39UG AIR HANDLING UNITS
Air flow rate : 2000 to 250 000 m^3/h

Manufactured in UAE By:

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INTRODUCTION

GENERAL

As a part of the Our range of 39UG air handling units presents a wide range with a perfect adaptability to air conditioning for comfort and industrial applications.
The 39UG air handling unit has a high performance casing with a unique design meeting stringent thermal performance and hygiene demands. As standard, the 39UG unit meets the Eurovent T2, TB2 classification.
The 39UG unit covers an airflow range from 2 000 to 70 000 m3/h (0.5 to 20 m3/s) as standard and up to 250 000 m3/h (70 m3/s) on special request.
The functionality in the 39UG range includes a full range of heat recovery systems as well as the usual HVAC functionality. With the heat recovery systems and our range of high efficiency fans we are able to offer solutions with a low cost of operation while also reducing the energy consumption and the impact on the environment.
The modular design allows you to configure the components in the way you need so that you can find the optimal use of space while fulfilling the technical requirements on air quality.
The units are configured and accurately calculated in our Air concept selection software; which is Eurovent certified
Our philosophy is not only to produce the most comprehensive standard range, but above all knowing how to adapt to your specifications.
All materials and components are carefully selected to meet the standards, codes and specifications. Each phase of production is strictly controlled to ensure continuous high quality level.
This quality is guaranteed by ISO 9001 and the performance is Eurovent certified.

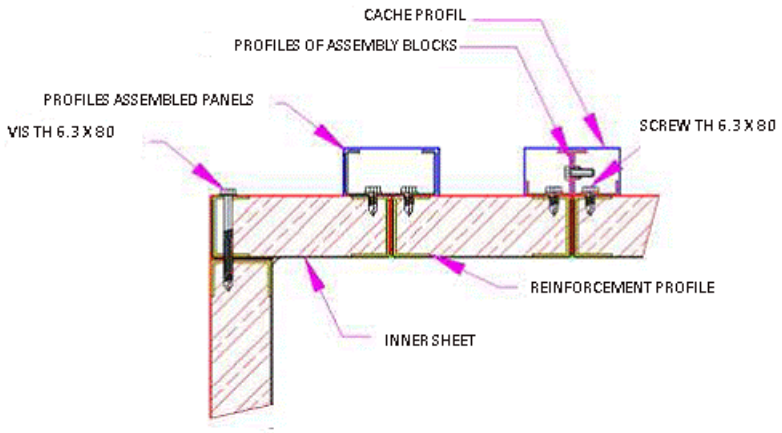
DESCRIPTION

Casing construction detail

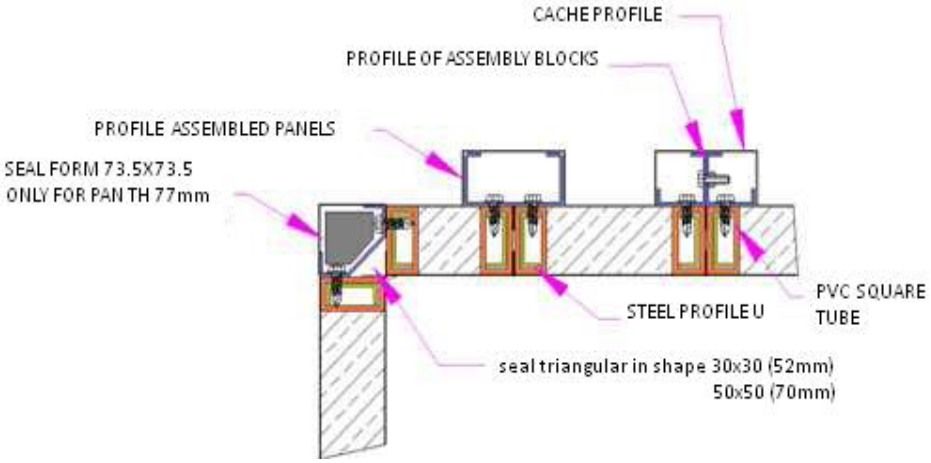
An important part of our expertise lies in the design of the casing on the 39UG units. The casing consists of double skin insulated self-supporting panels with 50mm high density rock wool insulation creating a casing with an industrial design and flexible modularity. This design creates a clean interior that is very easy to keep clean. It is available for either indoor or outdoor installation.

