

# PLATE HEAT EXCHANGER

Energy Recovery Ventilation Specialist



**HOLTOP**

Beijing Holtop Air Conditioning Co., Ltd





## COMPANY PROFILE

Holtop is the leading manufacturer in China specializing in the production of air to air heat recovery equipments. Founded in 2002, it is dedicated to the research and technology development in the field of heat recovery ventilation and energy saving air handling equipments for more than 15 years.

Holtop headquarters is located at the foot of Beijing Baiwangshan Mountain, covering area of 30,000 square meters. The manufacturing base is in Beijing's Badaling Economic Development Zone, covering an area of 60 acres, with an annual production capacity of 200,000 units of air heat recovery equipments. Holtop builds a sound certificate system of ISO9001, ISO14001 and OHSAS18001 as well as product certification systems. Moreover, it has a laboratory certified by national authority. As a well-known manufacturer in the field of heat recovery, Holtop has a strong R&D team and possesses dozens of national invention patents, and has participated in the compilation work of several national standards, and is also elected as Zhongguancun High-Tech Enterprise.

Holtop has mastered the core technology of heat recovery, independently developing products like plate and rotary heat exchangers, various heat & energy recovery systems and air handling units. Products have been exported to more than 41 countries and regions. Holtop continuously ranks the top in domestic market of heat and energy recovery ventilators.

Holtop will always committed to the mission of delivering highly efficient and energy saving products and solutions to improve indoor air quality, to ensure people's health and protect our earth.





# CERTIFICATION

After years of dedication to the research and technology development in the filed of heat recovery and indoor air quality, Holtop has many achievements on the product innovative and quality management, which is certified by National and International authorities.



Product Patent Certificates



Test lab Verification Certificates



Energy Saving Product Certificates



ISO9001 / ISO14001 / OHSAS18001 Certificates





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Holtop heat exchanger is one of the air-to-air heat exchangers. Outdoor air and exhaust air are separated by the plates to ensure the air tightness while transferring the heat. It has no movement parts, so it's more reliable and has longer service life.

According to the airflow directions of the heat exchanger, it is categorized into cross flow type, counter flow type, and cross-counter flow type. According to the recovery functions of the heat exchanger, it is categorized into sensible heat type and total heat type.



**Crossflow plate heat exchanger**

- Made by flat aluminum foils of 0.12mm thickness
- Two air streams flow crossly.
- Suitable for room ventilation system and industrial ventilation system.
- Heat recovery efficiency up to 70%



**Cross-counter flow plate heat exchanger**

- Made by flat aluminum foils of 0.12mm thickness
- Partial air flows crossly and partial air flows counter
- Suitable for room ventilation system and industrial ventilation system.
- Heat recovery efficiency up to 90%



**Cross flow plate fin total heat exchanger**

- Made by third generation E.R. paper
- Structured with flat plates and corrugated plates.
- Two air streams flow crossly.
- Fire retardant and mold resistance, certified by national authority
- Total heat recovery efficiency up to 80%



**Heat pipe heat exchanger**

- Made by cooper tube with hydrophilic aluminum fin
- Filled with special fluoride for heat exchange media.
- Heat insulation section in the middle for heat and cold source insulation
- Free of maintenance, washable and longer service life
- Total heat recovery efficiency up to 82%

**Model Description**

HB S - W 300/300 - 400 - 3 B - 1

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

- ① Stands for Holtop plate heat exchanger
- ② Function code: S - sensible heat exchanger, T - total heat exchanger.
- ③ Structure code: W - cross flow plate fin heat exchanger, ZF - cross flow heat exchanger, CF - counter flow plate heat exchanger, LB - cross-counter flow heat exchanger.
- ④ Stands for the cross section size (mm)
- ⑤ Stands for length of the heat exchanger (mm)
- ⑥ Stands for plate distance (mm)
- ⑦ Material: B - standard type, F - anti-corrosion, G - High temperature
- ⑧ 1/2/3, stands for air stream direction

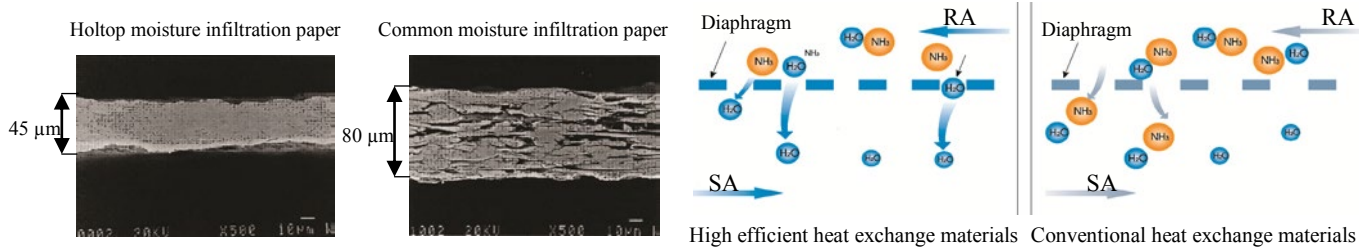
**Material of the heat exchanger**

**Sensible heat exchanger**

The plate is made of aluminum foils specially for air-to-air heat exchange. Various type are available for different applications.

**Total heat exchanger**

Total heat exchanger is made of ER paper which is featured by high moisture permeability, good air tightness, excellent tear resistance, and aging resistance. The clearance between the fibers is very small, so only the moisture molecules of small diameter can go through, the odor molecules of larger diameter are unable to pass through it. By this means, the temperature and humidity can be recovered smoothly, and prevent the pollutants infiltrating to the fresh air.



Gas molecules type	Carbon dioxide (CO <sub>2</sub> )	Ammonia (NH <sub>3</sub> )	Methane (CH <sub>4</sub> )	Vapor (H <sub>2</sub> O)	The clearance of fiber
Diameters (nm)	0.324	0.308	0.324	0.288	0.3 (for reference)

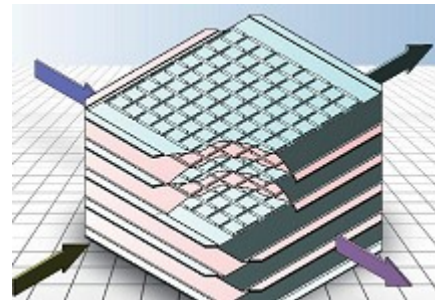


## Application

Used in comfortable air conditioning ventilation system and technical air conditioning ventilation system. Supply air and exhaust air totally separated, heat recovery in winter and cold recovery in Summer

## Working principle

Two neighbor aluminum foils form a channel for fresh or exhaust air stream. Heat is transferred when the air streams flow crossly through the channels, and fresh air and exhaust air is totally separated.



## Material type

### B series (standard type)

Heat exchanger is made of pure aluminum foils, with galvanized end cover and aluminium alloy wrap angle. Max. air temperature 100°C, it is suitable for most of the occasion.

