

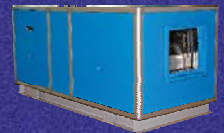
# Air Handling Unit

## Chilled Water / DX



### Customized AHU's for Critical Environments

Hospitals / Labs  
Medial Equipment Rooms  
Pharmaceuticals Industries  
Telecommunication Facilities  
FMCG Industries  
Textile Mills  
Printing Areas  
Commercial Buildings



**Pakistan's Largest  
Manufacturers of  
Air-Conditioners**



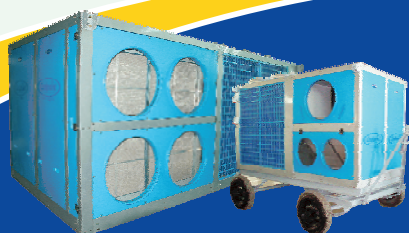
# THE LARGEST MANUFACTURER OF AIR CONDITIONING EQUIPMENT

Equipment is manufactured on latest CNC machines with prompt deliveries

Clients are welcome to visit our facilities & to discuss technical details

**Provides Turnkey Projects, Starting from conceptual planning till the commissioning of HVACR projects**

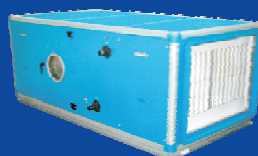
- Heat Load Calculation
- HVAC System Concept & Design
- Supply of HVAC Equipment
- Installation
- Testing & Commissioning
- Operation & Maintenance



Package Mobile AC Plant



Package Type Unit



Double Skinned AHU



Concealed Type AHU



Floor Standing Split AC



Vertical Type AHU



Air Cooled Water Chiller



Floor Standing Cabinet (DX/CW)



Universal Type Split AC



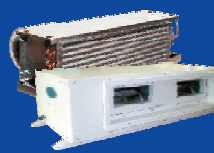
Cassette Type Split AC



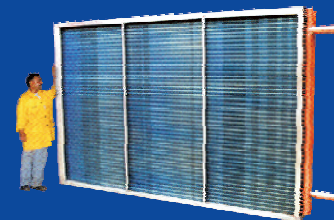
Cold Rooms & Reefer Containers



Air Handling Units



Duct Type Split AC Unit



Tube Size 3/8"OD, 1/2"OC, 5/8"OD

*COOL POINT (Pvt.) Ltd. Introduces new phenomenon of Water Cooled Air Conditioning System in small capacity units (1-Ton, 1.5-Ton, 2-Ton and 2.5-Ton)*

## Legend

Amp	Amperes
CFM	Cubic feet per minute
DBT	Dry Bulb Temperature
EAT	Entering Air Temperature
ESP	External Static Pressure
EWT	Entering Water Temp.
FPI	Fins Per Inch
fpm	Feet per minute
gpm	Gallons per minute
In. Wg.	Inches of Water Gauge
Hz	Hertz
KW	Kilowatts
Kg	Kilogram
KPa	Kilo Pascals
lbs	Pounds weight
l/s	Liters per second
LWT	Leaving Water Temp.
MBH	1000 Btuh
m/s	Meters per second
OD	Outdoor Diameter
Pa	Pascals
Ph	Phase
Psig	pounds per sq. inch.
rpm	revolutions per minutes
SST	Saturated Suction Temp.



## Introduction

COOL POINT Air Handling (CWAHU). Units are designed to a high engineering standard to provide the requirements of ventilation, heating, cooling, dehumidification and air distribution to a conditioned space

CWAHU are available in 16 sizes to deliver from 1200 cfm (566 l/s) to 45,000 cfm (21240 l/s) nominal air flow rate against total static pressure upto 8.0 inwg (2000 Pa) CWAHU are applicable for indoor and outdoor installation and they are ideal for large halls, schools, offices, banks, workshops, laboratories, restaurants, cinemas, hospitals, departmental stores, mosques and super markets, etc

COOL POINT double skin air handling units are designed to meet the Indoor Air Quality requirements as per ARI standard 62/89.

## General Features

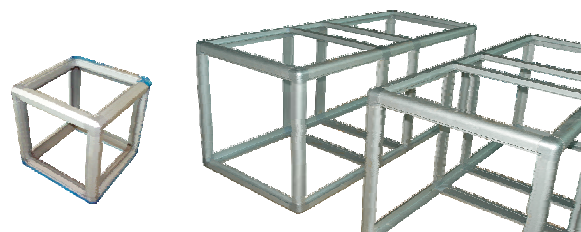
CWAHU are manufactured in combine single unit and in sections. All components of CWAHU are easily accessible Different sectional arrangements & fan discharge positions are possible depending on the site constraints and requirements CWAHU units are suitable both for duct connection or free discharge applications

A typical CWAHU consists of a wide choice of a combination but not limited to the following sections, fan, cooling coil, heating coil, humidifier, filter section, mixing box, return air fan, plenums as standard or optional.

## COMPONENT FEATURES

### Casing & Construction

**Aluminum Profile Frame**  
CWAHU section casings are constructed of framed modules for maximum rigidity and strength Structure frame is made of aluminum profile, called which has excellent mechanical characteristics. The cross section of this profile is specially designed for this type of applications. Aluminum profiles are connected by means of special corner pieces.



### Panels

Access and fixed panels are constructed of hot dip galvanized steel. Access panels are provided with quick



release fasteners to facilitate access to all internal components for maintenance and service. Suitable handles are provided for ease of handling.

All fixed panels are bolted to the frame and provided with special gasket between panels and frames to ensure air tightness. This bolted construction makes all sections accessible from both sides.

### Internal skin

Inner panel skin, so called “double skin” [DS] to retain the insulation, is made of galvanized steel, is easy to clean and has smooth surface. This eliminates any chance of dirt and bacteria accumulation, making Cool Point double skin units ideally suitable for hygienic applications, such as, pharmaceutical industries, hospitals, operation theatres and food processing industries, etc. Stainless steel inner skin are available as an option.

### Painting

CWAHU are supplied with painted panels. Units are not painted only when specified. Painted CWAHU are made out of a zinc coated galvanized steel thoroughly de-greased and then phosphated before application of an average 60 micron backed electrostatic polyester dry powder coating. This finish and coating can pass a 1000 hour, 5% salt spray testing at 95°F (35°C) and 95% relative humidity as per ASTM B 117-95.

### Insulation

For best thermal and acoustical performance, all panels and profiles frame is internally insulated.

Special gaskets are provided for thermal bridge protection to avoid condensation. CWAHU comes standard with 1” (25mm) insulation for sizes 12-150 and with 1.5” (38mm) for sizes 200-450.

1” (25mm) or 2” (50mm) polyurethane foam injection or board, with density in the range of 2 to 3 lb/ft<sup>3</sup> (32 to 48 kg/m<sup>3</sup>) and thermal conductivity of 0.16 BTU in/ft<sup>2</sup> °F h (0.023 W/m<sup>2</sup>°K). The injection is only possible for double skin units.

### Base Frame

Since CWAHU is constructed from Aluminum profile, which has inherent rigidity and stability. Sheet metal frame with holes for vibration mounts are provided on each side of the unit. A steel structure is provided coated with galvanized primer enamel finish.



