-programed with many different options. All you need to do is enable the options and sequences that you would like. All optional features are standard on the GOLD IQ Logic controller. The GOLD IQ Logic is BTL certified and communicates via BACNet IP. The IQ logic controller is upgradable for future changes to the operating system.	The controller for the Greenheck unit is an option. It is a factory programmed microprocessor with optional features. All optional features are standard on the GOLD IQ Logic controller. In order to talk BACNet or interface with a network, an additional module needs to be installed on the Greenheck unit.
FILTRATION	The standard GOLD filter is a 22" long MERV13 bag filter. The bag filter has a high surface area that helps reduce the overall static of the unit allowing lower energy usage. There is an option of using a MERV8 2" pre-filter with the bag filter to lengthen its lifespan.	Greenheck uses only 2" filters but they are available in both Merv 8 and 13. Typical life spans on cartridge filters are 4-6 months. Dirty filter sensors are standard on the GOLD unit and are configurable for different alarm set points. The sensors are optional for Greenheck.

CONTRACTOR SALES: SIDE-BY-SIDE COMMERCIAL COMPETITIVE ADVANTAGES

	SWEGON GOLD AIR HANDLING UNIT	GREENHECK ERCH UNIT
CABINET	All of our cabinets are one sided access. The doors have double acting handles for added safety.	Greenheck requires access at all four sides of their units for maintenance. This takes up costly mechanical room space.
FANS/ MOTORS	Swegon uses a direct drive fan so there are no belts that need to be replaced in the future. The motor is designed to be easily serviceable. Replacing motor bearings in less than an hour. The L10 life of the bearings is 70,000 hours which equates to 24 hours a day for 8 years. Swegon balances their entire fan package to within 4% in the entire operating range and less than 1% at the balancing rpm. All of our fans are mounted on sliding rails to allow for easy slide out access.	Greenheck uses a double width, double inlet forward curved fan with an AC motor and VFD. On average the EC motor will be at least 10% more efficient. See attached detailed analysis.
WHEEL	High efficiency filters extend the cleaning life of the Wheel. Our minimum efficiency filter is a Merv 11 which keeps the wheel clean. We recommend inspecting the wheel every year for debris build up. If the pressure drop across the wheel begins to increase, the wheel can be cleaned with a vacuum and compressed air.	Greenheck uses a side by side unit it meaning that access is tight. The polymer wheel does not have the same lifespan as an aluminum wheel and therefore may need to be replaced sooner.
CONTROLS	The controls are tried, tested and true. They are delivered on more than 8000 units per year. The Control algorithms are all configurable and preprogrammed for ease of use. By following the handheld, a unit can be started up by following the on screen prompts in under 5 minutes. All units are tested thoroughly prior to leaving the factory and therefore you know they will work and the control systems are functioning.	Greenheck's controls are optional and require field programming and setup. This takes significant time and money.
FILTRATION	Swegon uses filter pressure monitors to provide a "dirty filter" alarm to indicate when the filters should be changed. This saves time and money not changing clean filters and not having to always look at them determine their dirtiness. Swegon also uses a quick release face loading filter rack. By releasing the handles you can easily slide out the filters for changes. The face loading system also presses the full 4 sides of the filter frame up against filter seals to prevent filter bypassing.	Without the use of "dirty filter" alarms, you are required to visually inspect the filters which costs time. You may also be replacing them too early which costs extra money for filters, or too late which costs extra money for BHP.

PRODUCT SPECIFICATIONS

Product Model:	Greenheck ERT
Construction Overview:	• 1" thick walls • Solid exterior and solid interior panels • 1.5 lbs/cu.ft. media • Removable access doors with hinged access and SS hinges and quarter turn latches • G90 galvanized • Paint options • Internally isolated fans

HOW GOLD COMPETES

GOLD	ERT	Benefit
Direct Drive EC motor	Belt driven AC motor	At least 10% more efficient
Plenum fan	DWDI backward curve fan	More versatile design allowing a smaller footprint
Standard Inverter	Optional VFD	Standard VAV or CV control
80+% wheel efficiency	70+% wheel efficiency	Reduces the cooling load on average by 10%
Pre-programed and configurable controls	Optional controllers to allow for unit control and BAS integration	Reduces start up time and allows user flexibility

Unit	0	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000	10500	11000	11500	12000	12500	13000	13500	14000	14500	15000	15500	16000	16500	17000	17500	18000	18500	19000	19500	20000
GOLD	05			07	08	11	12	14	20		25	30			35			40/50					60					70					80								
ERT					45				55			90																														

STRATEGY: WHEN TO BID

1 **Good match-up, if there are**:
- Water coils
- Indoor units
- Wrap around coils is available

2 **Tough sell**:
- Rooftop curb mounted

3 **What we can work with**:
- Outdoor units, but not curb mount
- They are side-by-side, we are over under on air paths
- We have 460/3/60 and 575/3/60
  - 208/3/60 requires a transformer

4 **What to promote**:
- Direct drive plenum fans: look at the BHP!
- Higher efficiency wheel: may reduce cooling load by 7-8%
- More quiet unit
- Painted unit with high-end Euro look
- We provide full integrated controls with touchpad
- We have proven BAS integration
- We provide inverters with air flow stations

VALUE ENGINEERING

Our better wheel will reduce additional mechanical cooling requirement
- Downsize mechanical cooling by as much has 7-8%

We may have a smaller electrical service for electrical savings

If VRF project, tie the GOLD unit into VRF heatpumps

Try to group units to a larger size (beyond Greenheck's range)