### F series ( Anti-corrosion type)

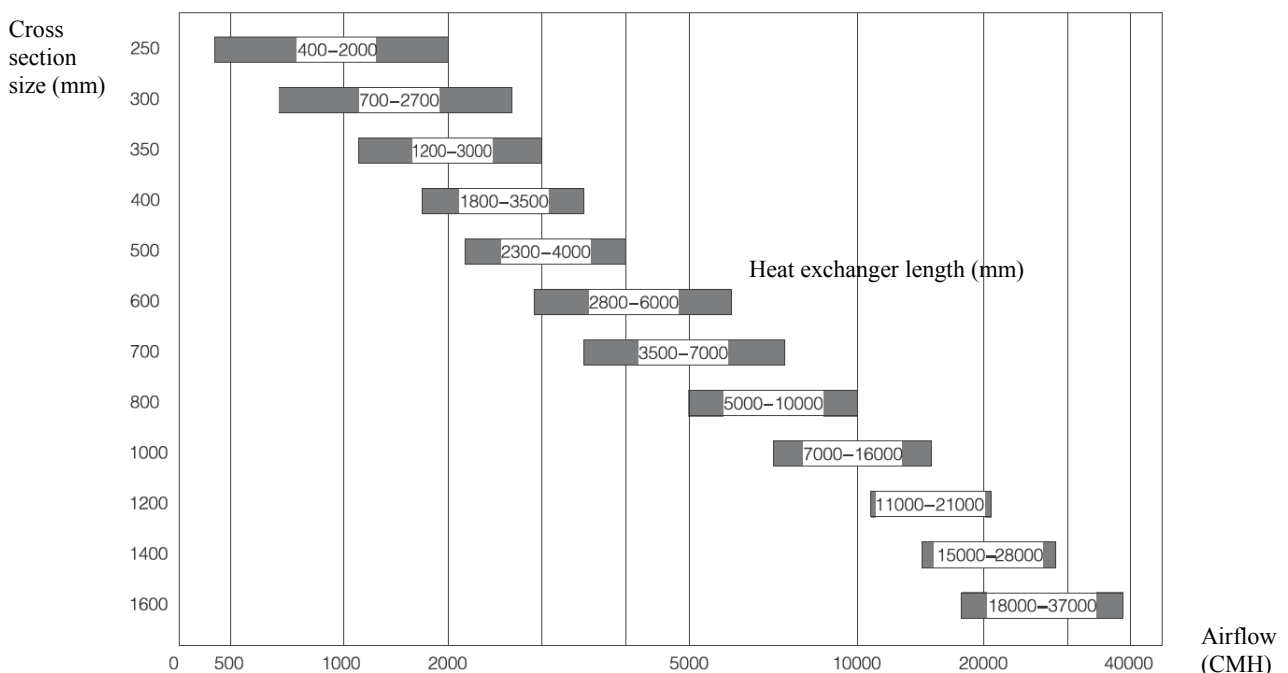
Heat exchanger is made of pure aluminum foils cover by special anti-corrosion material, with galvanized end cover and aluminium alloy wrap angle., it is suitable for the corrosive gas occasion.

### G series (high temperature type)

Heat exchanger is made of pure aluminum foils, with galvanized end cover and aluminium alloy wrap angle. Sealing material is special and allow the Max. air temperature to be 200°C, it is suitable for special high temperature occasion.

Aluminum foils thickness range from 0.12 to 0.18mm because of the different specification heat exchanger.

## Heat exchanger size and air volume



**Heat exchange coefficient**

According to research, heat exchange rate is based on the heat exchange coefficient, larger coefficient means higher heat exchange rate. Holtop use the special pure aluminum foils to produce heat exchanger, heat exchange rate is effectively improved.

**Heat exchange area**

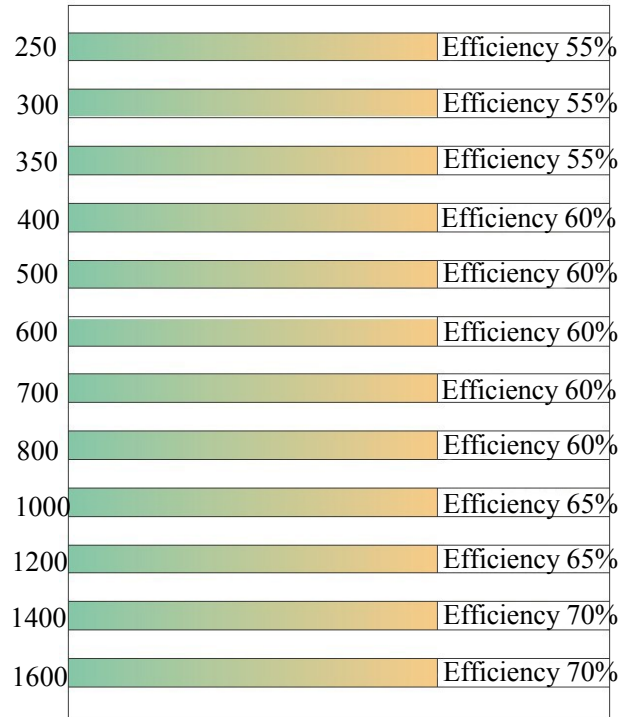
Heat exchange capacity is relevant to the heat exchange area. By changing the plate structure, increase heat exchange area, heat exchange efficiency is also increased. In order to increase the heat exchange area, Holtop heat exchanger has grooves in all the plates.

**Plate distance**

Small plate distance can increase heat exchange efficiency, but resistance also increased. Large plate distance means less resistance but efficiency is low. Only choose the suitable plate distance can have ideal heat exchange efficiency.

**Turbulent flow**

Because the special plate structure of Holtop heat exchanger, when airstream enter the heat exchanger will become turbulent so heat exchange efficiency increased.