## MAJOR SECTION

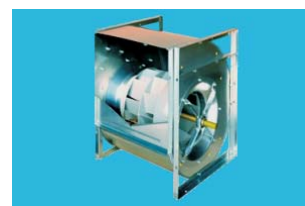
CWAHU is constructed of suitable sized casing module and following sub-assemblies:

### Fan Section

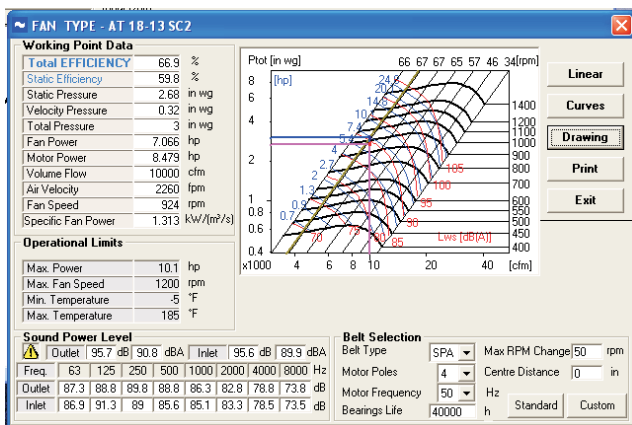
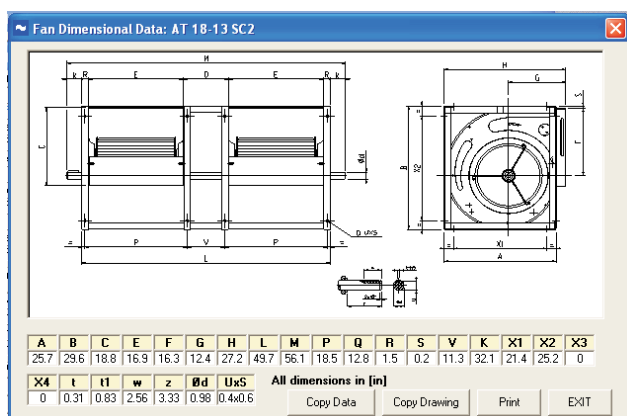
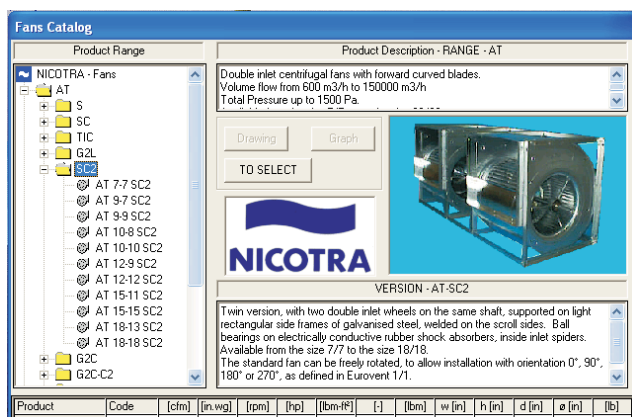
#### Fan

Double inlet double width centrifugal fans are standard supply in COOL POINT CWAHU. The impellers can have forward curved or, backward inclined or airfoil profile depending on the requirements. All fans are belt-driven by motors with adjustable pitch motor pulleys and fixed drive blower pulleys. The impellers are keyed to the shafts. All fans are statically and dynamically balanced.

COOL POINT fans use self-aligned ball or pillow block bearings that are greased for life. Pillow block bearings are provided with re-greasing fittings. Fans are selected for best sound characteristics based on maximum fan efficiency. Different fan positions are available depending on the requirement. Refer to dimensional data for details.

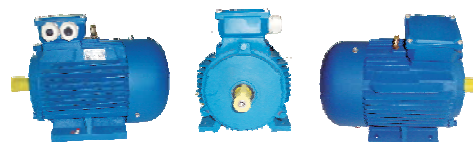


## Blower Selection Software



## Motors

Fan motors are totally enclosed fan cooled, foot mounted, 4 pole, IP-55 protected and Class-F insulated. The motor is mounted on adjustable base, so that belt tension can be easily adjusted. The complete fan motor drive assembly is mounted on floating sub base In order to limit transmission of noise and vibration the complete fan motor sub-base assembly is mounted on anti-vibration mounts and, therefore, it is not necessary to install external vibration mounts. Flexible connection is provided between fan discharge and casing panel to avoid transmission of vibration to the connecting duct.



### Options Available:

- Non-standard fan size.
- Explosion proof motor.
- Variable speed drive (Frequency Inverter).
- Standby motor (additional) with manual change over.
- Coating on fans.
- Motorized dampers / manual dampers.
- 2" Insulation

## Coil Section

Variety of coils including chilled water, direct expansion, hot water and steam are available to meet a wide range of application requirements. Coils are constructed from seamless copper tubes of 3/8" (9.5 mm) OD and 5/8" (15.9mm) OD and 1/2" (12.7 mm), arranged in a staggered form in the direction of airflow

Copper tubes are mechanically expanded into continuous corrugated aluminum fins, available in 8 fpi (3.2 mm), 10 fpi (2.54 mm) and 12 fpi (2.1 mm) fin spacing to provide continuous compression bond over the entire finned length for maximum heat transfer rates.

Headers are made out of seamless copper pipe. The headers joints are extruded to provide large bearing surface for maximum strength. Air vents are standard for water coils. Coils can be provided with moisture eliminator depending on the air conditions, with shape of eliminator specially designed to trap water droplets blown off the coil.

Cooling coil section is provided with insulated drain pan with drain connection, in order to hold and remove the condensate formed during dehumidification. Drain pan is made of painted zinc coated steel sheet. Coils are tested by air pressure while coils are submerged in water to a pressure of 300 psig (2060 kPa). COOL POINT coils are rated as per ARI standard.

## Coil Circuiting

Water coils can be provided with various coil circuiting like half, full or double depending on the water flow rate and water pressure drop through the coil.

Direct expansion coils are equipped with a properly sized distributor to ensure equal refrigerant fed to all circuits. The number of circuits is chosen to provide optimum heat transfer and reasonable refrigerant velocity and pressure drop so as not to trap any oil in the coil tubing. Coil connections can be provided on either right or left hand side facing the unit from return air side (see figure). Drain connection can be provided on either side or on both sides as required.

### Options Available

- Copper Fins
- Electro-tinned coils.
- Protective coating on coils.
- Stainless steel drain pan.
- MPT, FPT or flanged coil connectors.
- Expansion valve for direct expansion coils.
- Pipe size 3/8", 1/2", 5/8" are available in coils.

### Filter Section

Wide varieties of air filtration systems are available to choose from depending on the requirement. These include:

**Panel filters:** 2" (50 mm) panel filters with aluminum washable media or 2" (50 mm) fiberglass/synthetic disposable/washable media Average efficiency of filter ranges from 62% to 95%.



**Vee filters:** Filters arranged in a vee bank to increase the filtration area Media options are the same as in Panel filters

**Bag Filter:** 22" (559 mm), 30" (762 mm) or 36" (914 mm) deep high efficiency bag filters with average dust spot efficiency ranging from 75% to 95%. Combination of bag & flat filters are available.



