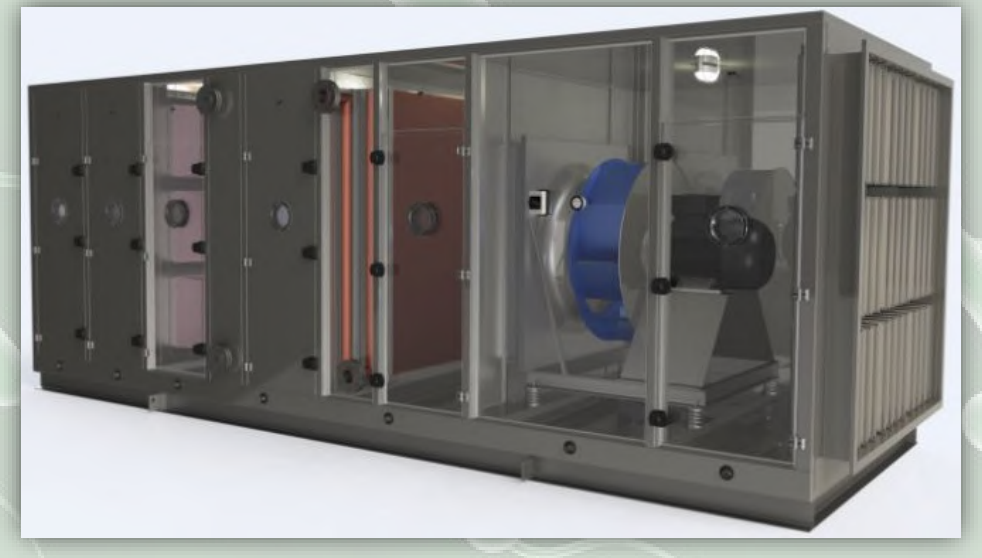
Hygienic Air Handling Units and Energy Saving



by
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V.P. Engineering & Sales
Pach Taas (Ashkelon) Ltd.

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Agenda

- Hygienic Air Handling Units (HAHU) application
- Microbes are everywhere
- HAHU Certification
- What makes AHU - HAHU
- HAHU Components
- HAHU Design Recommendations
- Electrical Motor
- FanWall® Technology Motor Choices
- FanWAll® Technology implementing in HAHU
- FanWAll® Technology implementing in HDXAHU
- HAHU & System Optimization = Energy Saving
- Optimized HAHU

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Hygienic Air Handling Units (HAHU) Application

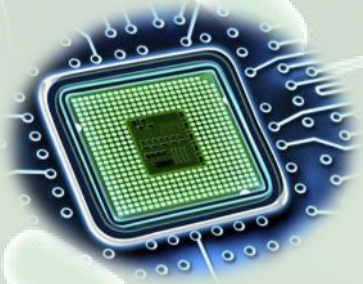
Hospitals

Laboratories

Food Industries

Hygienic Air Handling Units (HAHU) are used in:

Pharmaceutical Industries



Semi-Conductor Industries

Public Buildings for everyday life

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Microbes are everywhere

Location	Average Microbial Count / Sample
Carpets	1,062,500
Air filters in furnace/duct work	648,000
Toilets	291,000
Kitchen countertops	231,000
Dishwasher	189,000
Trash compactor, garbage disposal	167,000
Showers, bathtubs, water faucets	132,000
Refrigerator	76,300
Light switches and door knobs	15,100
Bedding, mattresses, furniture fabrics	13,600

HAHU Certification

❑ VDI 6022 Certification

High reliability and serviceability of the Hygienic Air Handling Units (HAHU).

- No strict requirements.
- No annual inspection at the factory.
- Wide range of variations between certified and supplied Units.

❑ Eurovent Certita Certification

Strict and detailed Certification for more detailed design of internal features and components location.

- Guarantee the hygienic aspect of the AHU.
- Check of the of the quality of used materials and selected components.
- Check of the Unit maintenance level.