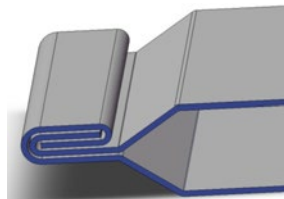
Efficiency of different specification heat exchanger

**Main features**

- Sensible heat recovery
- Total separation of fresh air & exhaust air streams
- Heat recovery efficiency up to 80%
- 2-side press shaping
- Double folded edge
- Completely joint sealing.
- Resistance of pressure difference up to 2500Pa
- Under pressure of 700Pa, air leakage less than 0.6%



2-side pressed shaping

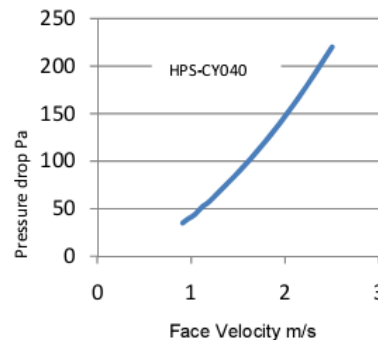
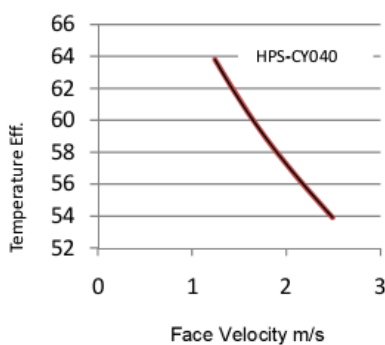


Double folded edge  
@5 times plate thickness



Completely joint sealing

**Performance chart**

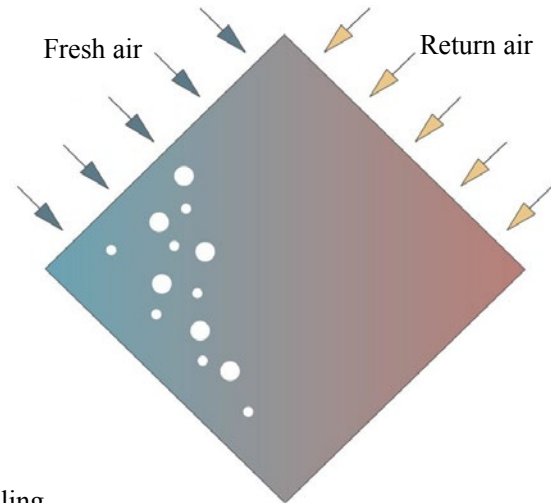


All data figured out above air tested according to GBT 21087-2007



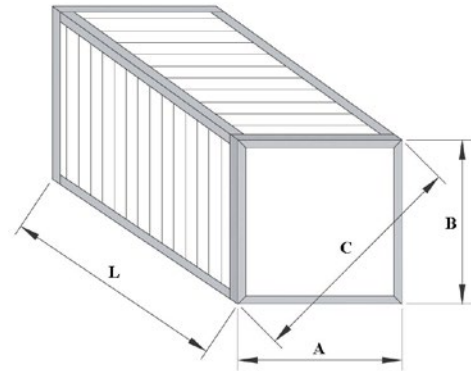
**Heat exchanger vertical installation**

When outdoor temperature is lower than indoor temperature, during heat exchanging if RA temperature is low enough (relative humidity 100%) then condensing water will come into being, once there is condensing water, heat exchange area inside heat exchanger is decreased, efficiency become lower and pressure drop increased, in order to eliminate the condensing water in time, heat exchanger vertical installation like the picture on right is the best choice.



**Condensing water pan**

When designing heat recovery functional section in air handling unit, under the heat exchanger should add the condensing water pan, in case of disorderly flow of condensing water



**Specifications**

Remarks:

- ① Length is customized, but should be within the specified range.
- ② Size C is for reference, size can be slightly increased according to heat exchanger length.

Model	A (mm)	B (mm)	C (mm)	Length per piece (L)	Optional spacing (mm)	Remarks
HBS-ZF250/250	250	250	356	≤400	4.0	One module
HBS-ZF300/300	300	300	427	≤400	4.0	
HBS-ZF300/300	300	300	427	≤500	5.0	
HBS-ZF350/350	350	350	498	≤400	4.0	
HBS-ZF350/350	350	350	498	≤500	5.0	
HBS-ZF350/350	350	350	498	≤550	6.0	
HBS-ZF400/400	400	400	568	≤400	4.0	
HBS-ZF400/400	400	400	568	≤500	5.0	
HBS-ZF400/400	400	400	568	≤550	6.0	
HBS-ZF500/500	500	500	710	≤550	6.0, 8.0, 10.0	
HBS-ZF600/600	600	600	851	≤550	6.0, 8.0, 10.0	
HBS-ZF700/700	700	700	993	≤550	8.0, 10.0	
HBS-ZF800/800	800	800	1134	≤550	8.0, 10.0	Four modules combined
HBS-ZF1000/1000	1000	1000	1417	≤500	6.0, 8.0, 10.0	
HBS-ZF1200/1200	1200	1200	1702	≤500	6.0, 8.0, 10.0	
HBS-ZF1400/1400	1400	1400	1985	≤500	8.0, 10.0	
HBS-ZF1600/1600	1600	1600	2265	≤500	8.0, 10.0	

# CROSS-COUNTER FLOW PLATE HEAT EXCHANGER **HOLTOP**

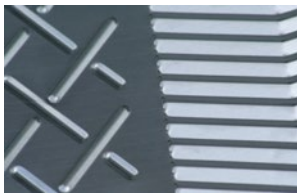
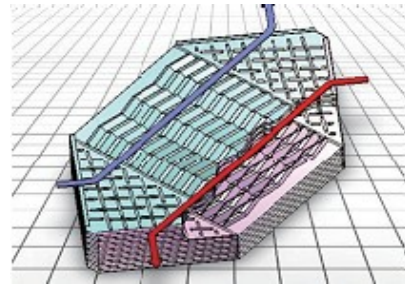


## Working principle

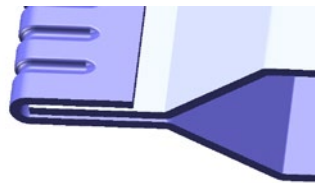
Two neighbor aluminum foils form a channel for fresh or exhaust air stream. Heat is transferred when the partial air streams flow crossly and partial air streams flow counter through the channels, and fresh air and exhaust air is totally separated.

## Main features

- Sensible heat recovery
- Total separation of fresh & exhaust air streams
- Heat recovery efficiency up to 90%
- 2-side press shaping
- Single folded edge
- Completely joint sealing.



2-side pressed shaping

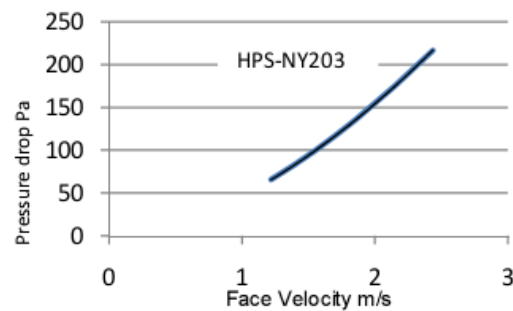
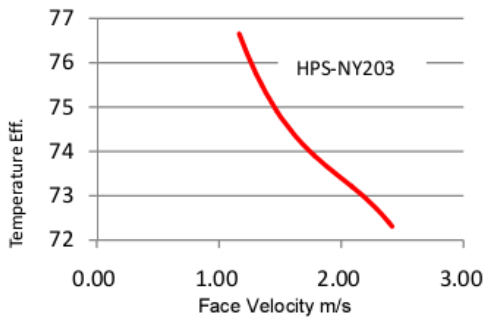