Push integrals controls
- Easy commissioning
- Easy to integrate into BAS

ENGINEER SALES: SIDE-BY-SIDE TECHNICAL COMPETITIVE ADVANTAGES

	SWEGON GOLD AIR HANDLING UNIT	GREENHECK ERT UNIT
CABINET	The GOLD cabinet is 2 inches thick with high density mineral wool media. It meets ASHRAE 90.1 with an R value of 8. It is 2.8lbs/ft3 which gives it superior acoustics properties allowing it to be extremely quiet.	Greenheck uses a cabinet wall thickness of 1" with fibreglass insulation which does not meets ASHRAE 90.1. The density of the fibreglass insulation is 1.5lbs/ft3 which results in lower levels of sound reduction through radiated noise.
FANS/ MOTORS	Swegon Gold uses EC direct drive motors with a Swegon designed and built plenum fan.	Greenheck uses a double width, double inlet backward curved fan with an AC motor and optional VFD. On average the EC motor will be at least 10% more efficient. See attached detailed analysis.
WHEEL	Swegon uses a 3A molecular sieve desiccant wheel. Our wheel is a one piece 10" deep wheel that is wound on a central hub. We average 80% efficiency and better. It is all aluminum.	Greenheck uses a segmented 3" deep polymer wheel that averages 70% efficiency. For a more detailed look at the impact of the wheels efficiency, see attached cooling load calculator.
CONTROLS	The Swegon controller is sold with all GOLD series products. That means we sell it with over 10,000 units worldwide. The controller is configurable and comes pre-programed with many different options. All you need to do is enable the options and sequences that you would like. All optional features are standard on the GOLD IQ Logic controller. The GOLD IQ Logic is BTL certified and communicates via BACNet IP. The IQ logic controller is upgradable for future changes to the operating system.	The controller for the Greenheck unit is an option. It is a factory programmed microprocessor with optional features. . In order to talk BACNet or interface with a network, an additional module needs to be installed on the Greenheck unit.
FILTRATION	The standard GOLD filter is a 22" long MERV13 bag filter. The bag filter has a high surface area that helps reduce the overall static of the unit allowing lower energy usage. There is an option of using a MERV8 2" pre-filter with the bag filter to lengthen its lifespan.	Greenheck uses only 2" filters but they are available in both Merv 8 and 13. Typical life spans on cartridge filters are 4-6 months. Greenheck allows you to use MERV 8 or Merv 13 or both in the inlet but only one type on the return. The sensors are optional for Greenheck.

CONTRACTOR SALES: SIDE-BY-SIDE COMMERCIAL COMPETITIVE ADVANTAGES

	SWEGON GOLD AIR HANDLING UNIT	GREENHECK ERT UNIT
CABINET	All of our cabinets are one sided access. The doors have double acting handles for added safety.	Greenheck requires access at all four sides of their units for maintenance. This takes up costly mechanical room space.
FANS/ MOTORS	Swegon uses a direct drive fan so there are no belts that need to be replaced in the future. The motor is designed to be easily serviceable. Replacing motor bearings in less than an hour. The L10 life of the bearings is 70,000 hours which equates to 24 hours a day for 8 years. Swegon balances their entire fan package to within 4% in the entire operating range and less than 1% at the balancing rpm. All of our fans are mounted on sliding rails to allow for easy slide out access.	Greenheck uses a double width, double inlet forward curved fan with an AC motor and VFD. On average the EC motor will be at least 10% more efficient. See attached detailed analysis.
WHEEL	High efficiency filters extend the cleaning life of the Wheel. Our minimum efficiency filter is a Merv 11 which keeps the wheel clean. We recommend inspecting the wheel every year for debris build up. If the pressure drop across the wheel begins to increase, the wheel can be cleaned with a vacuum and compressed air.	Greenheck uses a side by side unit it meaning that access is tight. The polymer wheel does not have the same lifespan as an aluminum wheel and therefore may need to be replaced sooner.
CONTROLS	The controls are tried, tested and true. They are delivered on more than 8000 units per year. The Control algorithms are all configurable and preprogrammed for ease of use. By following the handheld, a unit can be started up by following the on screen prompts in under 5 minutes. All units are tested thoroughly prior to leaving the factory and therefore you know they will work and the control systems are functioning.	Greenheck's controls are optional and require field programming and setup. This takes significant time and money.
FILTRATION	Swegon uses filter pressure monitors to provide a "dirty filter" alarm to indicate when the filters should be changed. This saves time and money not changing clean filters and not having to always look at them determine their dirtiness. Swegon also uses a quick release face loading filter rack. By releasing the handles you can easily slide out the filters for changes. The face loading system also presses the full 4 sides of the filter frame up against filter seals to prevent filter bypassing.	Without the use of "dirty filter" alarms, you are required to visually inspect the filters which costs time. You may also be replacing them too early which costs extra money for filters, or too late which costs extra money for BHP.