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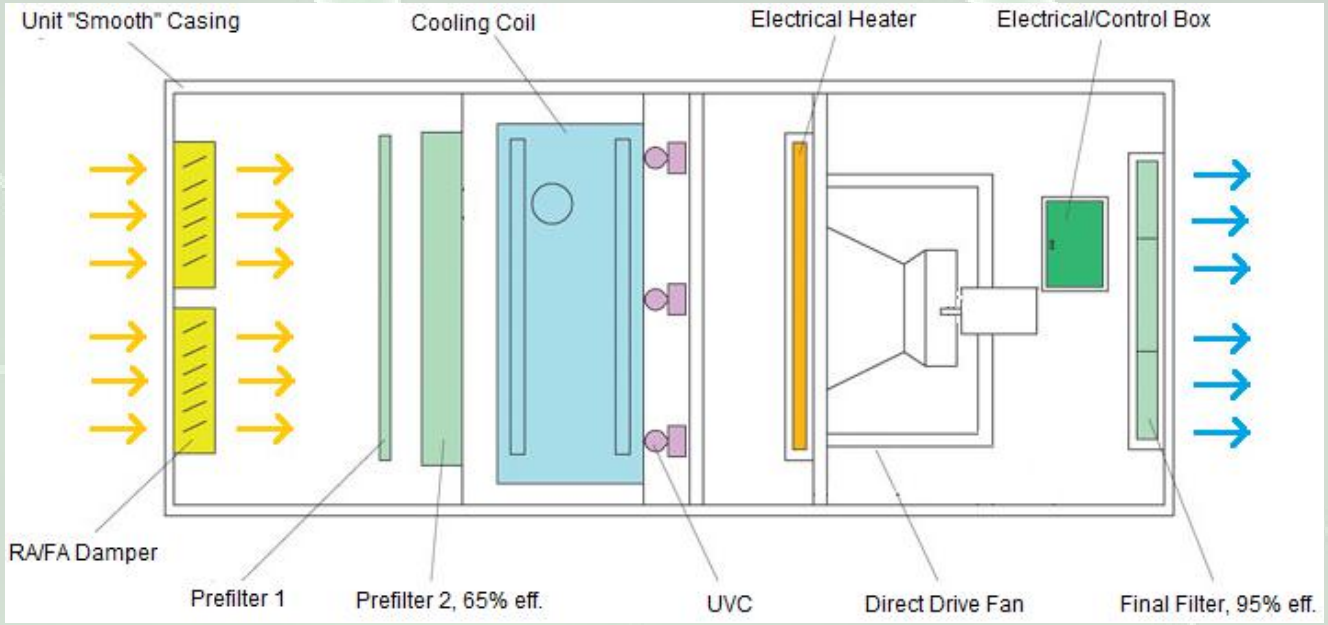
What makes AHU – HAHU?

- Smooth "Sandwich" Internal Surfaces for easy clean and disinfection
- High Protection Leakage Casing
- Low Condensation
- Easily Accessible Components for cleaning and removal
- Convenient service sections
- Only Directed Driven Fans
- Antibacterial growth proof coats, sealants, gaskets, filters
- Metallic parts coating according to Corrosion class C3
- Integrated UVC Technology
- Corrosion Proof Parts
- SS only Drain Pans
- "Clean" Silencer made of stone wool with glass fiber
- Inspection Windows in all Sections.

HAHU Components

- Dampers
- Pre filters
- Heat Exchangers
- Drop Eliminators
- UVC Lighting
- Heating Elements
- Direct Drive Fans
- Recuperator Types
- Humidification Systems
- Silencer
- Main Filter Types