To allow us to tailor the offering according to your needs, we have three versions of the casing as shown below:

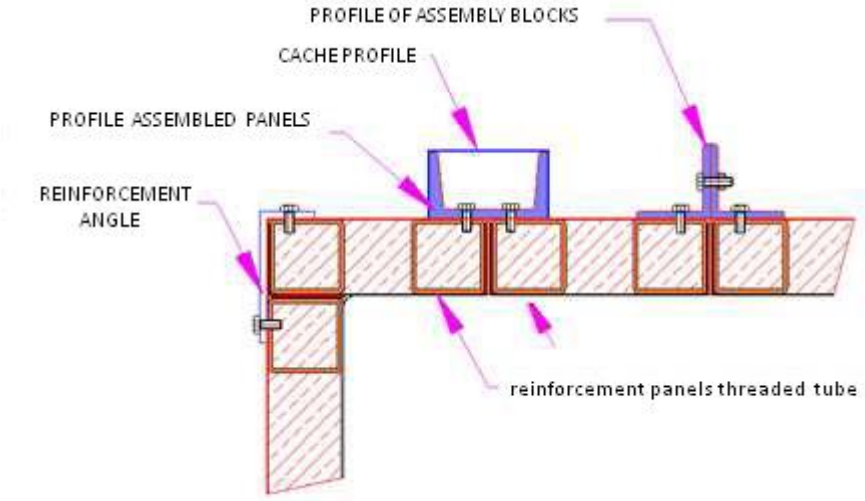
- Our standard series for pressures up to 2500 Pa.
- Our standard series for pressures up to 2500 Pa.



- Our thermal bridge free series "APT" (Anti thermal) without metallic continuity between the interior and exterior for low temperature applications.



- * Our reinforced series 39UG « THP » (very high pressure) for high pressures up to 7500Pa.



DELIVERY

39UG units can be delivered in separate blocks or assembled on a common base. We can also deliver in flat or knock down form according to your needs and requirements of transportation from our factory to your plant room. The 39UG unit is very easy to assemble on site.

EASE OF MAINTENANCE

39UG is designed to be easy to look after and maintain. Naturally, we provide maintenance instructions and wiring diagrams. The large doors and the clean interior make the task of maintenance as simple as possible. If necessary, in exceptional circumstances it is possible to remove fixed panels to allow greater access to internal components for repair or replacement. As an accessory we can provide telfer beams to aid removal of heavy items such as motors.
All signals facilitating commissioning, maintenance, and together with the signs of danger, are planned. Wiring diagrams of the engines are in the terminals of the motors.

2. GENERAL POINTS

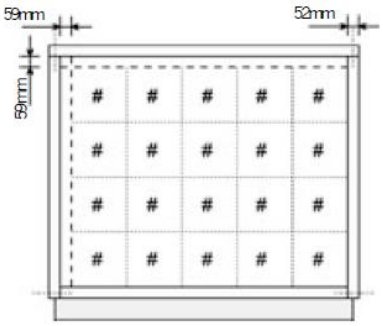
2.1 MODULARITY

39UG units have a two-dimensional internal modularity with a width and height of 305mm plus a fixed 59mm. The walls are 52 mm thick so the outer dimensions are 104mm more. The external profiles add another 40 mm for sizes up to xx and 57mm for larger sizes.
Casing blocks can be made up to 2400mm wide or long while the height is restricted to 2750mm

Occasional loads at the centre of the panel must be below 3 kg/cm^2

INTERNAL SECTION (HEIGHT AND WIDTH)

20 = 2 # (2 modules) =	669 mm
30 = 3 # (3 modules) =	974 mm
40 = 4 # (4 modules) =	1279 mm
50 = 5 # (5 modules) =	1584 mm
60 = 6 # (6 modules) =	1889 mm
70 = 7 # (7 modules) =	2194 mm
80 = 8 # (8 modules) =	2499 mm



LENGTH

1 #200 (1 Mod. en Longeur) =	200 mm
2 #200 (2 Mod. en Longeur) =	400 mm
3 #200 (3 Mod. en Longeur) =	600 mm
4 #200 (4 Mod. en Longeur) =	800 mm
5 #200 (5 Mod. en Longeur) =	1000 mm
6 #200 (6 Mod. en Longeur) =	1200 mm
7 #200 (7 Mod. en Longeur) =	1400 mm
8 #200 (8 Mod. en Longeur) =	1600 mm
9 #200 (9 Mod. en Longeur) =	1800 mm
10 #200 (10 Mod. en Longeur) =	2000 mm
11 #200 (11 Mod. en Longeur) =	2200 mm
12 #200 (12 Mod. en Longeur) =	2400 mm

Internal section of the envelope (or casing)

Add (2x52mm) = 104 mm in order to get height, width, length of the exterior of the central.