PRODUCT SPECIFICATIONS

Product Model:	Greenheck APEX
Construction Overview:	• 2" thick walls • Solid exterior and solid interior panels • 1.5 lbs/cu.ft. media • Removable access doors with hinged access and SS hinges and quarter turn latches • G90 galvanized • Paint options • Internally isolated fans

HOW GOLD COMPETES

GOLD	APEX	Benefit
Direct Drive EC motor	Belt driven AC motor	At least 10% more efficient
Plenum fan	DWDI backward curve fan	More versatile design allowing a smaller footprint
Standard Inverter	Optional VFD	Standard VAV or CV control
80+% wheel efficiency	70+% wheel efficiency	Reduces the cooling load on average by 10%
Pre-programed and configurable controls	Optional controllers to allow for unit control and BAS integration	Reduces start up time and allows user flexibility

Unit	0	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000	10500	11000	11500	12000	12500	13000	13500	14000	14500	15000	15500	16000	16500	17000	17500	18000	18500	19000	19500	20000
GOLD	05			07	08	11	12	14	20		25	30			35			40/50					60					70					80								
APEX																					200																				

STRATEGY: WHEN TO BID

1 — Good match-up, if there are:
- Water coils
- Indoor units
- Wrap around coils is available

2 — Tough sell:
- Rooftop curb mounted

3 — What we can work with:
- Outdoor units, but not curb mount
- They are side-by-side, we are over under on air paths
- We have 460/3/60 and 575/3/60
  - 208/3/60 requires a transformer

4 — What to promote:
- Direct drive plenum fans: look at the BHP!
- Higher efficiency wheel: may reduce cooling load by 7-8%
- More quiet unit
- Painted unit with high-end Euro look
- We provide full integrated controls with touchpad
- We have proven BAS integration
- We provide inverters with air flow stations

VALUE ENGINEERING

Our better wheel will reduce additional mechanical cooling requirement
- Downsize mechanical cooling by as much has 7-8%

We may have a smaller electrical service for electrical savings

If VRF project, tie the GOLD unit into VRF heatpumps

Try to group units to a larger size (beyond Greenheck's range)

Push integrals controls
- Easy commissioning
- Easy to integrate into BAS

ENGINEER SALES: SIDE-BY-SIDE TECHNICAL COMPETITIVE ADVANTAGES

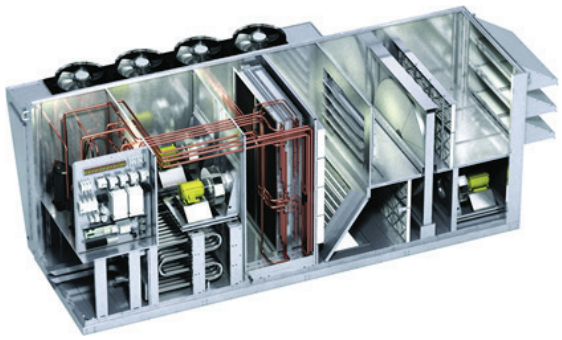
	SWEGON GOLD AIR HANDLING UNIT	GREENHECK APEX UNIT
CABINET	The GOLD cabinet is 2 inches thick with high density mineral wool media. It meets ASHRAE 90.1 with an R value of 8. It is 2.8lbs/ft3 which gives it superior acoustics properties allowing it to be extremely quiet.	Greenheck uses a cabinet wall thickness of 1" with fibreglass insulation which does not meets ASHRAE 90.1. The density of the fibreglass insulation is 1.5lbs/ft3 which results in lower levels of sound reduction through radiated noise.
FANS/ MOTORS	Swegon Gold uses EC direct drive motors with a Swegon designed and built plenum fan.	Greenheck uses a belt driven AC motors with a plenum fan. On average the EC motor will be at least 10% more efficient. See attached detailed analysis.
WHEEL	Swegon uses a 3A molecular sieve desiccant wheel. Our wheel is a one piece 10" deep wheel that is wound on a central hub. We average 80% efficiency and better. It is all aluminum.	Greenheck uses a segmented 3" deep plastic wheel that averages 70% efficiency. For a more detailed look at the impact of the wheels efficiency, see attached cooling load calculator.
CONTROLS	The Swegon controller is sold with all GOLD series products. That means we sell it with over 10,000 units worldwide. The controller is configurable and comes pre-programed with many different options. All you need to do is enable the options and sequences that you would like. All optional features are standard on the GOLD IQ Logic controller. The GOLD IQ Logic is BTL certified and communicates via BACNet IP. The IQ logic controller is upgradable for future changes to the operating system.	The controller for the Greenheck unit is an option. It is a factory programmed microprocessor with optional features. In order to talk BACNet or interface with a network, an additional module needs to be installed on the Greenheck unit.
FILTRATION	The standard GOLD filter is a 22" long MERV13 bag filter. The bag filter has a high surface area that helps reduce the overall static of the unit allowing lower energy usage. There is an option of using a MERV8 2" pre-filter with the bag filter to lengthen its lifespan.	Greenheck uses only 2" filters but they are available in both Merv 8 and 13. Typical life spans on cartridge filters are 4-6 months. Dirty filter sensors are standard on the GOLD unit and are configurable for different alarm set points. The sensors are optional for Greenheck.