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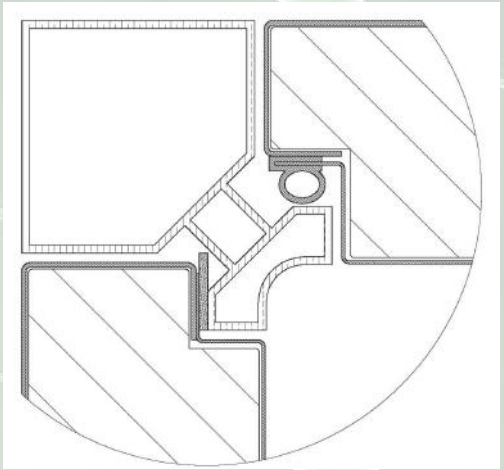
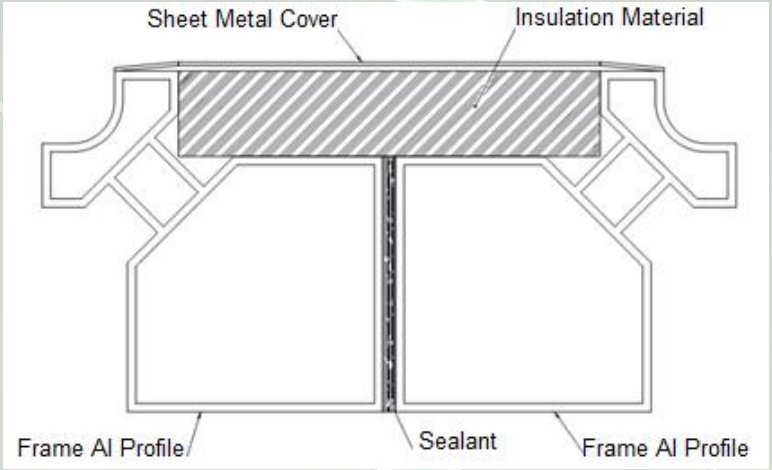
HAHU Design Recommendation

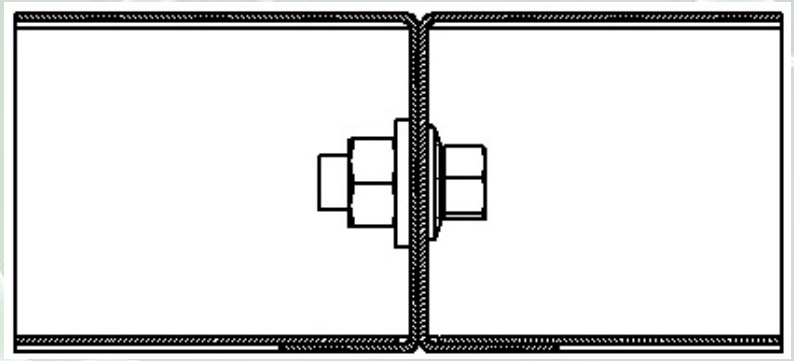
- **Smooth Internal Casing**





- Aluminum Construction

- Non Frame Construction



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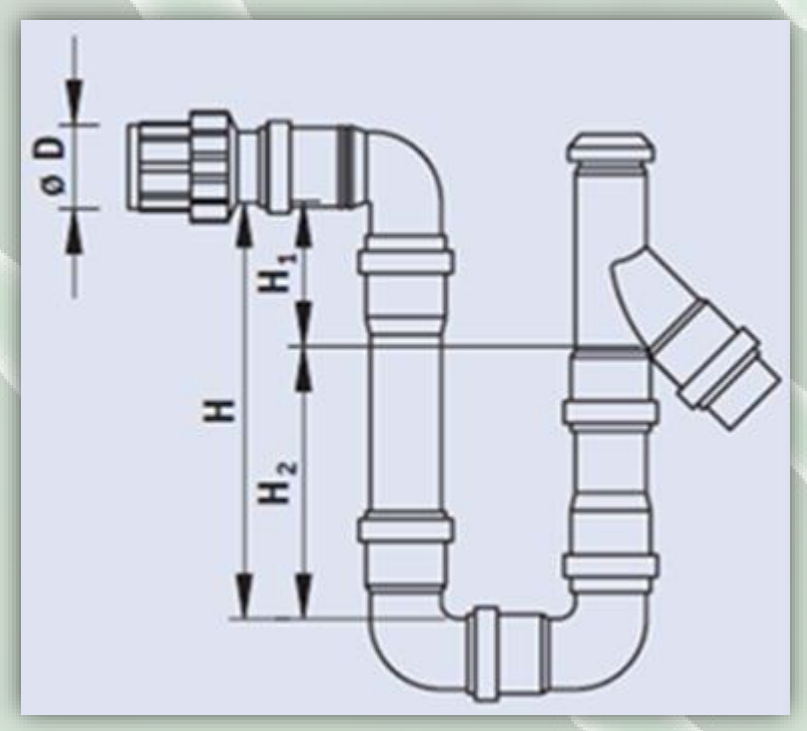
HAHU Design Recommendation

- **Proper Unit Drainage**



- **Location: Positive Pressure Side**

$$H_1 = 30\ mm,$$

$$H_2 = p + 30\ mm$$

- **Location: Negative Pressure Side**

$$H_1 = p + 30\ mm,$$

$$H_2 = \frac{p}{2} + 30\ mm$$

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HAHU Design Recommendation

- **Antimicrobial Coating**
  - Nirlat, Nirocryl Antimicrobial, compound of silver ions
  - Dupont, Agion in Alesta®AM, compound of silver ions.

