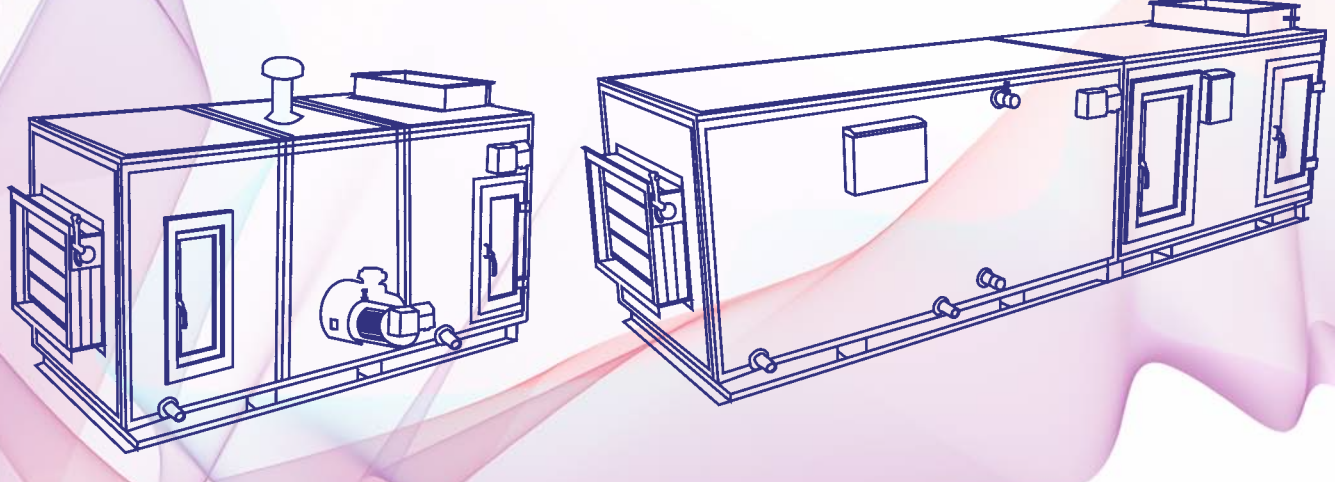
سیستم های تهویه مطبوع

گلدمن

Air Handling Units

GOLDMAN

Air Conditioning System



هواساز های منحصر به فرد گلدمن یکی از بهترین هواسازهای ارائه شده در دنیا می باشد که با استفاده دانش متخصصین و با استفاده از نرم افزار های به روز طراحی می گردد
پس از مدل کردن هواساز در نرم افزار تمام تنش های وارد شده در بدنه بررسی و بهینه می گردد و پس از آن وارد بخش تولید می گردد پس از ساخت، هواساز در سالن های مجهز به فن آوری روز تست شده و مطابق استاندارد بررسی کنترل کیفیت می گردد.

هواساز ارائه شده توسط گلدمن با ظرفیت هوادهی ۷۰۰۰ تا ۵۰۰۰۰ فوت مکعب بر دقیقه به سه گروه تقسیم می شوند:
هواساز کامپکت ، ایرواشر و هواساز شعله مستقیم

هواساز کامپکت

راندمان بالا
سطح صدا پایین
قابلیت اتصال به BMS (سفارشی)
قابلیت اتصال به کنترلرهای چیلر

ایرواشرها

راندمان بالا
سرمایش سیستم تبخیری
سطح صدا پایین
قابل ارائه درکلاس ٤، ۶ و ۸ ایرواشر

هواساز شعله مستقیم

حذف موتورخانه
سرمایش سیستم تبخیری
راندمان بالا
سطح صدا پایین

Framework

The GOLDMAN units are built up from an ingenious design of framework and panels providing considerable strength and stability. The frames are typically manufactured from an anticorrosive extruded aluminium pentapost section joined by die-cast monobloc corners to form an extremely rigid structure. Stainless steel framework is an option.