CONTRACTOR SALES: SIDE-BY-SIDE COMMERCIAL COMPETITIVE ADVANTAGES

	SWEGON GOLD AIR HANDLING UNIT	GREENHECK APEX UNIT
CABINET	All of our cabinets are one sided access. The doors have double acting handles for added safety.	Greenheck requires access at all four sides of their units for maintenance. This takes up costly mechanical room space.
FANS/ MOTORS	Swegon uses a direct drive fan so there are no belts that need to be replaced in the future. The motor is designed to be easily serviceable. Replacing motor bearings in less than an hour. The L10 life of the bearings is 70,000 hours which equates to 24 hours a day for 8 years. Swegon balances their entire fan package to within 4% in the entire operating range and less than 1% at the balancing rpm. All of our fans are mounted on sliding rails to allow for easy slide out access.	Greenheck supplies their fans with bearings that have a L10 life of 50,000 hours.
WHEEL	High efficiency filters extend the cleaning life of the Wheel. Our minimum efficiency filter is a Merv 11 which keeps the wheel clean. We recommend inspecting the wheel every year for debris build up. If the pressure drop across the wheel begins to increase, the wheel can be cleaned with a vacuum and compressed air.	Greenheck uses a side by side unit it meaning that access is tight. The polymer wheel does not have the same lifespan as an aluminum wheel and therefore may need to be replaced sooner.
CONTROLS	The controls are tried, tested and true. They are delivered on more than 8000 units per year. The Control algorithms are all configurable and preprogrammed for ease of use. By following the handheld, a unit can be started up by following the on screen prompts in under 5 minutes. All units are tested thoroughly prior to leaving the factory and therefore you know they will work and the control systems are functioning.	Greenheck's controls are optional and require field programming and setup. This takes significant time and money.
FILTRATION	Swegon uses filter pressure monitors to provide a "dirty filter" alarm to indicate when the filters should be changed. This saves time and money not changing clean filters and not having to always look at them determine their dirtiness. Swegon also uses a quick release face loading filter rack. By releasing the handles you can easily slide out the filters for changes. The face loading system also presses the full 4 sides of the filter frame up against filter seals to prevent filter bypassing.	Without the use of "dirty filter" alarms, you are required to visually inspect the filters which costs time. You may also be replacing them too early which costs extra money for filters, or too late which costs extra money for BHP.

PRODUCT SPECIFICATIONS

Product Model:	**Greenheck RV(E)**
Construction Overview:	• 2" thick walls • Solid exterior and solid interior panels • 1.5 lbs/cu.ft. media • R8 or R13 insulation • Removable access doors with hinged access and SS hinges and quarter turn latches • G90 galvanized • Paint options • Internally isolated fans



HOW GOLD COMPETES

GOLD	RV(E)	Benefit
Direct Drive EC motor	Belt driven AC motor	At least 10% more efficient
Plenum fan	DWDI backward curve fan	More versatile design allowing a smaller footprint
Standard Inverter	Optional VFD	Standard VAV or CV control
80+% wheel efficiency	70+% wheel efficiency	Reduces the cooling load on average by 10%
Pre-programed and configurable controls	Optional controllers to allow for unit control and BAS integration	Reduces start up time and allows user flexibility

Unit	0	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000	10500	11000	11500	12000	12500	13000	13500	14000	14500	15000	15500	16000	16500	17000	17500	18000	18500	19000	19500	20000
GOLD	05			07	08	11	12	14	20		25	30			35			40/50					60					70						80							
RV(E)	25					40			50		80						120																									

STRATEGY: WHEN TO BID

1

Good match-up, if there are:
- Water coils
- Indoor units

2

Tough sell:
- Integral DX and gas heat
- Rooftop curb mounted

3

What we can work with:
- Outdoor units, but not curb mount
- They are side-by-side, we are over under on air paths
- We have 460/3/60 and 575/3/60
  - 208/3/60 requires a transformer

4

What to promote:
- Direct drive plenum fans: look at the BHP!
- Higher efficiency wheel: may reduce cooling load by 7-8%
- More quiet unit
- Painted unit with high-end Euro look
- We provide full integrated controls with touchpad
- We have proven BAS integration
- We provide inverters with air flow stations

VALUE ENGINEERING

Our better wheel will reduce additional mechanical cooling requirement
- Downsize mechanical cooling by as much has 7-8%

We may have a smaller electrical service for electrical savings

If VRF project, tie the GOLD unit into VRF heatpumps

Try to group units to a larger size (beyond Greenheck's range)

Push integrals controls
- Easy commissioning
- Easy to integrate into BAS

ENGINEER SALES: SIDE-BY-SIDE TECHNICAL COMPETITIVE ADVANTAGES

	SWEGON GOLD AIR HANDLING UNIT	GREENHECK RV(E) UNIT
CABINET	The GOLD cabinet is 2 inches thick with high density mineral wool media. It meets ASHRAE 90.1 with an R value of 8. It is 2.8lbs/ft3 which gives it superior acoustics properties allowing it to be extremely quiet.	Greenheck uses a cabinet wall thickness of 2" with fibreglass insulation. The density of the fibreglass insulation is 1.5lbs/ft3 which results in lower levels of sound reduction through radiated noise.
FANS/ MOTORS	Swegon Gold uses EC direct drive motors with a Swegon designed and built plenum fan.	Greenheck uses a direct drive ac motor with a plenum fan and VFD. On average the EC motor will be at least 10% more efficient. See attached detailed analysis.
WHEEL	Swegon uses a 3A molecular sieve desiccant wheel. Our wheel is a one piece 10" deep wheel that is wound on a central hub. We average 80% efficiency and better. It is all aluminum.	Greenheck uses a segmented 3" deep plastic wheel that averages 70% efficiency. For a more detailed look at the impact of the wheels efficiency, see attached cooling load calculator.
CONTROLS	The Swegon controller is sold with all GOLD series products. That means we sell it with over 10,000 units worldwide. The controller is configurable and comes pre-programed with many different options. All you need to do is enable the options and sequences that you would like. All optional features are standard on the GOLD IQ Logic controller. The GOLD IQ Logic is BTL certified and communicates via BACNet IP. The IQ logic controller is upgradable for future changes to the operating system.	Greenheck also offers a factory mounted and programmed controller. It comes with standard control sequences and some optional features. In order to talk BACNet or interface with a network, an additional module needs to be installed on the Greenheck unit.
FILTRATION	The standard GOLD filter is a 22" long MERV13 bag filter. The bag filter has a high surface area that helps reduce the overall static of the unit allowing lower energy usage. There is an option of using a MERV8 2" pre-filter with the bag filter to lengthen its lifespan.	Greenheck uses only 2" filters but they are available in both Merv 8, 13 and 14. Typical life spans on cartridge filters are 4-6 months. The sensors are optional for Greenheck.