- **Internal Components Anticorrosion Coatings**
  - Polyester or Epoxy Powder Coating, C3 or C4
  - Blygold PoluAL XT MB
  - SS304/SS316.

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HAHU Design Recommendation

- **Heat Exchanger Adapting Materials**

Details	Materials
Tubes	Cu, SS304, SS316
Fins	Al, Cu, AlMg2.5, SS304, SS316
Fins Type	Flat
Manifold	Cu
Frame	Pre-painted Gal., Al, Cu, SS304, SS316
Connection	Cu/Fe, Cu/Cu, Cu/Brass, Cu/SS304, Cu/SS316, Cu/Fe (Victaulic)

- **Heat Exchanger Coating**
  - **Hydrophilic**
  - **Hydrophobic**
  - **AlMg2.5**
  - **Gold Epoxy**
  - **Grey Polyester**
  - **Blygold**
  - **Heresite P413**

HAHU Design Recommendation

- **UVC Lighting Usage**
  - No coating required

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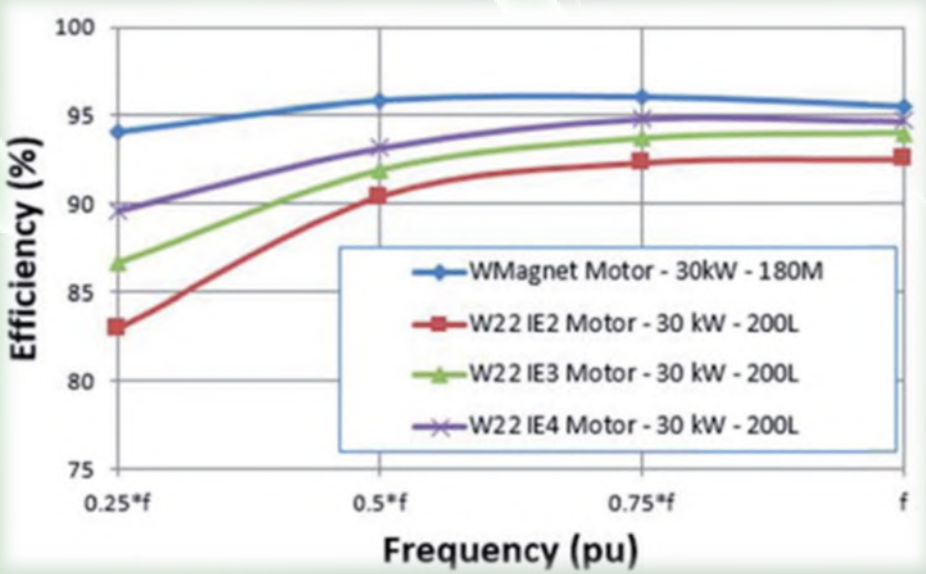
American Air & Water®

Electrical Motor

- **Motors Types**

  - AC motor, Eff. Class IE1, IE2, IE3, IE4
  - EC (BLDC), Eff. Class – not affected by IEC, but Close to IE4
  - Permanent Magnet AC (PM), Eff. Class IE4-IE5.