Single folded edge  
@3 times plate thickness

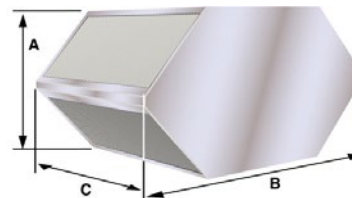
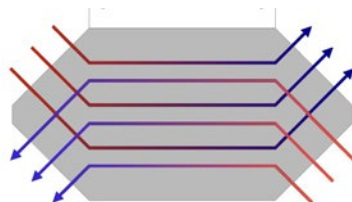


Completely joint sealing

## Performance chart



All data figured out above air tested according to GBT 21087-2007



## Specifications

Model	A (mm)	B (mm)	Length per piece (C)	Optional spacing (mm)
HBS-LB539/316	316	539	Custom-made Max. 650mm	2.1



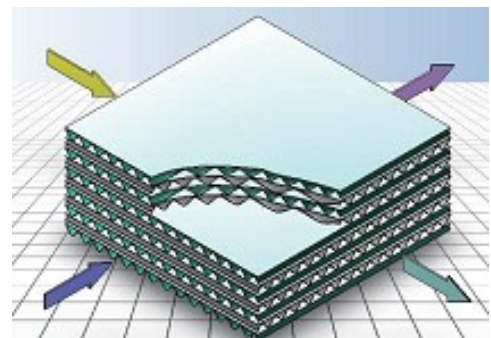


**Application**

Used in comfortable air conditioning ventilation system and technical air conditioning ventilation system. Supply air and exhaust air totally separated, heat recovery in winter and cold recovery in Summer

**Working principle**

The flat plates and the corrugated plates form channels for fresh or exhaust air stream. When the two air streams passing through the exchanger crossly with temperature difference, the energy is recovered.



**Performance index**

Item	Unit	Heat exchange paper	Corrugated paper
Ration	g/m <sup>2</sup>	60	80
Tightness	g/cm <sup>2</sup>	>0.85	>0.50
Vertical tensile resistance	N/15mm	>=20.0	>=30.0
Horizontal tensile resistance	N/15mm	>=15.0	>=20.0
Wet vertical tensile resistance	N/15mm	/	>=2.00
Wet horizontal tensile resistance	N/15mm	/	>=1.50
Hygroscopicity (Cobb method)	g/m <sup>2</sup>	>=20.0	/
Flame-retardant		Flame extinguishes after paper leaves the fire	
Antimicrobial		Has a bactericidal effect on E. coli 8099, Staphylococcus aureus ATCC6538, Klebsiella pneumoniae ATCC4352, Candida albicans ATCC10231	
Mildew resistance		Growing grade is 0	

Temperature efficiency: 70%  
 Effective air exchange rate: 98%  
 Mildew resistance grade: 0

Enthalpy efficiency: 60%  
 Flame retardant grade: B2  
 Antimicrobial: yes

### E.R. paper performance introduction

Heat exchange paper: for heat and moisture exchange, the main performance standards are diathermancy, moisture-penetrability and air permeability.

Corrugated paper: to construct the frame for the heat exchanger, flowing passages of the air stream.

### Heat transmissibility and physical strength

The sensible heat recovery efficiency of total heat exchanger depends on the heat transmissibility of the paper, it means the thermal conductivity of the paper. Generally speaking, the better thermal conductivity, the higher the sensible heat recovery efficiency. As the thermal conductivity of the paper is smaller than the aluminum foil, the paper thickness becomes important factor for the sensible heat recovery efficiency. The thinner heat exchanger paper, the better heat transmissibility and higher sensible heat recovery efficiency. And the thinner corrugated paper is helpful to reduce the resistance when the air stream pass the heat exchanger.

The physical strength of the paper material mainly includes anti-tensile strength, anti-split strength, anti-tear strength. The paper is thinner, the anti-tensile strength, anti-split strength, anti-tear strength is weaker.

The paper of HOLTOP are made of imported pulp by special processing methods and adding some inorganic materials, to keep the heat exchange paper thin while maintaining high heat transmissibility and anti-tear properties, and keep the corrugated paper stiff and strong but thin.

### Moisture penetrability and air permeability

Moisture penetrability means under the conditions that both sides of heat exchanger paper maintains moisture pressure difference, the moisture penetrate from one side to the other side, which is measured by the weight of the moisture penetrated from 1m<sup>2</sup> paper in 24h(g/24h.m<sup>2</sup>). The Moisture penetrability depends on the thickness of the paper material and the anti-permeate of the material .The Moisture penetrability is higher then the latent heat recovery efficiency is higher. The evaluating standards are according to GBT2679.2-1995 Paper and Cardboard Moisture Permeability and Crease Moisture Permeability Determination (disc method) to measure the amount of water vapor through the specific area of the test paper within a certain period of time.

The paper of HOLTOP was coated with hygroscopic agent with high absorption and release ability on the surface, and the small particle diameter water moisture molecule can pass while the bigger particle diameter like harmful gas or peculiar smell gas molecules can't pass, to make sure heat exchanger paper have strong penetrability, good selective ability and air tightness.

### Fire retardant

As the total heat exchanger is installed in the air handing unit ,according to the building fire safety rules, it should be fire resistance.

The paper of Holtop are added with fire retardant in the pulp, which was tested by the national construction engineering quality supervision and inspection center. According to the judging criteria of GB/TT8624-1997, the fire resistance of our total heat exchanger can reach B2 level ,and issued the test report.

The testing method is according to GB/T8626-2007 Building Materials Flammability Experiment Method. Igniting on the bottom edge of the paper for 15S, lasted for 20S, flame point doesn't exceed the 150mm tick mark of the sample, and no dye burn drips. Igniting on the surface of the paper for 15S, lasted for 20S. flame point doesn't exceed the 150mm tick mark of the sample ,and no dye burn drips.



Anti-bacteria and mold prevent performance

The bacteria exists in the damp air, when air goes through the heat exchanger, bacteria may stick on the walls of the exchanger. If the heat exchanger doesn't have the anti-bacteria ability, it will grow on the inside wall, and then blown into indoor, which will cause indoor air pollution. That is why the anti-bacteria performance is required. The ability of bacterial growth inhibition and killing bacteria, to prevent the production of mold, is an important factor of heat exchanger paper.

By adding the bactericides to the surface of paper and the anti-bacteria agents to the slurry, the heat exchanger has abilities to kill bacteria (such as Escherichia coli and staphylococcus) and inhibit fungal (such as Candida albicans) and prevent the bacteria and germ spreading in the air. Holtop heat exchanger paper was tested by Guangzhou Industry Microbe Test Center, and shown the antibacterial effect, and its mildew grade is 0.