CONTRACTOR SALES: SIDE-BY-SIDE COMMERCIAL COMPETITIVE ADVANTAGES

	SWEGON GOLD AIR HANDLING UNIT	GREENHECKRV(E) UNIT
CABINET	All of our cabinets are one sided access. The doors have double acting handles for added safety.	Greenheck requires access at all four sides of their units for maintenance. This takes up costly mechanical room space.
FANS/ MOTORS	Swegon uses a direct drive fan so there are no belts that need to be replaced in the future. The motor is designed to be easily serviceable. Replacing motor bearings in less than an hour. The L10 life of the bearings is 70,000 hours which equates to 24 hours a day for 8 years. Swegon balances their entire fan package to within 4% in the entire operating range and less than 1% at the balancing rpm. All of our fans are mounted on sliding rails to allow for easy slide out access.	Greenheck uses a double width, double inlet forward curved fan with an AC motor and VFD. On average the EC motor will be at least 10% more efficient. See attached detailed analysis.
WHEEL	High efficiency filters extend the cleaning life of the Wheel. Our minimum efficiency filter is a Merv 11 which keeps the wheel clean. We recommend inspecting the wheel every year for debris build up. If the pressure drop across the wheel begins to increase, the wheel can be cleaned with a vacuum and compressed air.	Greenheck uses a side by side unit it meaning that access is tight. The polymer wheel does not have the same lifespan as an aluminum wheel and therefore may need to be replaced sooner.
CONTROLS	The controls are tried, tested and true. They are delivered on more than 8000 units per year. The Control algorithms are all configurable and preprogrammed for ease of use. By following the handheld, a unit can be started up by following the on screen prompts in under 5 minutes. All units are tested thoroughly prior to leaving the factory and therefore you know they will work and the control systems are functioning.	Greenheck's controls are optional and require field programming and setup. This takes significant time and money.
FILTRATION	Swegon uses filter pressure monitors to provide a "dirty filter" alarm to indicate when the filters should be changed. This saves time and money not changing clean filters and not having to always look at them determine their dirtiness. Swegon also uses a quick release face loading filter rack. By releasing the handles you can easily slide out the filters for changes. The face loading system also presses the full 4 sides of the filter frame up against filter seals to prevent filter bypassing.	Without the use of "dirty filter" alarms, you are required to visually inspect the filters which costs time. You may also be replacing them too early which costs extra money for filters, or too late which costs extra money for BHP.

Aaon vs. Swegon
COMPETITIVE ANALYSIS

Swegon

PRODUCT SPECIFICATIONS

Product Model:	Aaon M2/M3
Construction Overview:	• 2" double wall, foam-filled construction with G90 galvanized and paint options • Multiple cooling options (split DX, CW coil, WSHP) • Multiple heating options (indirect gas, electric, HW coil, steam, WSHP) • MERV 8, 13 and 14 filter options • Optional controls • Optional VFD or EC motor

HOW GOLD COMPETES

GOLD	Aaon M2/M3	Benefit
Direct Drive EC motor	Direct drive AC motor	At least 10% more efficient
Plenum fan	Plenum fan	More versatile design allowing a smaller footprint
Standard Inverter	Optional VFD or inverter	Standard VAV or CV control
80+% wheel efficiency	60-70% wheel efficiency (silica gel)	Reduces the cooling load on average by 10%
Pre-programed and configurable controls	Optional controllers to allow for unit control and BAS integration	Standard on GOLD

Unit	0	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000	10500	11000	11500	12000	12500	13000	13500	14000	14500	15000	15500	16000	16500	17000	17500	18000	18500	19000	19500	20000
GOLD	05			07	08	11	12	14	20		25	30			35			40/50					60					70					80								
AAON																																									

STRATEGY: WHEN TO BID

1. **Good match-up, if there are**:
   - Unit mounted controls
2. **Tough sell**:
   - Some recirculating air configurations
3. **What we can work with**:
   - We have 460/3/60 and 575/3/60
     - 208/3/60 requires a transformation
4. **What to promote**:
   - Direct drive plenum fans: look at the BHP!
   - Higher efficiency wheel: may reduce cooling load by 7-8%
   - More quiet unit
   - Painted unit with high-end Euro look
   - We provide full integrated controls with touchpad
   - We have proven BAS integration
   - We provide inverters with air flow stations

VALUE ENGINEERING

Our better wheel will reduce additional mechanical cooling requirement

- Downsize mechanical cooling by as much has 7–8%

We may have a smaller electrical service for electrical savings

If VRF project, tie the GOLD unit into VRF heatpumps

If matched to Aaon condensing unit, look at Addison or some other competitive manufacturer