Double Skin Panels

As standard, all units have double skinned insulated panels, which fully enclose the insulation to comply with the latest hygiene requirements. The double skin panels allow for easy cleaning and ensure there is no possibility of insulation break down. They also provide superior noise breakout protection, resulting in extremely quiet running units.

External components are manufactured from galvanised sheet steel and finished with either a marine grade colour steel or an exterior powder coating. All internal sheetmetal is galvanised and unpainted to enable easy cleaning. Alternative panel constructions such as perforated metal facing, marine grade aluminium or stainless steel or special internal/ external finishes such as powder coating or epoxy painting are available upon request. There are numerous insulation options depending on the acoustic/thermal properties required for each application. Insulation thickness is nominal 25mm as standard, with nominal 40mm, 50mm and 60mm options.

All panels are fixed with screws or external clamps and quick release fasteners. Access doors are double skinned with positive seal latches, and can be opened from inside the unit. Door hinges are substantial, and a selection of locking devices is available. Factory fitted accessories such as inspection portholes and bulkhead lights are also available.

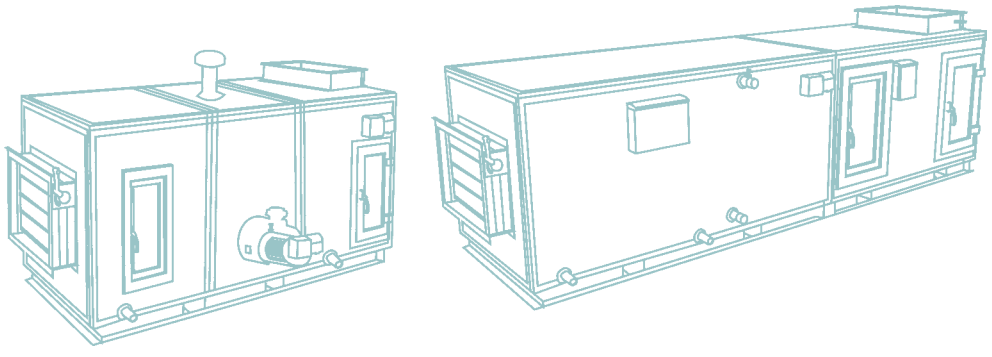
Fan Section

Fans are European design, and are available in forward curved, backward curved or aerofoil bladed as required, and housed or unhoused plenum (plug fan) variants, with both belt and direct driven options. As standard, all fans are mounted on anti-vibration mounts with a flexible connection to the unit casing. Holding down bolts are provided for shipping purposes.

These units have been designed to incorporate longer unit life with reduced maintenance costs. Features such as solid shafts, and statically and dynamically balanced fan wheels to grade G=2.5 all contribute to this goal.

Air Treat ment Section Cooling and heating coil computer selections are available for up to 12 row coils.

Standard construction is aluminium fin and copper tubes with galvanised end plates and post-manufacture acrylic anti-corrosion treatment for the whole coil block. Special surface treatments and other coil materials are available on request. All cooling coils are sized to a maximum face size and velocity



to minimise moisture carryover and condensate loading.
Drain trays are manufactured from stainless steel as standard. They are completely free draining and are easily cleaned without removal from the unit. Trays are supplied with a flexible outlet connection. Special waterless traps and screwed outlet connections are available and can be supplied on request. Drain pans are externally insulated with a minimum of 10mm polyethylene foam with foil faced vapour barrier to prevent condensation forming on the exterior. Heat recovery modules can be fitted to pre-heat or pre-cool supply air by recovery of waste heat from exhaust airstreams.

Filtration

A full range of filters is available from panel type coarse filters to carbon and high efficiency particulate air filters. Filter sections and mixing boxes are available to suit individual specific requirements with panel, bag, and rigid filters suitable for front withdrawal as standard and side withdrawal as an option.