**HEPA Filter:** Ultra high Absolute HEPA (High Efficiency Particulate Air) filter with efficiency in excess of 99% when measured by using DOP (Di-Octyle Phthalate) method

### Electrical Heater Section

Two different types of electric heater element batteries are available:

**Open Type:** constructed from 80/20 nickel chrome resistance elements

**Finned Type:** constructed from 80/20 nickel chrome resistance wire centered in stainless steel sheath metal tubes by compressed magnesium oxide

Electric heater batteries are available in a wide range of capacity (KW) and steps. Electric heater batteries are supplied with primary and secondary manual safety cutouts, as standard Recommended KW capacity on standard

(nominal airflow) rate is given in the table. Batteries other than this can be supplied upon request.

Electric heater capacity in KW can be calculated in IP system as:

Capacity (KW) = 1.085 x Airflow Rate (cfm) x Air Temperature Rise (F)/3412

or in SI system as:

Capacity (KW) = 1.21 x Airflow Rate (l/s) x Air Temperature Rise (°C)/1 .

Model Size	Capacity (KW)			
	Option 1	Stages	Option 2	Stages
12	6	1	9	2
16	7.5	1	12	2
24	12	1	18	2
32	15	2	24	2
40	18	2	27	3
50	24	2	36	2
62	30	2	45	3
80	36	2	54	3
100	48	2	72	4
120	60	2	84	4
150	72	2	108	3
200	90	2	144	4
250	126	3	180	5
320	144	4	225	5
400	189	3	270	5
450	216	6	324	6

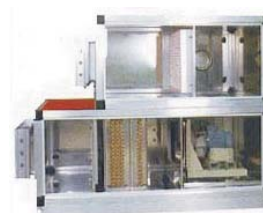
### Humidifier Section

Humidifiers are available depending on application and as per requirement.

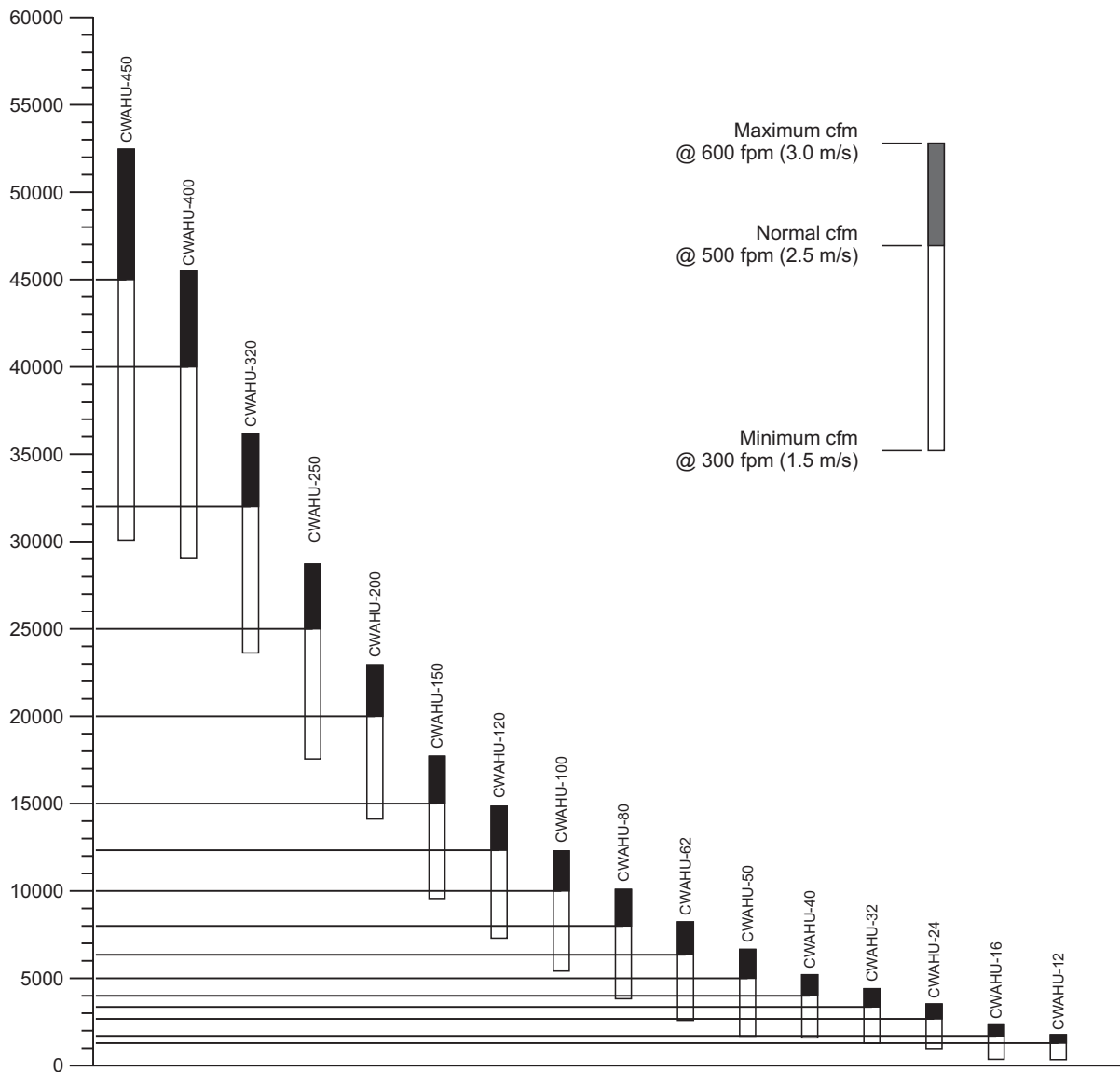
### Dampers (Optional)

CWAHU are also available with multi blade, low leakage, heavy duty dampers to control the air flow rate by introducing resistance to air flow in the system. Dampers are available with parallel blades and opposed blades. Links are provided for either manual or motorized operation. The following dampers are available:

The damper frame is constructed from galvanized steel, blades from galvanized steel, shafts from steel, bearing from bronze and linkage and brackets from galvanized steel. Aluminum damper blades in airfoil profile are available, as an optional.



## Quick Selection



## Motor Data

Rated Pow er Supply (V / Ph / Hz)			Motor Size, KW													
			0.55	0.75	1.1	1.5	2.2	3	4	5.5	7.5	11	15	18.5	22	30
380 / 3 / 50 415 / 3 / 50	FLA	Am p	1.7	2	2.6	3.7	5.2	7.1	9.2	12	15.2	21.1	29.1	36	43	58
	LRA		7	9	11.6	17.1	25.6	35.1	49.4	72	117	163	216	255	308	369

1. Motors upto 3 KW are STAR connected for all power supplies.
2. The motors including and above 4 KW are DELTA connected and are suitable for STAR/DELTA starting.
3. Refer inside of the motor terminal box for actual connections.