Push integrals controls

- Easy commissioning
- Easy to integrate into BAS

ENGINEER SALES: SIDE-BY-SIDE TECHNICAL COMPETITIVE ADVANTAGES

	SWEGON GOLD AIR HANDLING UNIT	Aaon M2/M3 UNIT
CABINET	The GOLD cabinet is 2 inches thick with high density mineral wool media. It meets ASHRAE 90.1 with an R value of 8. It is 2.8lbs/ft3 which gives it superior acoustics properties allowing it to be extremely quiet.	Aaon uses rigid polyurethane foam panels. Although these panels provide a higher R value (R13), they are less dense and radiated noise levels would be higher compared to Swegon's. Swegon's standard materials are pre-painted exterior and galvanized interior. Aaon's standard is galvanized exterior and interior.
FANS/ MOTORS	Swegon Gold uses EC direct drive motors with a Swegon designed and built plenum fan.	Aaon uses direct drive backward curved plenum fans. A VFD or ECM motor is an option. On average the EC motor will be at least 10% more efficient. See attached detailed analysis.
WHEEL	Swegon uses a 3A molecular sieve desiccant wheel. Our wheel is a one piece 10" deep wheel that is wound on a central hub. We average 80% efficiency and better. It is all aluminum.	Aaon uses an 8" polymer wheel with silica gel. It is a segmented wheel with efficiencies in the high 60's to low 70's. Silica gel has high humidity transfer when RH is over 60%.
CONTROLS	The Swegon controller is sold with all GOLD series products. That means we sell it with over 10,000 units worldwide. The controller is configurable and comes pre-programed with many different options. All you need to do is enable the options and sequences that you would like. All optional features are standard on the GOLD IQ Logic controller. The GOLD IQ Logic is BTL certified and communicates via BACNet IP. The IQ logic controller is upgradable for future changes to the operating system.	Aaon uses an optional controller. They also provide the option of the customer choosing a controller to factory installed. Although they have many options they all need to be configured on a per unit bases. You will need to use a very simple LCD screen, a mobile interface or a web interface. Wiring and points all need to be preselected for use. Aaon's controller is compatible with BACNet, Modbus, Johnson N2, LonTalk and Fox protocols.
FILTRATION	The standard GOLD filter is a 22" long MERV13 bag filter. The bag filter has a high surface area that helps reduce the overall static of the unit allowing lower energy usage. There is an option of using a MERV8 2" pre-filter with the bag filter to lengthen its lifespan. .Dirty filter sensors are standard on the GOLD unit and are configurable for different alarm set points.	Aaon uses pleated or cartridge filters with varying MERV ratings up to MERV 14.

CONTRACTOR SALES: SIDE-BY-SIDE COMMERCIAL COMPETITIVE ADVANTAGES

	SWEGON GOLD AIR HANDLING UNIT	Aaon M2/M3 UNIT
CABINET	All of our cabinets are one sided access. The doors have double acting handles for added safety.	Due to the flexibility of the foam filled panels, the structural skeleton causes the unit to be large and heavy.
FANS/ MOTORS	Swegon uses a direct drive fan so there are no belts that need to be replaced in the future. The motor is designed to be easily serviceable. Replacing motor bearings in less than an hour. The L10 life of the bearings is 70,000 hours which equates to 24 hours a day for 8 years. Swegon balances their entire fan package to within 4% in the entire operating range and less than 1% at the balancing rpm. All of our fans are mounted on sliding rails to allow for easy slide out access.	Aaon gives you the option of upgrading the fans to EC type for energy savings, however using standard fan law principles for building air handling units, Aaon units are very large and heavy.
WHEEL	High efficiency filters extend the cleaning life of the Wheel. Our minimum efficiency filter is a Merv 11 which keeps the wheel clean. We recommend inspecting the wheel every year for debris build up. If the pressure drop across the wheel begins to increase, the wheel can be cleaned with a vacuum and compressed air.	Aaon uses a segmented wheel which over time may shift and become less true.
CONTROLS	The controls are tried, tested and true. They are delivered on more than 10,000 units per year. The Control algorithms are all configurable and preprogrammed for ease of use. By following the handheld, a unit can be started up by following the on screen prompts in under 5 minutes. All units are tested thoroughly prior to leaving the factory and therefore you know they will work and the control systems are functioning.	Aaon's points need to be pre-verified to ensure they are correctly set up. You need to have a separate interface to begin start up. All control algorithms need to be set up in the field.
FILTRATION	Swegon uses filter pressure monitors to provide a "dirty filter" alarm to indicate when the filters should be changed. This saves time and money not changing clean filters and not having to always look at them determine their dirtiness. Swegon also uses a quick release face loading filter rack. By releasing the handles you can easily slide out the filters for changes. The face loading system also presses the full 4 sides of the filter frame up against filter seals to prevent filter bypassing.	Dirty filter sensors are optional and need to be selected, along with programed. This adds costs.

PRODUCT SPECIFICATIONS	
Product Model:	Aaon RQ/RN
Construction Overview:	• 2" double wall, foam-filled construction with G90 galvanized and paint options • Multiple cooling options (split DX, CW coil, WSHP) • Multiple heating options (indirect gas, electric, HW coil, steam, WSHP) • MERV 8, 13 and 14 filter options • Optional controls • Optional VFD or EC motor

HOW GOLD COMPETES

GOLD	Aaon RQ/RN	Benefit
This is Aaon's main DX rooftop solution and we do not compete against it.		