STANDARD FEATURES

General Arrangement

Modular Sizing from 400L/s to 30,500L/s
25 Standard Sizes
Horizontal, Vertical, Side-by-side, Double Deck and Multizone arrangements
Proudly Designed in USA and Manufactured in Italy.

Construction

Extruded Aluminium or Stainless Steel Pentapost Frame
Double Skin Nominal 25mm or 50mm Construction
Galvanised Coloursteel Panels with Injected Polyurethane Foam Insulation
Readily Removable Panels
Quality Access Door Hardware
Galvanised Steel Unit Base Frame or Mounting Feet

Filter Section

Front Withdrawal Access as Standard

Options

All units can be weatherproofed for outdoor mounting and supplied with a roof curb. Outdoor units are fitted with a full sloping roof to prevent pooling of water, and weatherproof face drainable inlet louvres, droplet eliminators or cowls. Louvres can also be acoustically treated for noise sensitive applications. Bulkhead lights, electrical wiring of motors, airflow meters, pressure gauges, filter manometers, and modulating damper actuators are all available as factory installed options.
Units can also be supplied with the latest in European control packages for minimising site electrical installation work. Packages include integrated variable speed drives, damper and control valve actuators, interlocks, sensors and transducers, and digital control packages.
Through the use of the latest production techniques, allied with computer selection of components, we are able to offer a reliable quality product with guaranteed performance on quick delivery and at competitive prices.

Coarse Grade Pre-Filters to EN779:2002 Grade G2, G3 & G4
Fine Filters to EN779:2002 Grade F5 to F9
Absolute Filters to EN1822:1998 Grade H10 to H14
Carbon or Chemical Absorption Filters for Odour Removal

Air Treatment Section

Chilled Water, DX, or Evaporative Cooling
LPHW, Steam, Condensing, or Electric Heating
3/8", 1/2" or 5/8" Diameter Tube Coils to Suit Application Requirements
Anti-Corrosion Treatment of all Coils as Standard
Completely Free Draining Externally Insulated Drain Pans of Stainless Steel Construction

Fan Section

Forward Curved, Backward Curved, or Aerofoil Options
Standard Housed or Plug (Plenum) Type Fans
Vee Belt or Direct Drive
Internally Isolated with Rubber or Spring Anti Vibration Mounts and Flexible Connection

OPTIONS

Construction

Coldbridge Free Construction with thermally broken profiles and panels
Special Hygiene Version
Coloursteel or Stainless Steel Interior Panels
Marine Grade Aluminium Construction
Acoustic Panels with Perforated Metal Internal Lining
Completely Knocked Down (CKD) for site assembly by factory trained personnel
Non-Standard Sizing to suit available space requirements

Heat Recovery

Air to Air Plate Heat Exchangers (Sensible Heat Recovery)
Rotary Thermal Wheels (Sensible or Latent Heat Recovery)
Run Around Coils (Sensible Heat Recovery)

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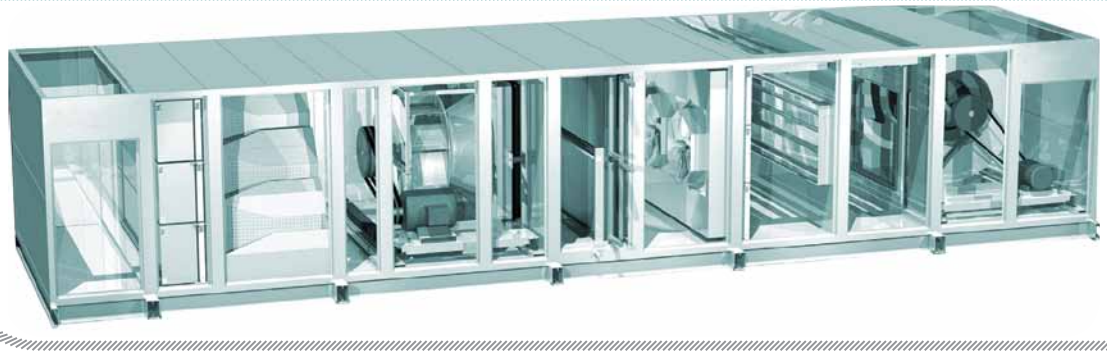