## Nominal Capacity Rating - Cooling Coils

Fin Spacing (10~12 FPI)						Chilled Water Coils @ 80/67°F ( 26.7/19.4°C ) On-Coil DBT / WBT & 45/55°F ( 7.2/12.8°C ) EWT/LWT								Direct Expansion Coils @ 80/67°F ( 26.7/19.4°C ) On-Coil DBT / WBT			
Model	Coil Area		Rows	Air Flow Rate		Total Capacity		Sensible Capacity		Water Flow		Air Flow Rate		Total Capacity		Sensible Capacity	
CWAHU	ft²	m²		cfm	l/s	MBh	KW	MBh	KW	gpm	l/s	ft.wg	KPa	MBh	KW	MBh	KW
12	2.5	0.23	4	1200	566	22.7	6.7	18.2	5.3	4.5	0.3	0.4	1.3	35.6	10.4	22.7	6.7
			6			34.1	10.0	24.6	7.2	6.8	0.4	1.1	3.3	43.2	12.7	28.0	8.2
			8			44.2	13.0	29.9	8.8	8.8	0.6	2.1	6.2	46.7	13.7	30.9	9.1
16	3.2	0.3	4	1600	755	41.1	12.0	27.9	8.2	8.2	0.5	7.1	21.3	46.7	13.7	29.9	8.8
			6			56.6	16.6	36.9	10.8	11.3	0.7	16.4	49.0	56.9	16.7	37.0	10.9
			8			61.4	18.0	40.8	11.9	12.3	0.8	4.2	12.4	61.7	18.1	40.9	12.0
24	4.7	0.44	4	2400	1133	61.7	18.1	41.7	12.2	12.3	0.8	8.3	24.7	69.3	20.3	44.5	13.0
			6			85.0	24.9	55.3	16.2	17.0	1.1	19.0	56.8	84.7	24.8	55.2	16.2
			8			92.5	27.1	61.2	17.9	18.5	1.2	4.9	14.5	91.9	26.9	60.9	17.9
32	6.4	0.6	4	3200	1510	85.5	25.1	56.9	16.7	17.1	1.1	12.6	37.7	93.1	27.3	59.7	17.5
			6			109.6	32.1	72.4	21.2	21.9	1.4	9.5	28.2	113.6	33.3	73.9	21.7
			8			127.1	37.3	83.2	24.4	25.4	1.6	7.3	21.9	123.1	36.1	81.6	23.9
40	8	0.74	4	4000	1888	96.4	28.3	67.4	19.8	19.3	1.2	3.3	9.8	116.2	34.1	74.5	21.8
			6			141.9	41.6	92.4	27.1	28.4	1.8	16.8	50.1	141.8	41.6	92.3	27.1
			8			163.9	48.0	106.0	31.1	32.8	2.1	12.9	38.5	153.7	45.1	101.9	29.9
50	10	0.93	4	5000	2359	120.5	35.3	84.3	24.7	24.1	1.5	3.3	9.8	145.3	42.6	93.2	27.3
			6			177.4	52.0	115.5	33.8	35.5	2.2	16.8	50.1	177.3	52.0	115.4	33.8
			8			204.9	60.0	132.5	38.8	41.0	2.6	12.9	38.5	192.2	56.3	127.4	37.3
62	12.5	1.16	4	6200	2926	151.8	44.5	105.4	30.9	30.4	1.9	3.7	10.9	180.8	53.0	115.9	34.0
			6			222.3	65.1	144.2	42.3	44.5	2.8	18.5	55.3	220.5	64.6	143.5	42.0
			8			256.1	75.1	165.2	48.4	51.2	3.2	14.2	42.3	238.9	70.0	158.3	46.4
80	16	1.49	4	8000	3775	251.0	73.6	177.0	51.9	50.2	3.2	17.3	51.9	232.4	68.1	149.1	43.7
			6			314.1	92.1	212.9	62.4	62.8	4.0	12.4	37.1	283.6	83.1	184.6	54.1
			8			358.6	105.1	236.0	69.2	71.7	4.5	9.3	27.9	307.5	90.1	203.8	59.7
100	20	1.86	4	10000	4719	313.8	92.0	221.3	64.9	62.8	4.0	17.3	51.9	290.5	85.1	186.3	54.6
			6			392.6	115.1	266.1	78.0	78.5	5.0	12.4	37.1	354.6	103.9	230.8	67.6
			8			448.2	131.4	294.9	86.4	89.6	5.7	9.3	27.9	384.4	112.7	254.8	74.7
120	24	2.23	4	12000	5663	340.3	99.7	252.0	73.9	68.1	4.3	3.9	11.7	348.6	102.2	223.6	65.5
			6			482.9	141.5	324.1	95.0	96.6	6.1	20.1	59.9	425.5	124.7	277.0	81.2
			8			549.8	161.2	358.9	105.2	110.0	6.9	15.0	44.9	461.2	135.2	305.7	89.6
150	30	2.79	4	15000	7078	441.9	129.5	321.1	94.1	88.4	5.6	6.1	18.2	435.8	127.7	279.5	81.9
			6			592.9	173.8	400.8	117.5	118.6	7.5	13.7	40.9	531.8	155.9	346.2	101.5
			8			636.9	186.7	427.9	125.4	127.4	8.0	3.3	9.9	576.5	169.0	382.1	112.0
200	40	3.72	4	20000	9438	596.1	174.7	430.7	126.2	119.2	7.5	7.3	21.7	581.0	170.3	372.7	109.2
			6			797.4	233.7	537.2	157.4	159.5	10.1	16.2	48.5	709.1	207.8	461.6	135.3
			8			858.3	251.6	574.2	168.3	171.7	10.8	3.9	11.8	768.7	225.3	509.5	149.3
250	50	4.65	4	25000	11797	775.7	227.4	549.9	161.2	155.1	9.8	13.3	39.8	726.3	212.9	465.9	136.5
			6			971.5	284.7	661.4	193.9	194.3	12.3	9.5	28.5	886.4	259.8	577.0	169.1
			8			1111.8	325.9	733.8	215.1	222.4	14.0	7.2	21.5	960.9	281.6	636.9	186.7
320	64	5.95	4	32000	15101	1004.1	294.3	708.1	207.5	200.8	12.7	15.9	47.5	929.6	272.5	596.3	174.8
			6			1256.3	368.2	851.7	249.6	251.3	15.9	11.4	34.0	1134.6	332.5	738.6	216.5
			8			1434.2	420.4	943.8	276.6	286.8	18.1	8.5	25.5	1229.9	360.5	815.3	238.9
400	80	7.43	4	40000	18876	1255.1	367.9	885.1	259.4	251.0	15.8	15.9	47.5	1162.0	340.6	745.4	218.5
			6			1570.4	460.3	1064.6	312.0	314.1	19.8	11.4	34.0	1418.2	415.7	923.2	270.6
			8			1792.8	525.5	1179.8	345.8	358.6	22.6	8.5	25.5	1537.4	450.6	1019.1	298.7
450	90	8.36	4	45000	21235	1255.3	367.9	937.4	274.8	251.1	15.8	3.1	9.1	1307.3	383.2	838.6	245.8
			6			1794.1	525.9	1208.6	354.2	358.8	22.6	15.6	46.5	1595.5	467.6	1038.6	304.4
			8			2047.9	600.2	1340.1	392.8	409.6	25.8	11.7	34.9	1729.6	506.9	1146.4	336.0