Profiles assembled panels and blocks

For unit which width is **inferior to module 60**, add 40 mm to the **height**.

For unit which width is **superior to module 60,** add 57 mm to the **height.**
Add those two values to the **width** from height of **module 40**.

Base frame
For central which width is **inferior or equal to module 60**, add 120 mm at the **height**.
Beyond this width or for specific unit, this height varies.
Denomination
The denomination of the unit can immediately identify height and width.
Example: 39UG 40 X 50, de 12# for the length.

Dimensions			**Exteriors**	**Overall**
Height 4 #	:	((4x305) +59)+(2x52)	=1383+40+120	=1543mm
Width 5 #	:	((5x305)+59)+(2x52)	=1688+40+40	=1768mm
Length 12#	:	12 x 200 +(2x52)	= 2400+104	=2504 mm

2.2 LIMITATIONS

Dimensions

The size of a unit can be limited by several parameters. The two mains parameters are the transport and the handling.

Maximum height of Blocks for a standard transport	= 2750 mm
Maximum width of Blocks for a standard transport	= 2400 mm
Maximum length of Blocks for a standard transport	= 2400 mm

Weight

Units must have been manhandled by a chassis. The weight of each block must stay in reasonable limits.

For units with several blocks installed on anti-vibration pads, it is a necessity to use a specific base frame which can associate with the pads.

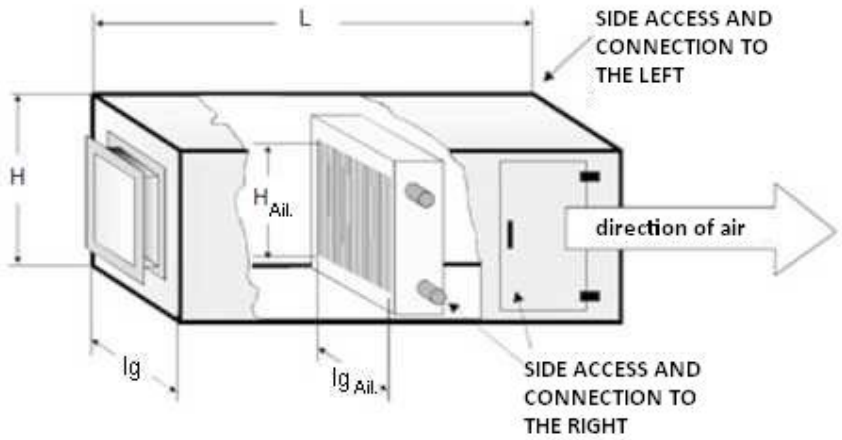
Occasional loads at the centre of the panel must be below 3 kg/cm^2

Tables and charts

Tables and charts indicate limits of selection. Do never extrapolate or expand charts.
We are not responsible in the event of extrapolation.

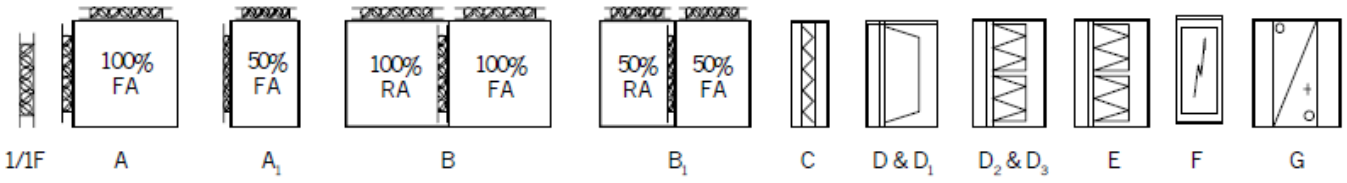
2.3 DIMENSIONS AND WEIGHTS

The main criterion for selecting a unit is the face velocity on the cooling coil. See the quick selection table (page x) to determine the appropriate section.
A brief overview of the dimensions and weights is given in the following tables. The overall dimensions and the total weight is calculated by adding the characteristics of each component. However, details are more easily found by using our selection program.