Heat Pipes (Sensible Heat Recovery)
Humidificati on/Dehumidificati on
Isothermal Humidifiers (Immersed Electrode, Gas Fired and Direct Steam Injection types)
Adiabatic Humidifiers (Atomised Water and Ultrasonic types)
Regenerative Desiccant Dehumidifiers

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Gas Fired Heating

Indirect Gas Fired Heaters
Direct Gas Fired Heaters

Weathe rproofing

Colorsteel Weather Roof with Drainage Gutters and Downpipes
Weatherproof Inlet Louvres, Cowls and Droplet Eliminators
Roof Curbs

Acoustic Treat ment

Acoustically Treated Inlet and Fan Sections
Intake and Discharge Silencers
Weatherproof Acoustic Inlet Louvres
Special Panel Constructions to Further Reduce Breakout Noise

Accessories

Extruded Aluminium or Stainless Steel Dampers with Airtight Options
Droplet Eliminators
Porthole Observation Windows
Bulkhead Lighting
Lockable Access Doors

Ancillary Plant

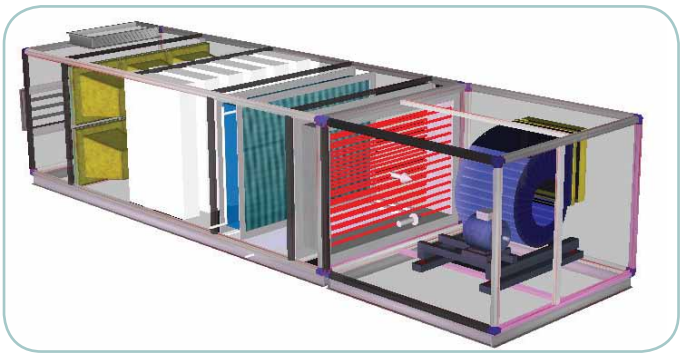
Matched DX or Reverse Cycle Condensing Units
Matched Chiller or Heat Pump Units
Desiccant Dehumidifiers

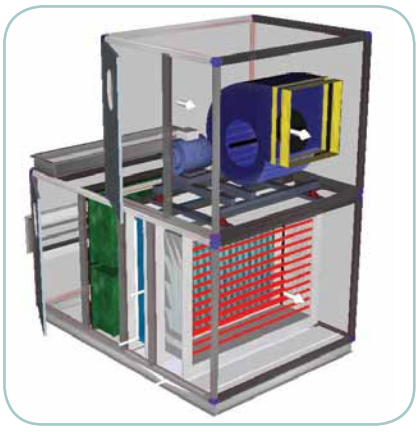
Controls & Wiring

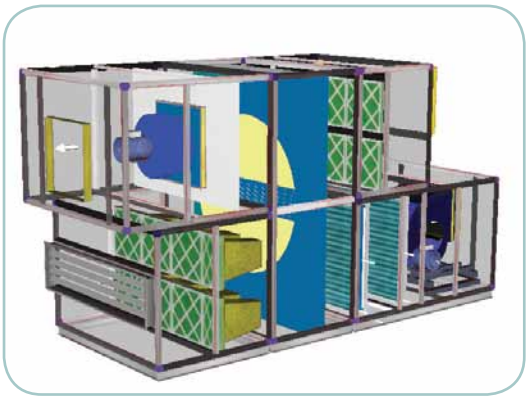
Electric Motor Wiring to External Isolator
Integrated Variable Speed Drives
Magnehelic or Inclined Manometers
Differential Pressure Transducers
Temperature Sensors
Damper Actuators & Control Valves
Interlocked Micro-switches on Access Doors
PLC Control Packages