## Nominal Capacity Rating - Heating Coils

Fin Spacing (10~12 FPI)						Hot Water Coils @ 70°F ( 21.1°C ) On EAT & 180/160°F ( 82.2/71.1°C ) EWT/LWT						Steam Coil @ 70°F (21.1°C) EAT & psig ( 0.14 bar ) steam pressure	
Model	Coil Area		Rows	Air Flow Rate		Total Capacity		Sensible Capacity		Water Pres. Drop		Capacity	
CWAHU	ft²	m²		cfm	l/s	MBh	KW	MBh	KW	gpm	l/s	MBh	KW
12	2.5	0.23	1	1200	566	25.8	7.5	2.6	0.2	1.8	5.3	56.0	16.4
			2			45.7	13.4	4.6	0.3	1.4	4.3	101.0	29.6
16	3.2	0.30	1	1600	755	36.4	10.7	3.6	0.2	3.6	10.9	72.4	21.2
			2			64.2	18.8	6.4	0.4	2.9	8.6	130.5	38.2
24	4.7	0.44	1	2400	1133	54.5	16.0	5.4	0.3	4.2	12.5	106.2	31.1
			2			96.4	28.3	9.6	0.6	3.3	9.9	191.5	56.1
32	6.4	0.60	1	3200	1510	76.1	22.3	7.6	0.5	6.4	19.1	143.8	42.1
			2			133.8	39.2	13.4	0.8	5.0	14.9	259.4	76.0
40	8.0	0.74	1	4000	1888	84	24.6	8.4	0.5	1.7	5.2	179.2	52.5
			2			161.2	47.2	16.1	1	3.0	9.1	323.2	94.7
50	10.0	0.93	1	5000	2359	105.0	30.8	10.5	0.7	1.7	5.2	224.0	65.7
			2			201.5	59.1	20.1	1.3	3.0	9.1	404.0	118.4
62	12.5	1.16	1	6200	2926	130.3	38.2	13	0.8	1.7	5.0	280.0	82.1
			2			252.7	74.1	25.3	1.6	3.3	10	505.0	148.0
80	16.0	1.49	1	8000	3775	245.2	71.9	24.5	1.5	9.4	27.9	354.1	103.8
			2			416.6	122.1	41.7	2.6	6.9	20.5	638.7	187.2
100	20.0	1.86	1	10000	4719	306.5	89.8	30.7	1.9	9.4	27.9	450.9	132.2
			2			520.7	152.6	52.1	3.3	6.9	20.5	813.3	238.4
120	24.0	2.23	1	12000	5663	326.2	95.6	32.6	2.1	2.2	6.7	536.0	157.1
			2			643.5	188.6	64.4	4.1	10.9	32.7	966.8	283.4
150	30.0	2.79	1	15000	7078	427.3	125.2	42.7	2.7	3.5	10.4	672.0	197.0
			2			828.9	242.9	82.9	5.2	16.6	49.6	1212.0	355.2
200	40.0	2.72	1	20000	9438	577.3	169.2	57.7	3.6	4.1	12.4	896.0	262.6
			2			1041.4	305.2	104.1	6.6	6.6	19.7	1616.0	473.7
250	50.0	4.65	1	25000	11797	756.6	221.8	75.7	4.8	7.5	22.3	1120.0	328.3
			2			1350.5	395.8	135.1	8.5	11.8	35.1	2020.0	592.1
320	64.0	5.95	1	32000	15101	980.9	287.5	98.1	6.2	8.8	26.4	1433.6	420.2
			2			1750	512.9	175.0	11.0	14.0	41.7	2585.6	757.8
400	80.0	7.43	1	40000	18876	1226.2	359.4	122.6	7.7	8.8	26.4	1792.0	525.2
			2			2082.9	610.5	208.3	13.1	6.5	19.3	3232.0	947.3
450	90.0	8.36	1	45000	21235	1415.6	414.9	141.6	8.9	12.1	36.3	2016.0	590.9
			2			2386.7	699.5	238.7	15.1	8.8	26.2	3636.0	1065.7

Note: For Capacities at different air conditions please refer to Cool Point Factory.

## Air Pressure Drop

			AIR PRESSURE DROP, inwg							AIR PRESSURE DROP, Pascals						
			Coil Face Velocity, fpm							Coil Face Velocity, m/s						
			300	350	400	450	500	550	600	1.5	1.8	2	2.3	2.5	2.8	3
HEPA FILTER			0. 87	1.03	1. 20	1.37	1.55	N R	N R	217	257	299	341	386	N R	N R
FAN			0. 08	0.09	0. 10	0.12	0.15	0. 18	0.21	20	22	25	30	37	45	52
ELECTRICAL HEATERS			0. 03	0.04	0. 05	0.06	0.07	0. 08	0.09	7	10	12	15	17	20	22
For Models CWAHU 12 to 62	Cooling Coil Per Row (WET)	8 fpi	0. 03	0.03	0. 04	0.05	0.06	0. 08	0.09	7	9	11	13	16	19	22
		10 fpi	0. 03	0.04	0. 05	0.06	0.08	0. 09	0.11	8	10	13	16	19	23	27
		12 fpi	0. 04	0.05	0. 06	0.08	0.09	0. 11	0.13	9	12	15	19	23	27	31
	Cooling Coil Per Row (DRY)	8 fpi	0. 02	0.03	0. 03	0.04	0.05	0. 06	0.07	5	7	8	10	12	15	17
		10 fpi	0. 02	0.03	0. 04	0.05	0.06	0. 07	0.08	6	8	10	12	15	18	21
		12 fpi	0. 03	0.04	0. 05	0.06	0.07	0. 08	0.1	7	9	12	15	18	21	24
For Models CWAHU 80 to 450	Cooling Coil Per Row (WET)	8 fpi	0. 05	0.06	0. 08	0.09	0.11	0. 13	0.15	11	15	19	23	28	32	38
		10 fpi	0. 06	0.07	0. 09	0.11	0.13	0. 16	0.18	14	18	23	28	33	39	45
		12 fpi	0. 06	0.08	0. 11	0.13	0.16	0. 18	0.21	16	21	26	32	39	46	53
	Cooling Coil Per Row (DRY)	8 fpi	0. 04	0.05	0. 06	0.07	0.08	0. 10	0.12	9	11	14	18	21	25	29
		10 fpi	0. 04	0.06	0. 07	0.09	0.1	0. 12	0.14	11	14	17	21	25	30	35
		12 fpi	0. 05	0.07	0. 08	0.1	0.12	0. 14	0.16	12	16	20	25	30	35	41
Eliminator			0. 02	0.04	0. 06	0.08	0.1	0. 11	0.12	5	10	15	20	25	27	30
Panel Filter		AF	0. 05	0.07	0. 10	0.12	0.18	0. 22	0.26	12	17	25	30	45	55	65
		SF	0. 15	0.17	0. 20	0.23	0.27	0. 31	0.35	37	42	50	57	67	77	87
B. F. 22"			0. 22	0.3	0. 38	0.49	0.6	0. 73	0.86	55	75	95	122	149	182	214
B. F. 30"			0. 20	0.27	0. 35	0.45	0.55	0. 67	0.79	50	67	87	112	137	167	197
B. F. 36"			0. 18	0.25	0. 32	0.41	0.5	0. 61	0.72	45	62	80	102	125	152	179
Mixing Box			0. 06	0.08	0. 10	0.11	0.13	0. 14	0.16	15	20	25	27	32	35	40

Note: For Capacities at different air conditions please refer to Cool Point Factory.