3. DIMENSIONS AND WEIGHTS

3.1 PER SECTIONS



1/1 F = Full frontal section registry
A_1 = Mixing Box 50% Fresh Air
B_t = Combination Box 50% Fresh Air
D = Flexible Filter in front access (with/ ss.Pref)
D_2 = Rigid filter in Access (with/ ss Pref.)
E = Absolute Filter
G = Hot Coil

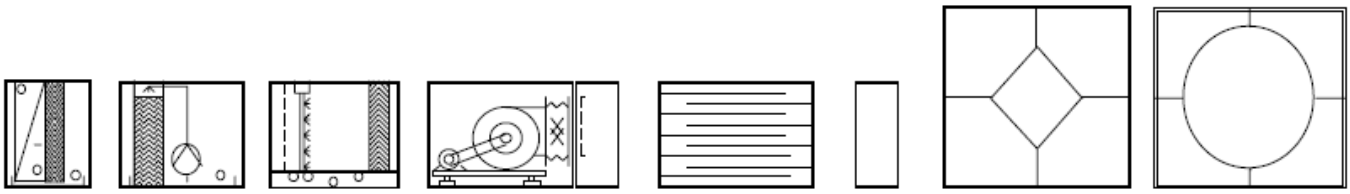
A = Mixing Box 100% Fresh Air
B = Combination Box 100% Fresh Air
C = Only prefilter rises to Slide or Front Access
D_1 = Pockets Filter in Soft Slide (with/ ss Pref.)
D_3 = Rigid Filter in Slide (with/ ss Pref.)
F = Electric Coil

Weight & Dimensions of internal components of the 39UG

DIM,HX dg	H (mm)	lg mm	Reg 1/1F		A 100%	A1 50%		B 100	B1 100%		C	C	D P.flexible	D1	SS Prefilters	with	D2 P. Rigid	D3	SSI Prefilters	with	E		F		G	
			mm	kg	mm	kg	kg	mm	kg	kg	mm	kg	mm	kg	kg		kg	kg	kg	mm	mm	kg	mm	mm	mm	kg
20X20	773	773	130	See Dimensions and Weight of registers 6 page 16	400	400	See Dimensions and Weight of registers 6 page 16	1000	800	See Dimensions and Weight of registers 6 page 16	200	8	600	800	9	12	400	600	9	12	400	56	200-600	See Dimensions and Weight of Electric Coils	200-400	See Dimensions and Weight of Water Coils
20X30	773	1078	130		400	400		1000	800		200	13	600	800	14	17	400	600	14	17	400	74	200-600		200-400	
20X40	773	1383	130		400	400		1000	800		200	18	600	800	19	24	400	600	19	24	400	90	200-600		200-400	
20X50	773	1688	130		400	400		1000	800		200	22	600	800	23	30	400	600	23	30	400	116	200-600		200-400	
30X30	1078	1078	130		800	400		1400	1000		200	18	600	800	19	25	400	600	19	25	400	101	200-400		200-400	
30X40	1078	1383	130		800	400		1400	1000		200	24	600	800	26	29	400	600	26	29	400	137	200-400		200-400	
30X50	1078	1688	130		800	400		1400	1000		200	35	600	800	37	47	400	600	37	47	400	149	200-600		200-400	
30X60	1078	1993	130		800	400		1400	1000		200	41	600	800	44	54	400	600	44	54	400	194	200-600		200-400	
30X70	1078	2298	160		800	600		1400	1000		200	49	600	800	52	66	400	600	52	66	400	224	200-600		200-400	
40X40	1383	1383	130		800	400		1600	1000		200	33	600	800	35	45	400	600	35	45	400	163	200-400		200-400	
40X50	1383	1688	130		800	400		1600	1000		200	44	600	800	46	59	400	600	46	59	400	211	200-600		200-400	
40X60	1383	1993	130		800	190		1800	120		200	51	600	800	54	69	400	600	54	69	400	239	200-600		200-400	
40X70	1383	2298	160		800	600		1800	1200		200	60	600	800	63	82	400	600	63	82	400	286	200-600		200-400	
40X80	1383	2603	160		800	600		1800	1200		200	69	600	800	72	92	400	600	72	92	400	315	200-600		200-400	
50X50	1688	1688	130		800	600		2000	1200		200	52	600	800	55	72	400	600	55	72	400	259	200-600		200-400	
50X60	1688	1993	160		800	600		2000	1400		200	66	600	800	69	89	400	600	69	89	400	307	200-800		200-400	
50X70	1688	2298	160		800	600		2000	1400		200	73	600	800	76	100	400	600	76	100	400	348	200-800		200-400	
50X80	1688	2603	160		800	600		2000	1400		200	85	600	800	88	115	400	600	88	115	400	406	200-800		200-400	
60X60	1993	1993	160		800	600		2400	1400		200	83	600	800	86	108	400	600	86	108	400	374	200-800		200-400	
60X70	1993	2298	160		800	600		2400	1400		200	85	600	800	89	117	400	600	89	117	400	448	200-800		200-400	
60X80	1993	2603	160		800	600		2400	1400		200	96	600	800	100	130	400	600	100	130	400	491	200-800		200-400	
70X70	2298	2293	160		800	800		2800	1800		200	98	600	800	135	135	400	600	135	135	400	527	200-800		200-400	
70X80	2298	2603	160		800	800		2800	1800		200	113	600	800	153	153	400	600	153	153	400	587	200-800		200-400	