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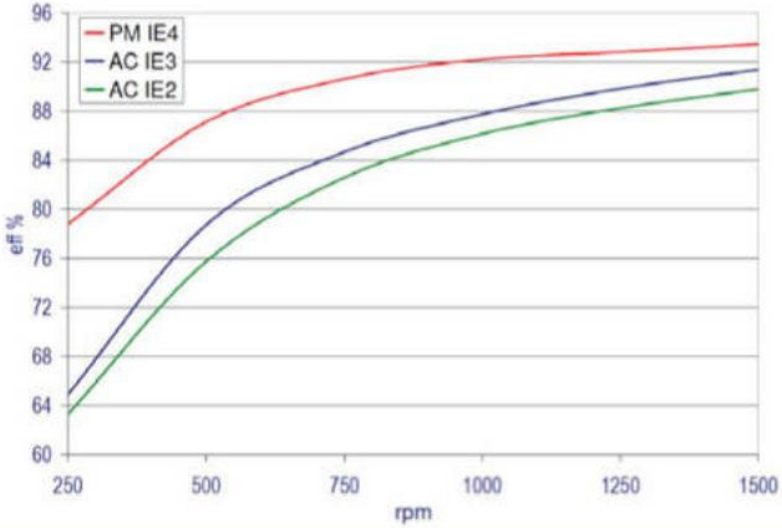
Electrical Motor

EC (BLDC) Motor,
integrated VSD

AC Motor, IE4
NO integrated VSD

Example of efficiency values with variable speed between IE2-IE3 induction motors and IE4 synchronous/brushless PM motors



PM Motor,
NO integrated VSD

PM Motor,
integrated VSD

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marathon® Motors

FanWall® Technology - Motor Choices

Flexibility in Motor Performance

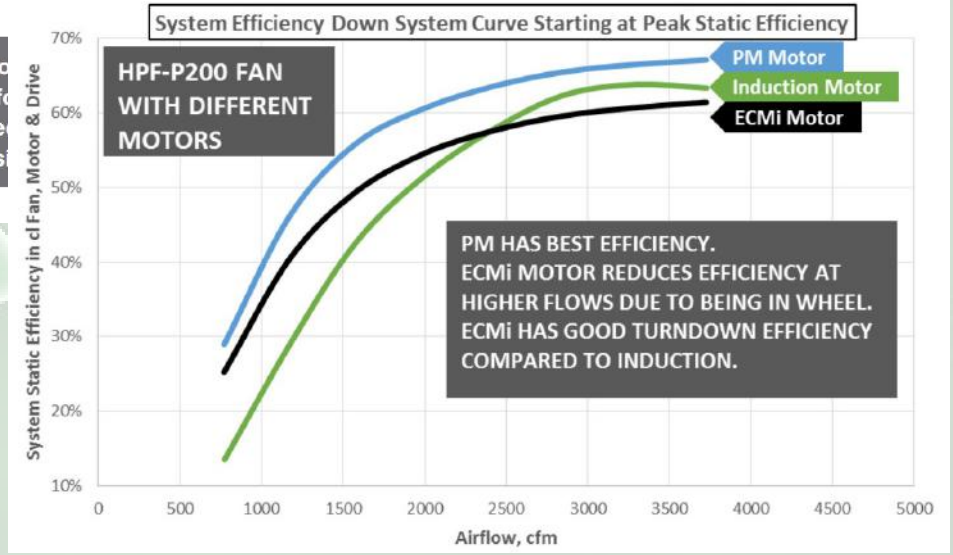
Motors are a major factor in the efficiency of fan systems. The air handler brands of Nortek Air Solutions offer multiple motors to meet your specific fan system performance requirements.

Motor	Typical Comparative Efficiency*
Induction	Good/Better
Electronical Commutated Permanent Magnet (ECMi)	Better
Permanent Magnet (PM)	Best

*Efficiency depends on specific application and system operating range.

FANWALL Air Handler System Available Motors		
Wheel Model	**Description**	**Motors**
HPF-P200	Polymer Wheel	AC Induction
		Permanent Magnet (PM)
HPF-P200 ECMi	Polymer Wheel	Electronically Commutated Permanent Magnet Motors (ECMi)
HPF-A100	Aluminum Wheel	AC Induction
		Permanent Magnet (PM)

Contact a Nortek Air Solutio Representative for more inf our brands of air handling e representative near you, visi



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NORTEK AIR SOLUTIONS
HUNTAIR

FanWall® Technology Implementing in HAHU

2 x 60,000 CFM

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NORTEK AIR SOLUTIONS
HUNTAIR