Fire resistance test report

**国家建筑工程质量监督检验中心检验报告**  
TEST REPORT OF NATIONAL CENTER FOR QUALITY SUPERVISION AND TEST OF BUILDING ENGINEERING

报告编号(No. of Report): BETC-NH-2011-1112 共1页 第1页(Page 1 of 1)

委托单位(Client)	北京环都人工环境科技有限公司			
地址(ADD)		电话(Tel)	010-58511908	
样品(Sample)	名称(Name)	板翅式全热交换器(芯体)	状态(State)	完好
	商标(Brand)	HOLTOP	规格型号(Type/Model)	厚 2.5 cm
生产单位(Manufacturer)	北京环都人工环境科技有限公司			
送样日期(Date of delivery)	2011.05.17.	地点(Place)		
工程名称(Name of engineering)				
检验(Test)	项目(Item)	燃烧性能(B2)	数量(Quantity)	1组
	地点(Place)	试验室	日期(Date)	2011.05.26.
	依据(Reference documents)	GB8624-1997, GB/T8626-2007, ISO11925-2:2002		
	设备(Equipment)	可燃性试验仪		

**检验结论(Conclusion)**

- 按照GB/T8626-2007/ISO11925-2:2002进行检验, 在试件底边缘点火15s, 自点火开始后的20s内, 火焰尖头未超过试件150mm刻度线, 且无燃烧滴落物。
- 按照GB/T8626-2007/ISO11925-2:2002进行检验, 在试件表面点火15s, 自点火开始后的20s内, 火焰尖头未超过试件150mm刻度线, 且无燃烧滴落物。
- 根据GB8624-1997的判定条件, 判定所选样品的燃烧性能达到B2级。  
(本页以下无正文)

批准(Approval)	审核(Verification)	主检(Chief tester)	联系电话(Tel)	报告日期(Date)
			010-64517759	20110527

Anti-bacteria and mold prevention test report

**检测报告**  
REPORT FOR ANALYSIS

广州工业微生物检测中心  
GUANGZHOU INDUSTRY MICROBE TEST CENTER

收样日期: 2011年6月16日 检测日期: 2011年6月20日  
Date Received Date Analyzed

试验菌种: 球毛壳霉 ATCC 6205  
试验条件: 时间 28 天, 湿度 >90%RH, 温度 28℃

样品编号	委托方样品编号	长霉程度	长霉级别
WJ2011519-1	L.F003-11	无生长	0 级

注: 长霉等级:  
0 级 无生长 (试样表面霉菌覆盖面积 <10%)  
1 级 微量生长 (试样表面霉菌覆盖面积 10%-30%)  
2 级 轻度生长 (试样表面霉菌覆盖面积 30%-60%)  
3 级 中度生长 (试样表面霉菌覆盖面积 >60%)  
4 级 重度生长 (试样表面霉菌覆盖面积 >60%)  
以下空白  
Blank Below

编审: Organizer and Checker Business	批准: Issuer 职务: 高级工程师 Business	签发日期: Date Reported 检测专用章(公章) Official seal
		2011.7.19

第 2 页, 共 2 页

The heat exchange paper and corrugated paper are adhesived with waterborne binder, the core and cover are sealed with special sealant to total separate the supply air and exhaust air, in order to keep the structure strength and air tightness and prevent the cross contamination. It is widely applied and the maximum temperature should not exceed 100 °C.

For size A within 500mm and the size L within 600mm, the heat exchanger is built in one module. For size A bigger than 500mm and size L bigger than 600mm, the heat exchanger is built in multi-modules.

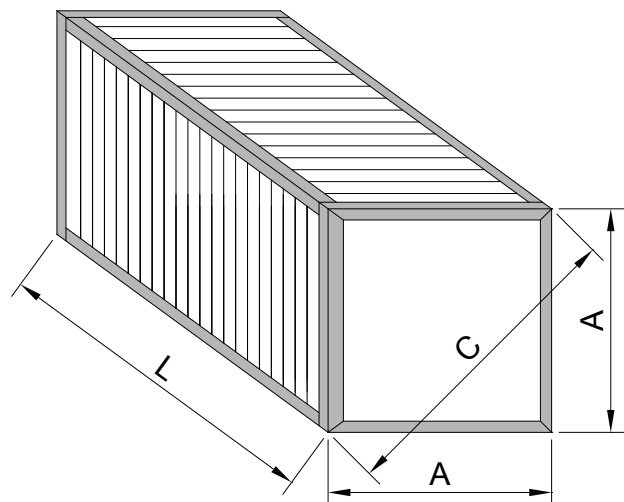
## Specifications

Model	A (mm)	L (mm)	C (mm)	Optional corrugation height (mm)	Remarks
HBT-W168/168	168	≤500	240	2.0, 2.5	One module
HBT -W202/202	202	≤500	288	2.0, 2.5	
HBT -W222/222	222	≤500	317	2.0, 2.5	
HBT-W250/250	250	≤700	356	2.0, 2.5, 3.5	
HBT-W300/300	300	≤700	427	2.0, 2.5, 3.5	
HBT -W350/350	350	≤700	498	2.5, 3.5	
HBT -W372/372	372	≤700	529	2.5, 3.5	
HBT -W400/400	400	≤700	568	3.5	
HBT -W472/472	472	≤550	670	3.5	
HBT -W500/500	500	≤550	710	3.5	
HBT -W552/552	552	≤550	783	3.5	
HBT -W600/600	600	≤550	851	3.5	
HBT -W652/652	652	≤550	925	3.5	Multi-module combined
HBT -W700/700	700	≤550	993	3.5	
HBT -W800/800	800	≤550	1134	3.5	
HBT-W1000/1000	1000	≤450	1417	3.5	
HBT-W1200/1200	1200	≤450	1702	3.5	
HBT -W1400/1400	1400	≤450	1985	3.5	
HBT -W1600/1600	1600	≤450	2265	3.5	

Note:

1, The height of heat exchanger is customer-made, and the height of per single heat exchanger should be within the required range.

2, Size C is for reference only, can be adjusted according to the length of heat exchanger.