## Fan Performance Data

Model	AirFlow		Total Static Pressure, inwg (Pa)															
			0.5 (125)	1.0 (250)	1.5 (375)	2.0 (500)	2.5 (625)	3.0 (750)	3.5 (875)	4.0 (1000)	5.0 (1250)							
CWAHU	cfm	l/s	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW	rpm	kW
12	1200	566	822	0.12	1126	0.23	1384	0.35	1606	0.48	1802	0.61	1978	0.75	-	-	-	-
			808	0.16	1144	0.29	1419	0.44	1648	0.59	1845	0.75	2019	0.91	2178	1.07	2323	1.24
16	1600	755	704	0.19	953	0.33	1177	0.49	1377	0.67	1557	0.84	1721	1.01	1872	1.19	-	-
			748	0.21	1032	0.36	1275	0.55	1487	0.75	1675	0.96	1844	1.19	1999	1.42	2143	1.67
24	2400	1133	831	0.43	1012	0.6	1184	0.8	1349	1.01	1507	1.24	1657	1.48	1800	1.73	1936	1.99
			859	0.47	1071	0.65	1270	0.86	1458	1.09	1633	1.35	1797	1.61	1951	1.9	2095	2.19
32	3200	1510	634	0.53	819	0.77	992	1.02	1148	1.28	1291	1.57	1422	1.87	-	-	-	-
			600	0.48	794	0.74	972	1.05	1133	1.4	1279	1.76	1412	2.15	1535	2.55	1648	2.96
40	4000	1888	1669	0.56	1853	0.76	2021	0.97	2174	1.19	2316	1.41	2449	1.63	2575	1.86	2695	2.1
			503	0.54	671	0.86	821	1.24	957	1.65	1080	2.09	1194	2.54	-	-	-	-
50	5000	2359	658	0.78	819	1.07	974	1.4	1120	1.77	1257	2.18	1386	2.61	1506	3.05	1620	3.52
			2001	0.96	2152	1.19	2298	1.43	2436	1.69	2566	1.96	2688	2.23	2805	2.5	2916	2.78
62	6200	2926	546	0.87	690	1.22	823	1.63	947	2.08	1062	2.57	1170	3.09	-	-	-	-
			472	0.72	627	1.12	772	1.59	905	2.12	1026	2.7	1137	3.31	1239	3.95	1335	4.63
80	8000	3775	1301	0.85	1442	1.14	1569	1.46	1688	1.79	1798	2.13	1903	2.48	2002	2.85	2098	3.22
			1183	0.65	-	-	-	-	1591	1.55	1714	1.89	1830	2.25	1942	2.62	2048	3.01
100	10000	4719	438	0.81	577	1.27	703	1.79	815	2.34	917	2.93	1009	3.54	1094	4.19	-	-
			517	1.15	644	1.58	769	2.08	888	2.65	1001	3.27	1107	3.93	1207	4.63	1301	5.36
120	12000	5663	1548	1.41	1668	1.77	1780	2.14	1885	2.52	1984	2.92	2079	3.33	2169	3.75	2257	4.18
			1404	1.03	-	-	-	-	-	-	1854	2.48	1957	2.87	2058	3.29	2155	3.71
150	15000	7078	491	1.37	602	1.93	710	2.53	812	3.17	908	3.85	997	4.55	1080	5.28	-	-
			491	1.6	598	2.13	704	2.77	808	3.51	909	4.34	1006	5.26	1098	6.25	1186	7.29
200	20000	9438	1398	1.93	1499	2.4	1592	2.87	1680	3.36	1765	3.85	1847	4.36	1925	4.89	2002	5.42
			1283	1.46	-	-	-	-	-	-	1654	3.23	1743	3.73	1829	4.25	1914	4.8
250	25000	11797	461	1.99	559	2.63	654	3.37	745	4.2	832	5.11	913	6.1	991	7.14	1064	8.24
			1258	2.35	1347	2.92	1431	3.5	1509	4.1	1585	4.7	1658	5.32	1728	5.95	1797	6.6
320	32000	15101	1202	2	-	-	-	-	-	-	1515	4.25	1588	4.94	1661	5.46	1732	6.1
			397	2.15	488	2.93	575	3.83	659	4.86	739	6	814	7.24	884	8.57	951	9.98
400	40000	18876	1064	2.51	1150	3.2	1229	3.89	1303	4.6	1374	5.34	1441	6.09	1506	6.86	1568	7.66
			1035	2.18	1113	2.88	-	-	-	-	1328	4.91	1396	5.63	1461	6.37	1526	7.14
450	45000	21235	332	2.59	415	3.59	497	4.77	574	6.11	646	7.56	714	9.11	777	10.74	836	12.46
			925	3.01	999	3.83	1067	4.66	1132	5.53	1194	6.42	1255	7.35	1314	8.32	1372	9.31
			885	2.47	962	3.35	1034	4.21	-	-	-	-	1228	6.93	1289	7.9	1347	8.89
			313	3.78	386	5.1	453	6.59	517	8.26	577	10.08	634	12.03	687	14.1	-	-
			863	4.49	925	5.57	983	6.67	1037	7.8	1090	8.96	1141	10.16	1190	11.4	1238	12.67
			823	3.48	886	4.5	945	5.58	1001	6.71	1055	7.89	1108	9.11	1158	10.37	1208	11.67
			268	4.63	334	6.3	395	8.14	451	10.13	503	12.28	552	14.55	598	16.96	-	-
			755	5.47	811	6.84	863	8.24	913	9.68	961	11.15	1008	12.66	1053	14.21	1098	15.81
			736	4.46	795	5.82	849	7.21	899	8.62	947	10.08	994	11.57	1039	13.11	1083	14.7
			240	5.94	297	7.94	352	10.32	405	13.04	454	16.03	500	19.23	543	22.62	-	-
			678	7.16	728	8.86	775	10.62	821	12.44	864	14.32	906	16.26	947	18.26	986	20.3
			664	5.95	713	7.74	758	9.5	800	11.27	841	13.1	881	14.96	919	16.89	957	18.87
			212	7.31	263	9.91	312	12.81	359	16.03	403	19.55	445	23.36	484	27.44	522	31.78
			616	9.1	660	11.13	703	13.28	744	15.53	784	17.85	822	20.26	858	22.74	894	25.28
			605	7.61	647	9.86	686	12.04	722	14.23	758	16.47	792	18.75	826	21.1	859	23.52
			226	9.66	272	12.51	317	15.59	360	18.94	401	22.57	441	26.48	479	30.65	-	-
			682	12.36	722	14.6	761	16.95	799	19.4	835	21.93	870	24.53	905	27.21	938	29.95
			671	10.08	709	12.67	744	15.13	778	17.57	810	20.03	84.2	22.53	873	25.08	904	27.68

\* Performance shown at nominal airflow rates. For other airflow variety of fan types are available, please contact Cool Point Factory.