Weight of 39UG Tunnel in Function block length & type of insulation

DIM,HXdg	Weight in Kg of Rock Wool Tunnel (chassis included) as per the length of the rocks											Weight in Kg of Tunnel Made of Polyurethane (chassis included) as per the length of the blocks										
	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400
20X20	54	72	90	107	129	147	164	182	200	217	235	46	60	73	87	104	118	131	145	159	172	186
20X30	65	85	105	125	151	151	191	212	232	252	272	55	70	85	100	121	136	152	167	182	197	212
20X40	76	98	121	143	173	196	218	241	264	286	309	64	81	97	114	138	155	172	188	205	222	238
20X50	86	111	136	161	196	221	246	270	295	320	245	73	91	109	128	155	173	192	210	228	246	264
30X30	72	95	117	140	168	191	213	236	258	281	303	60	77	94	110	133	150	166	183	200	216	233
30X40	83	108	133	158	190	215	240	265	290	315	340	69	88	106	124	150	168	186	204	223	241	259
30X50	94	121	148	176	212	240	267	295	322	349	377	78	98	118	138	167	187	206	226	246	266	285
30X60	107	138	169	199	242	273	303	334	365	384	413	90	112	135	157	191	213	236	258	281	290	312
30X70	117	151	184	217	297	297	331	364	397	418	450	99	123	147	171	208	232	256	280	304	315	338
40X40	90	117	145	172	207	235	262	289	317	344	371	75	95	114	134	161	181	201	221	241	260	280
40X50	101	131	160	190	229	259	289	319	349	378	408	84	105	126	148	178	200	221	242	264	285	306
40X60	114	147	181	214	258	292	325	359	392	413	445	95	119	143	167	202	226	250	274	298	310	333
40X70	124	160	196	232	281	316	352	388	424	447	482	104	130	155	181	219	245	270	296	322	334	359
40X80	135	173	212	250	303	341	379	417	456	481	518	113	140	167	194	236	263	290	318	345	359	385
50X50	108	140	172	205	246	278	311	343	375	407	440	89	112	135	158	190	213	236	259	282	304	327
50X60	121	157	193	228	275	311	347	383	419	442	476	100	126	152	177	214	239	265	291	316	329	354
50X70	132	170	208	246	297	336	374	412	450	476	513	109	137	164	191	231	258	285	312	339	354	380
50X80	142	183	224	264	320	360	401	442	482	510	550	118	147	176	204	248	276	305	334	363	378	406
60X60	128	166	205	243	292	330	369	407	445	471	508	106	133	160	187	226	253	334	307	334	348	374
60X70	139	179	220	261	314	355	396	436	477	505	544	115	143	172	201	242	271	357	329	357	373	401
60X80	149	193	236	279	336	380	423	466	509	539	581	124	154	184	214	259	290	380	350	380	398	427
70X70	146	189	232	275	331	374	417	460	504	534	576	120	150	181	211	254	284	375	345	375	393	422
70X80	157	202	248	293	353	399	444	490	535	568	613	129	161	193	225	271	303	398	366	398	417	448



J = Cold Coil with/without Separator
K = Runoff humidifier 65 to 85%
L= Air washer 1 or 2 Ramp
M = Motor-driven fan
N = Subwoofer Relaxation
O = Acoustic trap
T = Empty section
P = Collector plates with/without bypass
Q = Rotary recuperator no hygroscopic/hygroscopic.