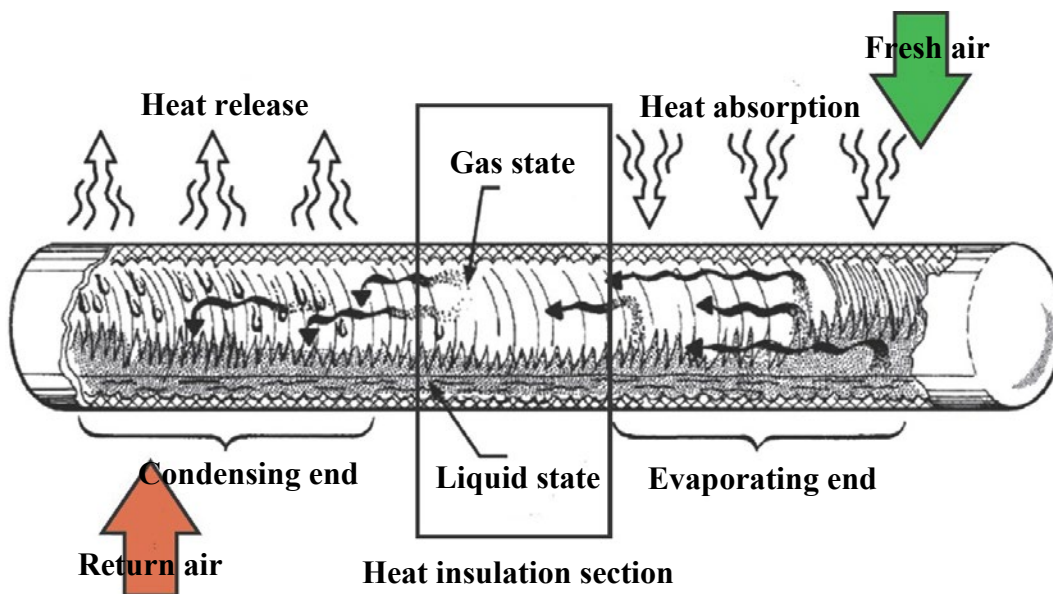


## Working principle

When heating one end of the heat pipe, liquid inside this end evaporates, the steam flows to the other end under pressure difference. Steam will condense and release heat in the condensing end. Heat transfers from high temperature to low temperature finished, condensate flows back to the evaporating end. In the same way, liquid inside the heat pipe evaporates and condenses circularly, so, heat is transferred from high temperature to low temperature constantly.



## Take summer as sample



## Main features

1. Applying cooper tube with hydrophilic aluminum fin, low air resistance, less condensing water, better anti-corrosion.
2. Galvanized steel frame, good resistance to corrosion and higher durability.
3. Heat insulation section separates heat source and cold source, then liquid inside the pipe has no heat transfer to outside.
4. Special inner mixed air structure, more uniform airflow distribution, making heat exchange more sufficient.
5. Different working area designed more reasonably, Special heat insulation section avoids leakage and cross-contamination of supply and exhaust air, heat recovery efficiency is 5% higher than the traditional design.
6. Inside the heat pipe is special fluoride without corrosion, it is much safer.
7. Zero energy consumption, free of maintenance.
8. Reliable, washable and long life.

## Model Description

HPS - 8 - 13.8 x 08 - L

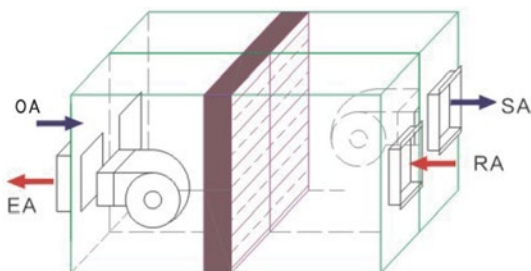
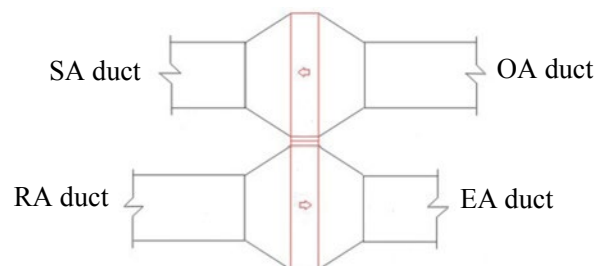
① ② ③ ④ ⑤

- ① Stands for Holtop heat pipe heat exchanger
- ② 8 rows pipe ( 2 rows, 4 rows, 6 rows and 8 rows available).
- ③ Width of windward side: number x 100 (mm)
- ④ Height of windward side: number x 100 (mm)
- ⑤ L is horizontal installation (0°), P is vertical installation (90°)

## Application

Application 1: duct installation

Connect the air ducts to the heat pipe heat exchanger directly, installation is easy, investment saved and energy recovery.

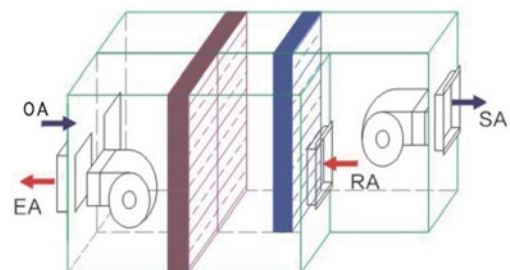


Application 2: Heat recovery ventilator

Heat pipe heat exchanger can be installed inside heat recovery ventilator horizontally, with the supply fan and exhaust fan to achieve energy recovery.

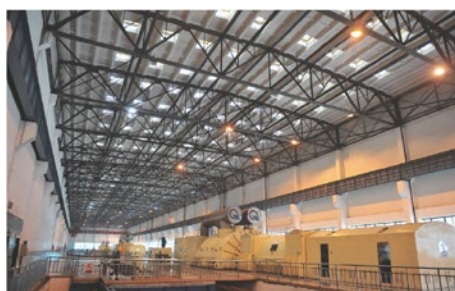
Application 3: Air handling unit

Holtop heat pipe heat exchangers are widely used in air handling units, it have functions of energy recovery, free dehumidification and re-heating, etc.