ENGINEER SALES: SIDE-BY-SIDE TECHNICAL COMPETITIVE ADVANTAGES

	SWEGON GOLD AIR HANDLING UNIT	Aaon RQ/RNUNIT
CABINET	The GOLD cabinet is 2 inches thick with high density mineral wool media. It meets ASHRAE 90.1 with an R value of 8. It is 2.8lbs/ft3 which gives it superior acoustics properties allowing it to be extremely quiet.	Aaon uses rigid polyurethane foam panels. Although these panels provide a higher R value (R13), they are less dense and radiated noise levels would be higher compared to Swegon's. Swegon's standard materials are pre-painted exterior and galvanized interior. Aaon's standard is galvanized exterior and interior.
FANS/ MOTORS	Swegon Gold uses EC direct drive motors with a Swegon designed and built plenum fan.	Aaon uses direct drive backward curved plenum fans. A VFD or ECM motor is an option. On average the EC motor will be at least 10% more efficient. See attached detailed analysis.
WHEEL	Swegon uses a 3A molecular sieve desiccant wheel. Our wheel is a one piece 10" deep wheel that is wound on a central hub. We average 80% efficiency and better. It is all aluminum.	Aaon uses an 8" polymer wheel with silica gel. It is a segmented wheel with efficiencies in the high 60's to low 70's. Silica gel has high humidity transfer when RH is over 60%.
CONTROLS	The Swegon controller is sold with all GOLD series products. That means we sell it with over 8000 units worldwide. The controller is configurable and comes pre-programed with many different options. All you need to do is enable the options and sequences that you would like. All optional features are standard on the GOLD IQ Logic controller. BACNet IP and network interfacing is standard on the GOLD unit. The IQ logic controller is upgradable for future changes to the operating system.	Aaon uses an optional controller. They also provide the option of the customer choosing a controller to factory installed. Although they have many options they all need to be configured on a per unit bases. You will need to use a very simple LCD screen, a mobile interface or a web interface. Wiring and points all need to be preselected for use. Aaon's controller is compatible with BACNet, Modbus, Johnson N2, LonTalk and Fox protocols.
FILTRATION	The standard GOLD filter is a 22" long MERV13 bag filter. The bag filter has a high surface area that helps reduce the overall static of the unit allowing lower energy usage. There is an option of using a MERV8 2" pre-filter with the bag filter to lengthen its lifespan. .Dirty filter sensors are standard on the GOLD unit and are configurable for different alarm set points.	Aaon uses pleated or cartridge filters with varying MERV ratings up to MERV 14. Dirty filter sensors are standard on the GOLD unit and are configurable for different alarm set points.

CONTRACTOR SALES: SIDE-BY-SIDE COMMERCIAL COMPETITIVE ADVANTAGES

	SWEGON GOLD AIR HANDLING UNIT	Aaon M2/M3 UNIT
CABINET	All of our cabinets are one sided access. The doors have double acting handles for added safety.	Aaon uses SS continuous piano hinges and outswing doors.
FANS/ MOTORS	Swegon uses a direct drive fan so there are no belts that need to be replaced in the future. The motor is designed to be easily serviceable. Replacing motor bearings in less than an hour. The L10 life of the bearings is 70,000 hours which equates to 24 hours a day for 8 years. Swegon balances their entire fan package to within 4% in the entire operating range and less than 1% at the balancing rpm. All of our fans are mounted on sliding rails to allow for easy slide out access.	Aaon gives you the option of upgrading the fans to EC type for energy savings, however using standard fan law principles for building air handling units, Aaon units are very large and heavy.
WHEEL	High efficiency filters extend the cleaning life of the Wheel. Our minimum efficiency filter is a Merv 11 which keeps the wheel clean. We recommend vacuuming the wheel every 5 years, or when the pressure drop begins to increase. There is easy access to the wheel though the filter cabinets.	Aaon uses a segmented wheel which over time may shift and become less true.
CONTROLS	The controls are tried, tested and true. They are delivered on more than 8000 units per year. The Control algorithms are all configurable and preprogrammed for ease of use. By following the handheld, a unit can be started up by following the on screen prompts in under 5 minutes. All units are tested thoroughly prior to leaving the factory and therefore you know they will work and the control systems are functioning.	Aaon's points need to be pre-verified to ensure they are correctly set up. You need to have a separate interface to begin start up. All control algorithms need to be set up in the field.
FILTRATION	Swegon uses filter pressure monitors to provide a "dirty filter" alarm to indicate when the filters should be changed. This saves time and money not changing clean filters and not having to always look at them determine their dirtiness. Swegon also uses a quick release face loading filter rack. By releasing the handles you can easily slide out the filters for changes. The face loading system also presses the full 4 sides of the filter frame up against filter seals to prevent filter bypassing.	Dirty filter sensors are optional and need to be selected, along with programed. This adds costs.

Venmar vs. Swegon
COMPETITIVE ANALYSIS

Swegon

PRODUCT SPECIFICATIONS

Product Model:	**Venmar VHC**
Construction Overview:	• 2" double-wall construction with G90 galvanized and paint options • Multiple cooling options (split DX, WSHP, integral DX, CW coil) • Multiple heating options (indirect gas, electric, HW coil, steam, WSHP) • MERV 8, 13 and 14 filter options • Optional controls • Optional VFD

HOW GOLD COMPETES

GOLD	Venmar VHC	Benefit
Direct Drive EC motor	Direct drive AC motor	At least 10% more efficient
Plenum fan	Plenum fan	Standard VAV or CV control
Standard Inverter	Fanwall	Reduces the cooling load on average by 10%
80+% wheel efficiency	60-70% wheel efficiency	Reduces start up time and allows user flexibility
Pre-programed and configurable controls	Optional controllers to allow for unit control and BAS integration	Standard on GOLD

Unit	0	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000	10500	11000	11500	12000	12500	13000	13500	14000	14500	15000	15500	16000	16500	17000	17500	18000	18500	19000	19500	20000
GOLD	05			07	08	11	12	14	20		25	30			35			40/50					60					70					80								
VHC			36			42		50																																	