Weight & Dimensions of internal components of the 39UG Unit

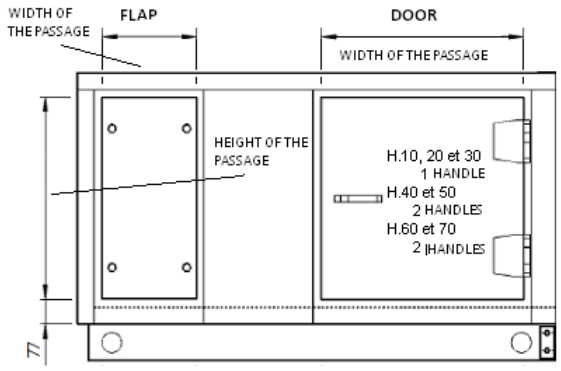
DIM,HXdg	J		K		L		M		N		O						T		P		Q	
												600	1000	1200	1500	2000						
	mm	kg	mm	kg	mm	kg	mm	kg	mm	kg	mm	kg	kg	kg	kg	kg	mm	kg	mm	kg	#	kg
20X20	400-800	See Dimensions and Weight of Water Coils/ DX 6 page 27	800	81	1800	210	600-1000	See Dimensions and Weight of Motor-driven fans/ 11 page 45	400-600	11	600-2000	15	31	37	46	60	200	Check the Weight of the YCCM Tunnel	800-1200	46	600	70
20X30	400-800		800	92	1800	215	800-1200		600	13	600-2000	23	46	55	69	90	200		800-1200	71	600	114
20X40	400-800		800		1800	220	1000-1200		600	16	600-2000	31	61	73	92	119	200		800-1200	95	600	137
20X50	400-800		800	121	1800	245	1000-1200		600	18	600-2000	38	77	92	115	149	200		800-1200	120	600	164
30X30	400-800		800	109	1800	240	1000-1400		600-800	15	600-2000	34	69	83	103	134	200		1000-1600	125	600	125
30X40	400-800		800	138	1800	270	1000-1400		600-800	19	600-2000	46	92	110	138	179	200		1000-1600	168	600	212
30X50	400-800		800	155	1800	295	1000-1400		600-800	20	600-2000	57	115	138	172	224	200		1000-1600	212	600	268
30X60	400-800		800	190	1800	315	1000-1400		600-800	22	600-2000	69	138	165	207	269	200		1000-1600	255	600	311
30X70	400-800		800		1800	330	1000-1400		600-800	25	600-2000	60	161	193	241	313	200		1000-1600	299	600	383
40X40	400-800		800	161	1800	300	1200-1800		800-1000	20	600-2000	61	122	147	184	239	200		1200-2000	262	600	230
40X50	400-800		800	184	1800	340	1200-1800		800-1000	23	600-2000	77	153	184	230	298	200		1200-2000	329	600	358
40X60	400-800		800	190	1800	380	1200-1800		800-1000	25	600-2000	92	184	220	275	358	200		1200-2000	397	600	435
40X70	400-800		800	230	1800	400	1400-1800		800-1000	28	600-2000	107	214	257	321	418	200		1200-2000	465	600	1522
40X80	400-800		800	253	1800	440	1400-1800		800-1000	30	600-2000	122	245	294	367	477	200					
50X50	400-800		800	213	1800	420	1200-2200		1000	25	600-2000	96	191	230	287	373	200					
50X60	400-800		800	224	1800	430	1400-2400		1000	27	600-2000	115	230	275	314	448	200					
50X70	400-800		800	253	1800	460	1400-2400		1000	30	600-2000	134	268	321	402	522	200					
50X80	400-800		800	283	1800	525	1600-2400		1000	32	600-2000	153	306	367	459	597	200					
60X60	400-800		800	259	1800	485	1600-2800		1000-1200	29	600-2000	138	275	330	413	537	200					
60X70	400-800		800	282	1800	540	1600-2800		1000-1200	32	600-2000	161	321	386	482	627	200					
60X80	400-800		800	316	1800	605	1600-2800		1000-1200	34	600-2000	184	367	441	551	716	200					
70X70	400-800		800	328	1800	640	1800-3000		1000-1200	35	600-2000	187	375	450	562	731	200					
70X80	400-800		800	385	1800	660	1800-3000		1000-1200	37	600-2000	214	428	514	643	835	200					