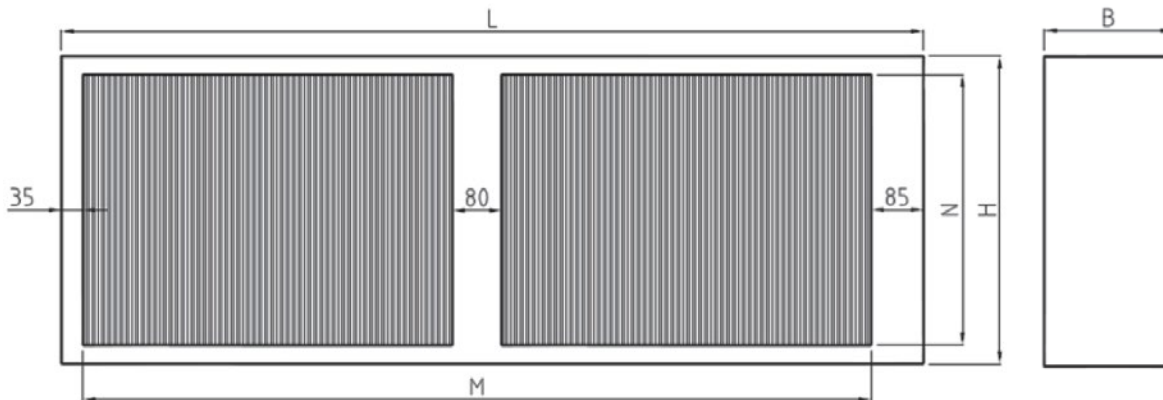
## Application range

1. Residential ventilation system, HVAC energy recovery system.
2. Waste heat/cool recovery place.
3. Clean room.





Specification



Specification introduction

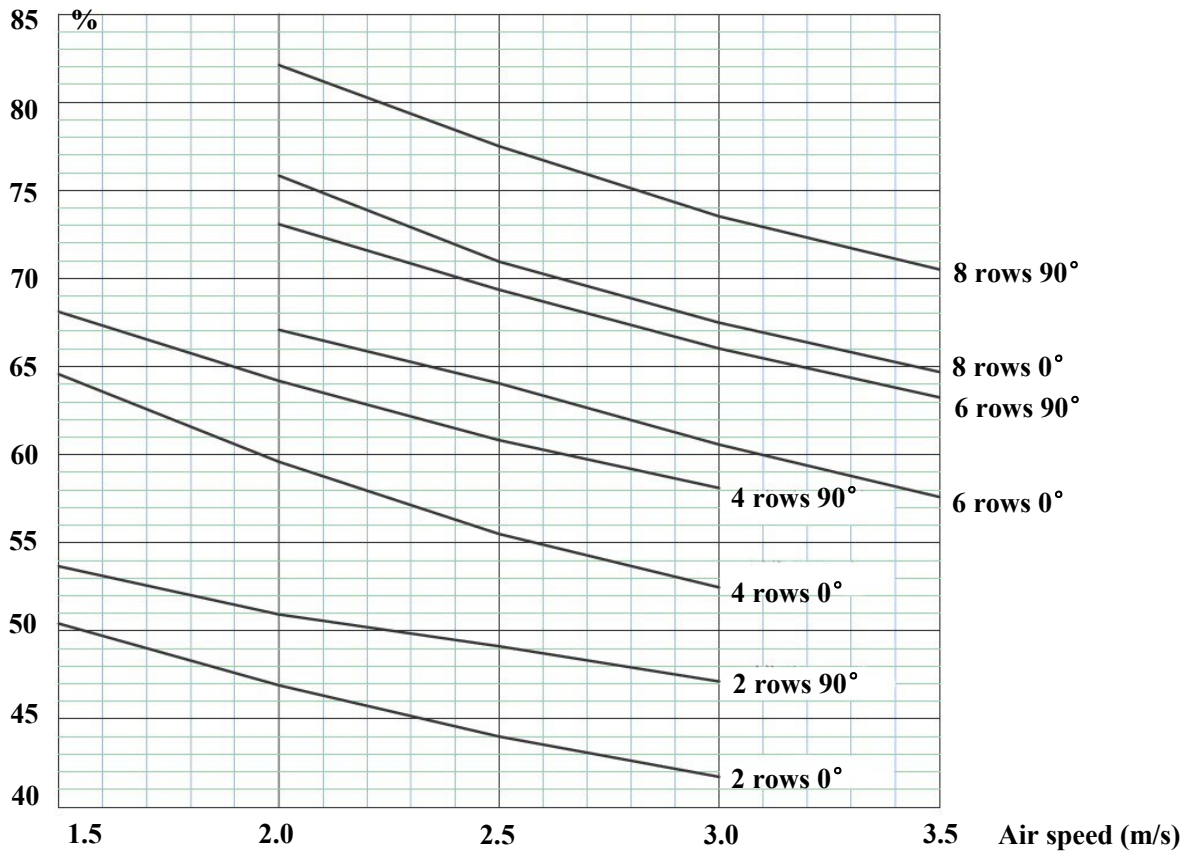
1. Pipe rows: 2 rows, 4 rows, 6 rows and 8 rows
2. Specification table:

Item	Spec. code	Size (mm)
Width of windward side	M	780, 830, 880, 930, 980, 1030, 1080, 1130, 1180, 1230, 1280, 1330, 1380, 1430, 1480, 1530, 1580, 1630, 1680, 1730, 1780, 1830, 1880, 1930, 1980, 2030, 2080, 2130, 2180, 2230, 2280, 2330, 2380, 2430, 2480, 2530, 2580, 2630, 2680, 2730, 2780, 2830, 2880, 2930, 2980, 3030, 3080, 3130, 3180, 3230, 3280, 3330, 3380, 3430, 3480, 3530, 3580 Recommend incremental size is 50mm (above size includes heat insulation section 80mm)
Height of windward side	N	One layer: 250, 300, 350, 400, 450, 500, 550, 600, 650, 700, 750, 800 Two layers: 850, 900, 950, 1000, 1050, 1100, 1150, 1200, 1250, 1300, 1350, 1400, 1450, 1500, 1550, 1600 Three layers: 1650, 1700, 1750, 1800, 1850, 1900, 1950, 2000, 2050, 2100, 2150, 2200, 2250, 2300, 2350, 2400 Four layers: 2450, 2500, 2550, 2600, 2650, 2700, 2750, 2800, 2850, 2900, 2950, 3000, 3050, 3150, 3200 Recommend incremental size is 50mm
Width of outline	L	$L=M+120$
Height of outline	H	When $250 \leq N \leq 800$ , $H=N+62$ , one layer When $800 < N \leq 1600$ , $H=N+124$ , two layers When $1600 < N \leq 2400$ , $H=N+186$ , three layers When $2400 < N \leq 3200$ , $H=N+248$ , four layers
Thickness of outline	B	2 rows (150), 4 rows (250), 6 rows (400), eight rows (500)