STRATEGY: WHEN TO BID

1 **Good match-up, if there are**:
- Water coils
- Indoor units

2 **Tough sell**:
- Integral DX and gas heat
- Rooftop curb mounted

3 **What we can work with**:
- Outdoor units, but not curb mount
- They are side-by-side, we are over under on air paths
- We have 460/3/60 and 575/3/60
  - 208/3/60 requires a transformation

4 **What to promote**:
- Direct drive plenum fans: look at the BHP!
- Higher efficiency wheel: may reduce cooling load by 7-8%
- More quiet unit
- Painted unit with high-end Euro look
- We provide full integrated controls with touchpad
- We have proven BAS integration
- We provide inverters with air flow stations

VALUE ENGINEERING

Lead time

If VRF project, tie the GOLD unit into VRF heatpumps

Can we group units to a larger size (beyond Venmar's VHC range)

Push integrals controls
- Easy commissioning
- Easy to integrate into BAS

Swegon

ENGINEER SALES: SIDE-BY-SIDE TECHNICAL COMPETITIVE ADVANTAGES

	SWEGON GOLD AIR HANDLING UNIT	Venmar VHC UNIT
CABINET	The GOLD cabinet is 2 inches thick with high density mineral wool media. It meets ASHRAE 90.1 with an R value of 8. It is 2.8lbs/ft3 which gives it superior acoustics properties allowing it to be extremely quiet.	Venmar uses fibreglass insulation which also meets ASHRAE 90.1, however it only has a density of 1.5lbs/ft3 which results in higher radiated noise levels. Venmar has the option of using rigid insulation. GOLD comes in a prepainted material. Venmar is available in prepaint or galvanized.
FANS/ MOTORS	Swegon Gold uses EC direct drive motors with a Swegon designed and built plenum fan.	Venmar uses their fanwall technology. This means they are direct driven AC fans. They are AMCA 210 certified to 72% efficient. Each motor is driven by its own VFD. On average the EC motor will be at least 10% more efficient. See attached detailed analysis.
WHEEL	Swegon uses a 3A molecular sieve desiccant wheel. Our wheel is a one piece 10" deep wheel that is wound on a central hub. We average 80% efficiency and better. It is all aluminum.	Venmar has multiple wheel selections, they have a sensible only wheel and a desiccant total energy wheel. They have different depths and average high 60's to low 70's for efficiency.
CONTROLS	The Swegon controller is sold with all GOLD series products. That means we sell it with over 8000 units worldwide. The controller is configurable and comes pre-programed with many different options. All you need to do is enable the options and sequences that you would like. All optional features are standard on the GOLD IQ Logic controller. BACNet IP and network interfacing is standard on the GOLD unit. The IQ logic controller is upgradable for future changes to the operating system.	The Venmar Controller is a factory programmed microprocessor with optional features. It talks BACNet MSTP and has the option to talk LonWorks, Modbus and Metasys. Most setpoints must be configured through BACNet.
FILTRATION	The standard GOLD filter is a 22" long MERV13 bag filter. The bag filter has a high surface area that helps reduce the overall static of the unit allowing lower energy usage. There is an option of using a MERV8 2" pre-filter with the bag filter to lengthen its lifespan. .Dirty filter sensors are standard on the GOLD unit and are configurable for different alarm set points.	Venmar uses only 2" filters but they are available in both Merv 8 and 13. Venmar recommends changing filters every 3 months. The sensors are optional for Venmar.

CONTRACTOR SALES: SIDE-BY-SIDE COMMERCIAL COMPETITIVE ADVANTAGES

	SWEGON GOLD AIR HANDLING UNIT	Venmar VHC UNIT
CABINET	All of our cabinets are one sided access. The doors have double acting handles for added safety.	Venmar requires access at all four sides of their units for maintenance. This takes up costly mechanical room space.
FANS/ MOTORS	Swegon uses a direct drive fan so there are no belts that need to be replaced in the future. The motor is designed to be easily serviceable. Replacing motor bearings in less than an hour. The L10 life of the bearings is 70,000 hours which equates to 24 hours a day for 8 years. Swegon balances their entire fan package to within 4% in the entire operating range and less than 1% at the balancing rpm. All of our fans are mounted on sliding rails to allow for easy slide out access.	Since Venmar uses Fan Wall technology, there are multiple AC motors and multiple VFD's.
WHEEL	High efficiency filters extend the cleaning life of the Wheel. Our minimum efficiency filter is a Merv 11 which keeps the wheel clean. We recommend vacuuming the wheel every 5 years, or when the pressure drop begins to increase. There is easy access to the wheel though the filter cabinets.	Multiple wheel segments are typically less true and usually cause higher levels of air transfer between supply and exhaust.
CONTROLS	The controls are tried, tested and true. They are delivered on more than 10,000 units per year. The Control algorithms are all configurable and preprogrammed for ease of use. By following the handheld, a unit can be started up by following the on screen prompts in under 5 minutes. All units are tested thoroughly prior to leaving the factory and therefore you know they will work and the control systems are functioning. All optional features need to be configured through the BMS network.	In order to set up the Venmar unit, you need to have the BACNet set up so that the points can be configured.
FILTRATION	Swegon uses filter pressure monitors to provide a "dirty filter" alarm to indicate when the filters should be changed. This saves time and money not changing clean filters and not having to always look at them determine their dirtiness. Swegon also uses a quick release face loading filter rack. By releasing the handles you can easily slide out the filters for changes. The face loading system also presses the full 4 sides of the filter frame up against filter seals to prevent filter bypassing.	Dirty filter sensors are options and need to be selected, along with programed. This adds costs.