## GUIDE SPECIFICATIONS

### General

Air Handling Units shall be factory assembled. To meet project requirements, units may consist of a wide choice of combinations of sections like fan, cooling coil, heating coil, humidifier, filter, mixing box, return air fan, plenums, etc as indicated on the equipment schedule.

Units may be shipped fully or partially assembled in accordance with jobsite requirements. Units shall be horizontal or vertical arrangements as shown on attached drawings.

### Casing & Construction

- CWAHU units casing shall be constructed of heavy-gauge steel structure frame with horizontal and vertical members and panels. Fixed panels shall be bolted to the frame and removal of access panels shall not affect on the structural integrity of the unit
- Units casing shall be in galvanized or painted finish as indicated on the equipment schedule
- Galvanized casing shall be made of hot-dip galvanized steel sheets
- Painted casing shall be made of hot-dip galvanized steel sheets. Fabricated steel shall be thoroughly degreased and then phosphatized before application of an average 60 micron baked electrostatic polyester dry powder coating. This finish can pass 1000-hour, 5% salt spray test at 95°F (35°C) and 95% relative humidity (ASTM B 117/95).
- Units casing can be made of stainless steel or aluminum if so specified (optional).
- All access panels can be provided with quick release fasteners and handles (optional).
- In addition to quick release fasteners and handles, all access panels shall be provided with hinges if so specified.
- To ensure air tightness and to avoid thermal bridges, all panels shall be provided with closed-cell foam gaskets.
- All panels and frames shall be internally insulated.
- To prevent insulation erosion into air stream, the unit shall be provided with double wall panels "Double Skin", if so specified.
- Interior skin of the panels shall be made of hot dip

galvanized steel.

- Interior skin of the panels can be made of perforated galvanized steel, aluminum or stainless steel if so specified.
- Insulation thickness shall be 1" (25mm), 1.5" (38mm) or 2" (50mm) (based on unit's size and application).

Following optional insulations shall be provided if so specified:

- 1" (25 mm) or 2" (50 mm) thick polyisocynurate board with density in the range 2-3 lb/ft<sup>3</sup> (32-48 kg/m<sup>3</sup>) and thermal conductivity of 0.16 BTU in/ft<sup>2</sup> F.h (0.023 W/m<sup>2</sup>k)
- Units (up to size 100) shall be provided with painted steel base frame Larger units shall be provided with painted rigid steel structure base frame
- Units for outdoor installation shall be provided with weatherproof top cover

### Fan Section

- Fan shall be double width, double inlet, multi blades, and centrifugal type wheels.
- Fan shall be statically & dynamically balanced and tested.
- Fan blades shall be forward curved or backward inclined or backward inclined air foil as indicated on the equipment schedule.
- Forward curved blades shall be made of galvanized steel
- Fan shaft shall be made of C-45 carbon steel with an anti corrosion varnish.
- Backward inclined blades shall be made of mild steel finished with epoxy paint Fan shaft shall be made of C-45 carbon steel with an anti corrosion varnish
- Backward inclined airfoil blades shall be made of corrosion resistance steel coated with an anti corrosion primer and a final layer of synthetic paint Fan shaft shall be made of hardened steel, precision ground and polished with protection paint
- Fan impeller shall be keyed to fan shaft to prevent slipping

- Fan bearings shall be ball type, hermetically sealed, self-aligning with eccentric ring for clamping to the shaft.
- Fan shaft shall be stainless steel if so specified (Optional).
- Flexible connection shall be provided between fan discharge and casing panel.
- Fan motor shall be mounted inside fan section on adjustable base Motor shall be totally enclosed fan cooled (TEFC), foot mounted, 4 poles, IP-55 protected with class-F insulation
- Motor size and electrical characteristics shall be as indicated on the equipment schedule.
- To limit transmission of noise and vibration, the complete fan motor subassembly shall be mounted on rubber in shear isolators
- Stand by motor with manual change over, spark proof fan, explosion proof motor, fan with polygly coating, belt guard shall be provided if so specified (Optional).
- Fan shall be belt-driven by using anti static belts and adjustable pitch drives.
- For variable air volume controls, fan with inlet guide vanes or variable frequency drive shall be installed as indicated on the equipment schedule.

### Coil Section

- Chilled water, hot water, steam & DX coils shall be provided as indicated on the equipment schedule.
- Coil shall be constructed of seamless copper tubes of 1/2", 3/8" (9.5mm) (for models 12-20) or 5/8" (15.9mm) (for models 80 - 450) outside diameter arranged in a staggered form
- All water coils shall be provided with automatic air vents (Optional).
- DX coil shall be provided with distributor Expansion valve shall be provided if so specified.
- Coil circuiting shall be counter flow (Direction of coil water / refrigerant flow shall be counter to direction of unit airflow).
- Supply and return water connections of coil section shall be labeled with "WATER IN" & "WATER OUT" respectively.

- DX coil section shall be labeled with "LIQUID" & "SUCTION".
- Coil tubes shall be mechanically expanded into continuous corrugated aluminum fins to provide compression bond of tubes to fins. Fins shall have drawn collars.
- Optional copper fins, electro-tinned coils or coils with protective coating shall be provided if specified (optional).
- Maximum fins spacing shall be 12 fpi (2.1mm).
- Coil connections shall be sweat type Optional MPT, FPT or flanged connections shall be provided if so specified.
- Coil shall be rated as ARI - 410 and tested by compressed air under water to the pressure of 300 psig (21.09kg/cm<sup>2</sup>)
- Cooling coil shall be provided with drain pan to remove the condensate formed during the dehumidification. Drain pan shall be constructed of 1.5 mm (for models 12-200) or 2.0 mm (for models 250-450) thick zinc coated steel sheets, painted and insulated from outside with minimum 1" (25mm) thick fiberglass insulation To meet the requirement of ASHRAE Standard 62, the bottom of drain pan shall be tapered sloping towards the center and its connection shall be MPT.
- Drain pan shall be provided with one connection (for models 12-200) or two connections (for models 250-450).
- Drain pan shall be constructed of stainless steel if so specified.
- Drain pan shall be constructed such that coil headers & U-bends are enclosed by it.
- Moisture eliminator shall be provided if so indicated on the equipment schedule.

### Filter Section

- Filter type & efficiency shall be as indicated on the equipment schedule.
- Filter section of CWAHU shall be constructed to accommodate one or more of the following filters:
  - Panel Filter:  
Thickness: 1"-2"  
Media: Washable Aluminum  
Form: Flat  
Average dust arrestance: 75 %

Thickness: 2" (50mm)  
Media: Disposable Synthetic  
Form: Flat  
Average dust arrestance: 87 %

Thickness: 2: (50mm)  
Media: Blend of non woven cotton and polyester  
Form: Pleated  
Average dust arrestance: 93 %

- V Filters: Filters shall be arranged in a V bank to increase the filtration area. Media options are the same as in flat form panel filters (optional).
- Bag Filters: Bag filter media shall be 22fl (559mm), 30fl (762mm) or 36fl (914mm) deep with average dust spot efficiency (opacimetric measure) 85% or 95% as per ASHRAE test # 52/76 (optional).
- HEPA Filters: Ultra high absolute HEPA filter media shall be 12fl (300mm) deep with efficiency >99% when measured by using DOP method (optional).
- To monitor air pressure drop across filter, manometers shall be provided if so specified (optional).