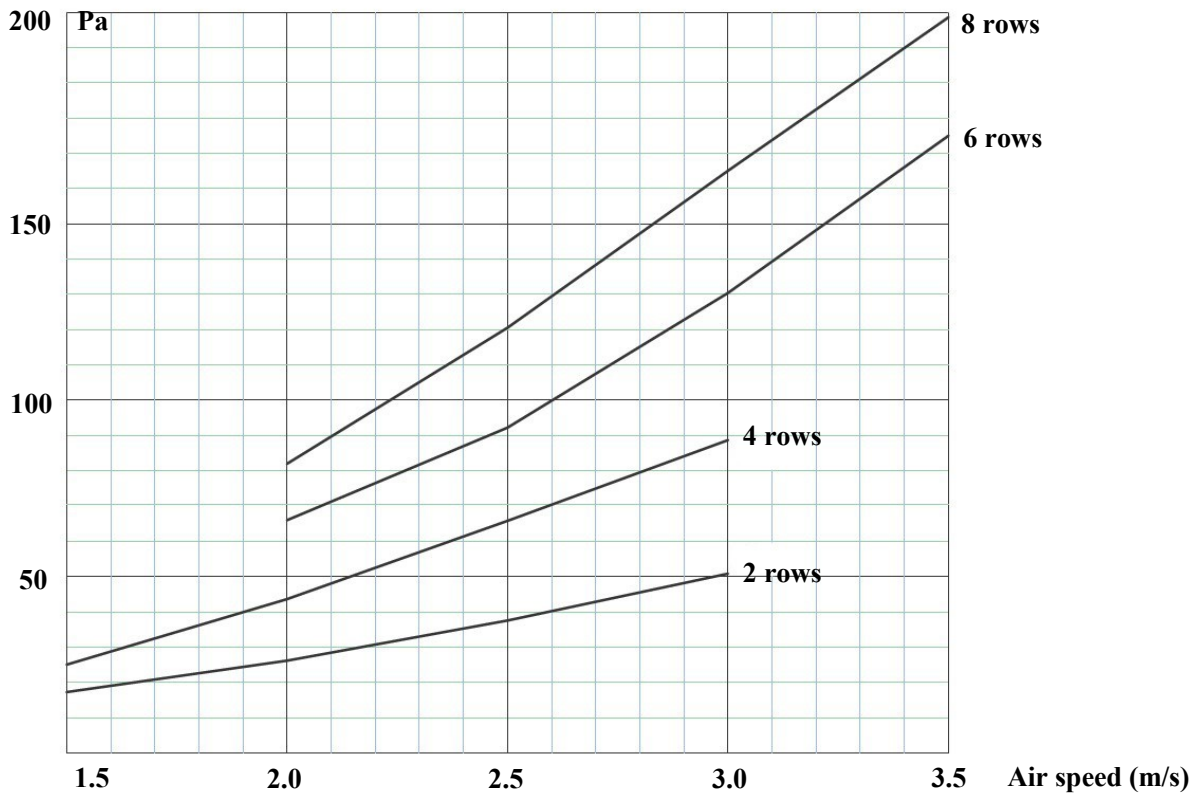
Remarks:

1. Width of windward side between 780mm to 3580mm can be manufactured according to request
2. Heat pipe heat exchanger is suitable for vertical installation in single cooling or single heating place, pay attention that the right side should toward up, namely 90° clockwise rotation according to above specification picture.

**Heat exchange efficiency curves**

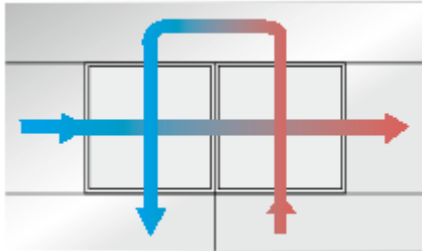


**Air resistance curves**

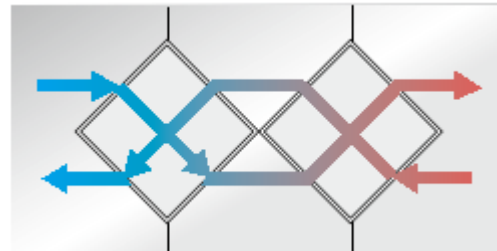


**Installation patterns**

**Pattern 1 and 2**, to increase the heat exchange area, suitable for occasions requiring higher heat recovery efficiency, however, air resistance will increase accordingly.

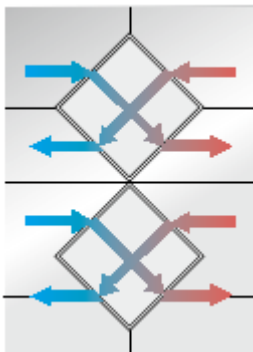


Pattern 1

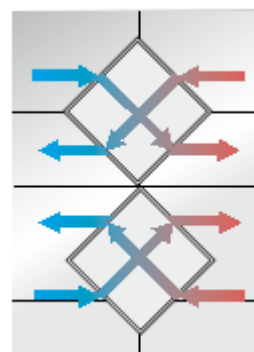


Pattern 2

**Pattern 3 and 4**, to increase the front face area, suitable for occasions requiring large airflow, both air resistance and heat recovery efficiency remain stable.

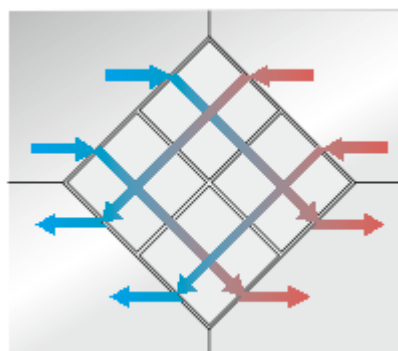


Pattern 3



Pattern 4

**Pattern 5**, to increase both front face area and heat exchange area, suitable occasions requiring higher heat recovery efficiency and large airflow.



Pattern 5



Selection Software

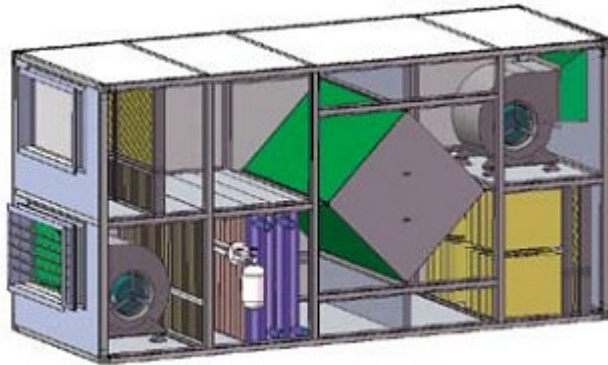
We have developed a calculation program for simple selection for crossflow plate heat exchanger and total heat exchanger models. It can not only be used as a single design selection program, but can also be combined into your program by DLL. We can add it to your program upon your request, too. Please contact us for the selection program.

■ Holtop crossflow plate heat exchanger

■ Holtop crossflow total heat exchanger

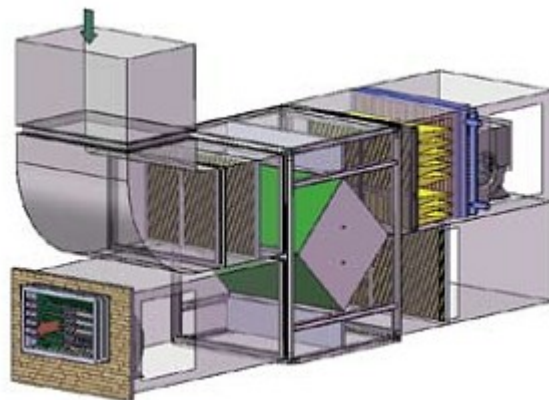
### Installed in air handling unit

Holtop plate heat exchanger can be used in the air handling unit (AHU) as a main part of the heat recovery section, and the bypass can be built in when required.



### Installed in ducts

It can also be installed in the ducts of ventilation system as a main part of the heat recovery section. The installation is very flexible.



Note: the size and patterns of the heat exchanger should be selected according to the application spaces as well as transportation capability and conditions at installation.

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