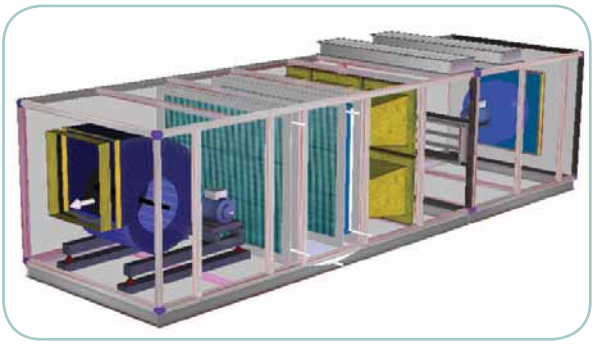
MIXING BOX & ECONOMISER SECTIONS

Standard mixing box and economiser sections feature GOLDMAN ARD100 opposed blade air regulating dampers, and these may be used at the unit inlet for fresh air / return air mixing, within the unit for manual or automatic bypass arrangements, or at the unit outlet for return air/ exhaust air diverting.
Dampers are of extruded aluminium design with integral flanges and stiffening ribs.
The blades are aerofoil shaped and are fitted with a flexible edge seal for low leakage characteristics. The toothed drive gear wheels and bearings are high strength polyamide plastic and are concealed within the damper housing, resulting in a clean internal and external finish. The 12mm square brass drive shaft is suitable for motorised operation, or can be fitted with a manual lockable quadrant.
Standard internal (airstream) height









increments of 100mm from 110mm, and with length to suit.

Minimum Single Section Size 200 wide x 110 high (1 blade) Maximum Single Section Size 1500 wide x 1210 high (12 blades) Larger dampers are assembled with multiple sections, and dependent upon size, may require multiple drives.

The dampers must be installed square and free of twist. It is recommended that the damper be mounted with the blades horizontal for longer maintenance-free operation.

For infrequent motorised or manual operation, the damper can be installed with blades vertical.

Special damper variants such as stainless steel construction and airtight construction to DIN1946 are also available as standard options.

For damper authority, the wide open damper pressure drop should be 10-15% of the system pressure the damper is controlling, to maintain proportional control. This figure is for standard opposed blade dampers. For parallel blade dampers, the pressure drop should be 30-50% of the system pressure the damper is controlling.

Air inlets on weatherproof units will be fitted with either a face drainable weather louvre, a minimum 60° included angle weather cowl, or for exposed installations a combination cowl with droplet eliminator.

COMPONENT PRESSURE DROPS

The following are the typical GOLDMAN component pressure drop allowances for quick
selection purposes:
Filters
Filter Grade Description Filter Pressure Drop (Pa)
(to EN779) Initial/Clean Mean Final/Dirty
Bug Filter 25mm pleated media 40

Filter Grade (to EN779)	Description	Filter Pressure Drop (Pa)		
		Initial/ Clean	Mean	Final/Dirty
Bug Filter	25mm pleated media		40	
G3	50mm pleated media	65	145	225
G4	50mm pleated media	80	150	225
F5	600mm 6-pocket bag	60	155	250
F6	635mm 12-pocket bag	65	160	250
F7	635mm 12-pocket bag	85	170	250
F8/9	635mm 12-pocket bag	130	190	250
H11	300mm mini-pleat	185	390	600
H13	300mm mini-pleat	315	460	600
Carbon Filter			90	

G3 50mm pleated media 65 145 225The above ratings are based on standard airflow rates of 1000L/s per nominal 600mm
square filter module. In practice, actual clean pressure drops are lower due to oversized filter area.
The above ratings are based on standard airflow rates of 1000L/s per nominal 600mm square filter module. In practice, actual clean pressure drops are lower due to oversized filter area.
For constant speed applications, fans shall be selected for optimum efficiency with filters rated at the mean condition between the manufacturer's recommended clean and dirty pressure drop conditions, and shall be set-up to run at this speed. This will result in excess air with clean filters, dropping off through the design point as the filters load up.
At the dirty filter condition, airflow will be below design. The variation in airflow between clean and dirty conditions will be dependent upon the ratio of the filter pressure drop to the fan static pressure. Motors will be sized to suit this operating static, and, in the case of forward curved fan applications, checked for overload at the clean condition.
For systems with VSD drives, fans will be selected for optimum efficiency as above but set-up with pulleys to run at the combined dirty filter condition (maximum static) at the rated motor speed (50Hz). Motor will be sized accordingly for the full system static.