Final Weight of Unit & Accessories of 39UG Unit

DIM,HXdg	Weight of the extremity of rock wool					Weight of the extremity of polyurethane foam					Weight of the roof by 200kg	Rain screen			Awning of the fan	flexible sleeve		
	Full extremity	Connecting sheet metal			Intermediate sheet metal	Full extremity	Connecting sheet metal			Intermediate sheet metal		1/1F kg	1/1 kg	1/2 kg		1/1F kg	1/1 kg	1/2 kg
		1/1F	1/1	1/2			1/1F	1/1	1/2									
20X20	16	4	6	10	8	12	3	5	7	8	2	10	9	7	2	4	3	2
20X30	21	5	9	13	11	16	4	6	10	11	3	13	11	10	2	5	4	4
20X40	27	7	11	16	13	20	5	8	12	13	4	15	13	13	4	6	5	5
20X50	32	8	13	19	15	23	6	9	14	15	4	18	15	15	4	7	6	6
30X30	29	7	12	18	13	21	5	9	13	13	3	18	15	13	3	6	5	5
30X40	37	9	15	22	15	27	7	11	16	15	4	22	19	15	3	7	6	6
30X50	45	11	18	27	17	32	8	13	19	17	4	25	21	18	6	8	7	7
30X60	52	13	21	31	19	37	9	15	22	19	5	28	24	22	6	9	8	7
30X70	59	15	24	36	22	42	11	17	25	22	5	32	27	22	6	10	9	7
40X40	47	12	19	28	17	34	8	13	20	17	4	34	29	15	4	8	7	6
40X50	56	14	23	34	19	40	10	16	24	19	5	38	32	18	5	9	8	7
40X60	66	17	26	40	22	47	12	19	28	22	6	42	36	22	6	10	9	7
40X70	76	19	30	45	24	54	13	21	32	24	8	46	39	25	8	11	9	8
40X80	85	21	34	51	26	60	15	24	36	26	8	50	43	28	8	12	10	9
50X50	68	17	27	41	22	49	12	19	29	22	4	28	24	25	6	10	9	8
50X60	80	20	32	48	24	57	14	23	34	24	5	32	27	28	7	11	9	9
50X70	92	23	37	55	26	65	16	26	39	26	5	36	31	32	8	12	10	10
50X80	103	26	41	62	28	73	18	29	44	28	6	40	34	32	8	13	11	9
60X60	94	23	38	56	26	66	17	26	40	26	5	38	32	28	7	12	10	9
60X70	108	27	43	65	28	76	19	30	45	28	5	42	36	32	9	13	11	10
60X80	121	30	49	73	30	85	21	34	51	30	6	46	39	38	9	14	12	9
70X70	124	31	49	74	30	87	22	35	52	30	5	49	42	46	9	14	12	11
70X80	139	35	56	84	33	97	24	39	58	33	6	54	46	50	9	15	13	12