Fan Wall® Technology - Implementing in HDXAHU

- HDXAHU Water Condensing

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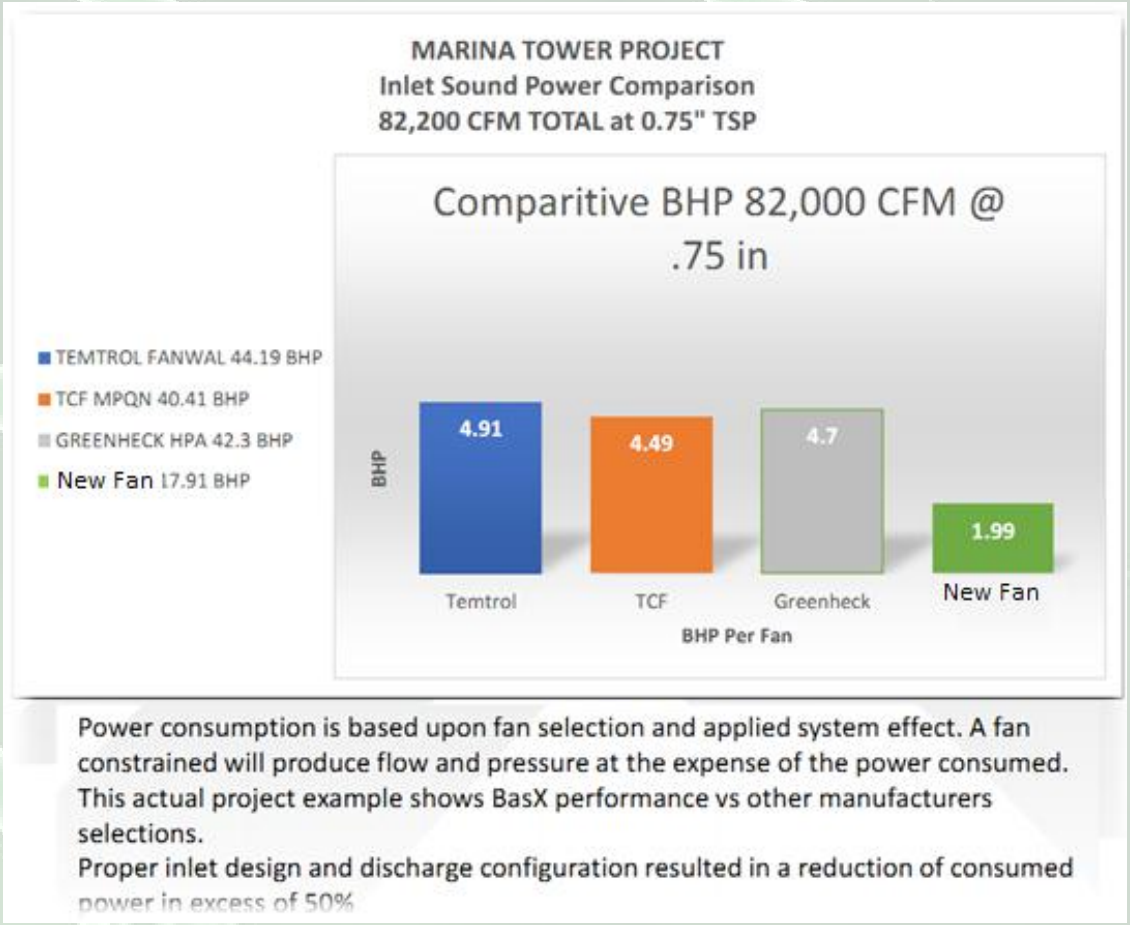
NORTEK AIR SOLUTIONS
HUNTAIR®

Free Delivery Cell – Next Fans Generation



Power consumption is based upon fan selection and applied system effect. A fan constrained will produce flow and pressure at the expense of the power consumed. This actual project example shows BasX performance vs other manufacturers selections.

Proper inlet design and discharge configuration resulted in a reduction of consumed power in excess of 50%

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HAHU & System Optimization

- Process Understanding and Specification
- Process Air Capacity Calculation
- Pressure Drop Calculation **CLOSE TO PROCESS**
- Filter Facing Velocity
- Maximize Heat Exchanger Facing Velocity according to Process Air Capacity
- Run Around Heat Exchangers or Recuperator: Plate or Rotary type
- Air & Water Pressure Drop optimizing
- Rows Deep Ver. Fins optimizing (Reducing Rows Deep by using thicker Fins)
- UVC Lighting to prevent bacteria growing on Heat Exchanger and Wet Surfaces
- Fan & Motor optimizing to operation conditions, when design point can be at up to 75Hz
- Combination of Fans QTY (Fan Wall® Technology Flexibility).