MODEL RANGE

Model No.	Dimensions (mm)		Coil Face Area	Nominal Airflow (L/s) @ Coil Face Velocity (m/s)							
	H[2]	W	(m^2)	1.5	1.75	2.0	2.25	2.5	2.75	3.0	3.5
15	590	670	0.177	266	310	354	399	443	487	531	620
20	640	700	0.220	330	385	440	495	550	605	660	770
25	700	805	0.305	457	533	610	686	762	838	914	1067
35	735	975	0.391	587	685	782	880	978	1076	1173	1369
45	785	1050	0.483	724	845	966	1087	1207	1328	1449	1690
50	850	1125	0.584	876	1022	1168	1314	1461	1607	1753	2045
65	925	1280	0.740	1111	1296	1481	1666	1851	2036	2221	2591
80	1020	1400	0.899	1349	1574	1798	2023	2248	2473	2697	3147
100	1020	1500	1.057	1585	1849	2113	2377	2642	2906	3170	3698
125	1085	1650	1.271	1907	2225	2543	2860	3178	3496	3814	4449
150	1280	1650	1.527	2291	2673	3055	3437	3819	4201	4582	5346
180	1380	1890	1.892	2837	3310	3783	4256	4729	5202	5675	6621
220	1400	2050	2.190	3285	3832	4380	4927	5474	6022	6569	7664
250	1510	2195	2.489	3734	4356	4978	5601	6223	6845	7468	8712
300	1710	2300	3.038	4557	5316	6076	6835	7595	8354	9114	10632
350	1770	2550	3.551	5326	6214	7102	7990	8877	9765	10653	12428
400	1900	2805	4.268	6402	7469	8536	9603	10670	11737	12804	14937
500	2040	3110	5.138	7708	8992	10277	11561	12846	14131	15415	17984
600	2215	3300	6.063	9094	10610	12126	13642	15157	16673	18189	21220
700[3]	2280	3720	7.112	10668	12446	14224	16002	17780	19558	21336	24892
800[3]	2500	3900	8.123	12185	14216	16246	18277	20308	22339	24370	28431
900[3]	2535	4200	9.041	13562	15822	18082	20343	22603	24863	27123	31644
1000[3]	2805	4335	10.389	15583	18180	20777	23374	25972	28569	31166	36360
1100[3]	2805	4700	11.316	16974	19802	22631	25460	28289	31118	33947	39605
1200[3]	2805	5050	12.205	18307	21358	24409	27461	30512	33563	36614	42716

1. Nominal airflows for alternative model types are identical.
   - AP25C — Add 30mm to above height and width dimensions.
   - AP50 — Add 45mm to above height and width dimensions.
   - AP50C & AP50HC — Add 70mm to above height and width dimensions.
   - AP50L — Add 50mm to above height and width dimensions.
2. Height dimension does not include for the unit baseframe (generally additional 100mm for units up to model 300, 140mm for models 350 to 1000, and 150mm for units 1100 & 1200).
3. AP25 & AP25C construction only available up to model 600. AP50 construction only available up to model 800.

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صـدای مشـتری: ۶۲۲ ٤١ ۲۲۰ ۰۲۱

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بلـــوار گلشـهـر، بـــرج آی تـک، طبقـه سـوم
تلفـن:۱۳۷ ۳۸ ۲۲۰ دورنـگار:۹۵ ۱۶۶ ۲۲۰