### Electrical Heater Section

- Electric heater capacity and steps shall be as indicated on the equipment schedule.
- Electric heater batteries shall be supplied with contactors, fuses, disconnect switch and airflow switch if so specified.
- Control panel consisting of all controls shall be provided as integral part of the unit.

### Humidifier Section (Optional)

Humidification capacity and efficiency shall be as indicated on the equipment schedule.

The humidifier type shall be steam or water as specified on the equipment schedule.

### Dampers

- To control the fresh, return and exhaust airflow rates in mixing box, exhaust box, economizer, face & bypass and multi-zone sections, CWAHU shall be provided with dampers.
- Damper shall be arranged in parallel or opposed blades configuration.

- Damper frame, shaft, linkages and brackets shall be constructed of galvanized steel.
- Damper blades shall be constructed of stainless steel if so specified.
- Damper blades shall be rotate in bronze bearings which lubrication is not required.



# THE LARGEST MANUFACTURER OF AIR CONDITIONING EQUIPMENT

## COMPANY PROFILE

Cool Point (Pvt) Ltd. is a subsidiary of M/s Cool Industries (Pvt.) Ltd, leading manufacturer of Deep Freezers, Refrigerators and Split Air Conditioners in Pakistan of renowned brand

On a modes level, Cool Point (Pvt.) Ltd. has grown into one of the prime Manufacturers of Air Conditioners & Coils in Pakistan. Out professional staff and dedicated management is fully committed to quality and Service of its product. Our system is certified for ISO 9001:2000 Standard.

We possess the latest machinery and technology required for production of high quality products. Our team of professional engineers and technical staff is capable of responding to the market's most expecting demands for that we are continuously struggling to improve our Manufacturing capability and quality to become the leader of the market.

We have efficient network of After Sales Services throughout the country for the entire satisfaction of our customers.

## DISPLAY CENTERS

**Lahore:** Shop No. 13, Ground Floor, Raja Chamber, 35 Fatima Jinah Road. Ph: 042-7534623-4  
159-Karim Block, Alama Iqbal Town, Mian Wahdat Road. 042-45-46-47

**Karachi:** Hashmi Electronics Market, Abdullah Haroon Road. Ph: 021-7727743-4

**Faisalabad:** Kotwali Road, Opp. Thana Kotwali. Ph: 041-601684

**Multan:** Mian Market, Hussain Agahi Road.

## MAJOR CLIENTS FOR COMMERCIAL AC UNITS

MCR (Pvt.) Ltd. Raazee Therapeutics (Pvt.) Ltd. Nishat Group of Companies Package Limited Cool Industries (Pvt.) Ltd. Dyson Research Laboratories Shifa International Hospital Dewan Salman Fibre Ltd. Prime Dairies Limited Akhtar Textile Industries (Pvt.) Ltd. Mumtaz Engineering (Pvt.) Ltd. Colgate Palmolive Pakistan Limited Highnoon Laboratories (Pvt.) Ltd. Uni Lever Pakistan Limited Elahi Group of Companies H. Nizam Din & Sons (Pvt.) Ltd. H. Karim Bukhsh Enterprises Siza International Pharma (Pvt.) Ltd. Aneeb Pharmaceuticals (Pvt.) Ltd. PACE Pakistan Limited Punjab Institute of Computer Science Olympia Group of Industries KIDCO (Agro Chemicals (Pvt.) Ltd.) Gelcaps (Pakistan) Limited Pakistan Beverage Limited (PEPSI) Pakistan International Airport (PIA) Food & Beverages Co. (Pvt.) Ltd. Novins Internationals Conimpex Hatchery Peace Engineering Services Paksol (Pvt.) Ltd. Ranfro Textiles Master Textile Limited	A. A. Associates United Engineering WAPDA Organon Engineering Company Premier Industries (Pvt.) Ltd. Azgard Nine Tops Food & Beverages Doctors Hospitals Union Fabrics Limited ILF Pakistan (Pvt.) Ltd. Allaience Pharmaceuticals (Pvt.) Ltd. Bentley Pharmaceuticals Sitara Chemicals Industries Limited Inter Food Industries PC Hotels Atchison College Toyota Defence Motors Pakistan Atomic Energy Commission Pakistan Navy CMH (Combine Military Hospital) Pakistan Telecommunication Company Limited International Industries Angatech International Darbarwala Industries Horizon Developers Bilal Engineering Frooto Industries (Pvt.) Ltd. Vetcon Pharmaceuticals Drug Pharmaceuticals CHS Pharmaceuticals Zephyr Pharmaceuticals Hightech Chemicals Pakistan Petroleum Limited	Medicraft (Pvt.) Ltd. Rexo Engineering (Pvt.) Ltd. Engineering Kinetics (Pvt.) Ltd. Newage Garments S. T. Associates Engineering Enterprises Defence Housing Authority Electrical and Mechanical Engineering Lasania Groups ICI Kheora US Capital Textile (Pvt.) Ltd. Kamal Spinning Mills Al-Khair Industries Pak Gulf Constructions The Layton Rehmatullah Benevolent Trust Lahore Chamber of Commerce (LCCI) General Electro-Mechanique Company TELENOR (Pvt.) Ltd. Stiches (Pvt.) Ltd. ISI Headquarters Zafar Cool Comfort Luck Traders Diamonds Paints Zantock Pharmaceuticals Labs. Fedro pharmaceuticals Festal Laboratories Ocean Pharmaceuticals Safina Pharmaceuticals Hamza Pharmaceuticals Candid Pharmaceuticals Cardex Pharmaceuticals Crescent Bahuman Star Laboratories (Pvt.) Ltd.	Techno Pak Industries (Pvt.) Ltd. Pakistan Air Force Batala Pharmaceuticals TCS (Pvt.) Ltd. Asia Tent Services Telephone Industries Pakistan (TIP) National Development Complex (NDC) Pakistan Military Office (PMO) Pakistan Army Standard Chartered Bank Masood Textile Nazar Sons Shalimar Hospital Mobilink GSM Pakistan NES PAK (Pvt.) Ltd. Himont Pharmaceuticals Rafhan Bestfood Farmaceutics International W & Ali Sons Pharmaceuticals Rafey Associates U. I. G. (Pvt.) Ltd. LMK Resources M. M. Engineering Geofman Pharmaceuticals Silver Sands Dr. Ziauddin Hospital Salt'N'Pepper Shawn Pharmaceuticals Glaxo Welcome Pakistan Frezol (Pvt.) Ltd. The Monal (Pvt.) Ltd. Naico (Pvt.) Ltd. AES Lalpir
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