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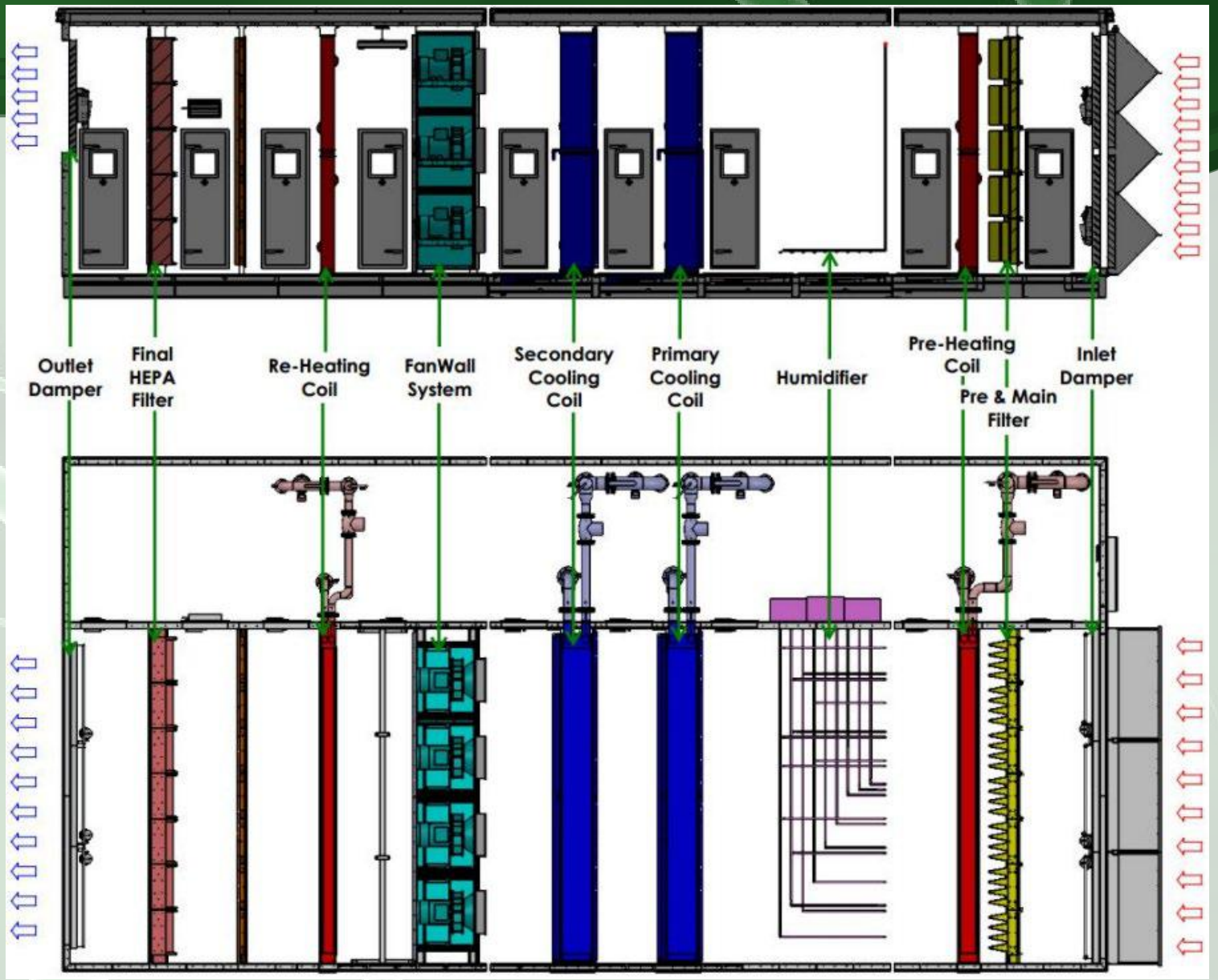
All THESE UP TO 60% Energy Save

Optimized HAHU



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Thank You!

Since 1972

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