3.2 DIMENSIONS OF ACCESS

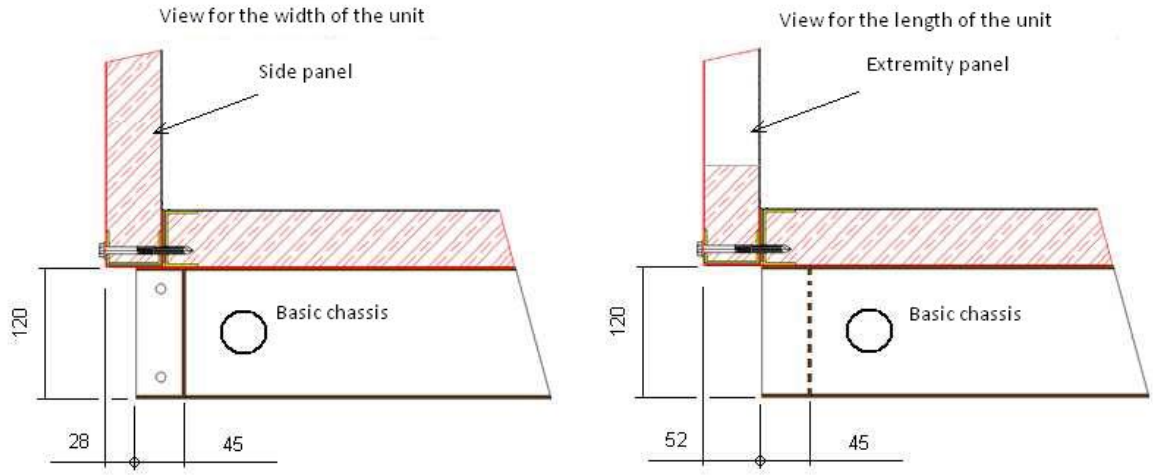
Doors & Hatches



Passing Access Section

			HEIGHT OR WIDTH					
			20	30	40	50	60	70
FLAP 200 mm	WIDTH		150 mm	150 mm	150 mm	150 mm	150 mm	150 mm
	HEIGHT		619 mm	924 mm	1229 mm	1534 mm	1839 mm	2144 mm
DOOR	WIDTH	400 mm	350 mm	350 mm	350 mm	350 mm	350 mm	350 mm
		600 mm	500 mm	500 mm	500 mm	500 mm	500 mm	500 mm
		800 mm	700 mm	700 mm	700 mm	700 mm	700 mm	700 mm
	HEIGHT	ALL LENGHT	619 mm	924 mm	1229 mm	1534 mm	1839 mm	1839 mm

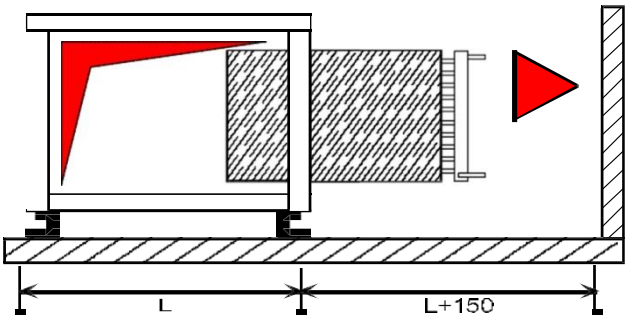
3.3 Base frame



4. INSTALLATION

WORKING SPACE

If the unit is fitted with a scrubber and pump, the base should be lengthened. Provide sufficient space on the service side of the unit to allow ease of access to the installed components such as the fan motor unit, electrical heater and humidifier. The minimum working space to be provided to allow the coils, the fan and the filters to be slid out should be equal to the width of the unit plus 150 mm.

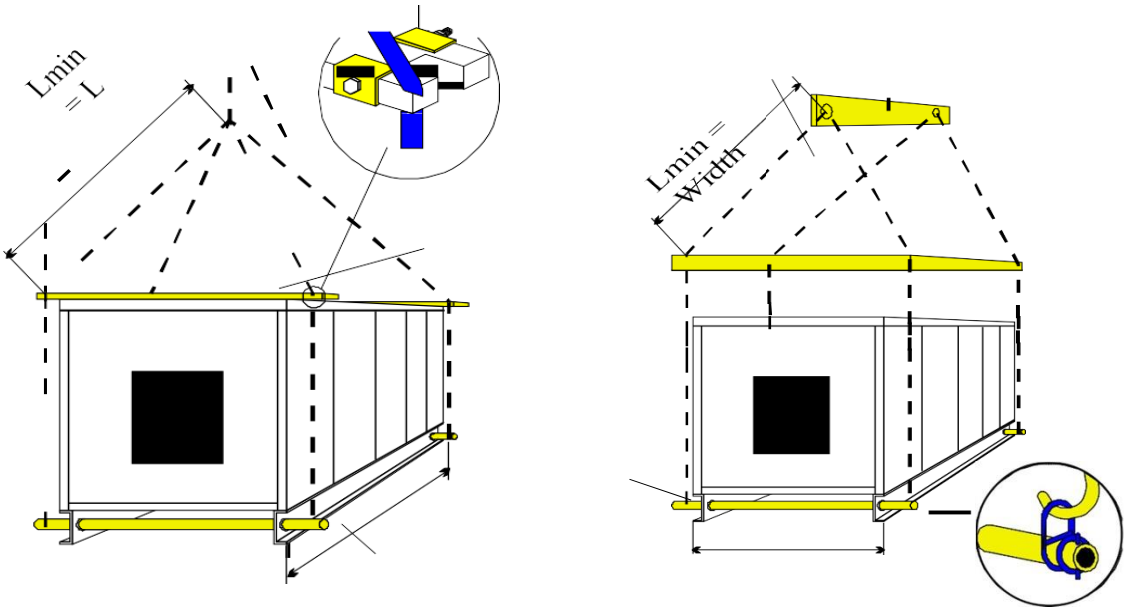


HANDLING

The modules are arranged on a framework of folded sheet metal (or channel- section steel for large units) with the framework resting on wooden beams which enable it to be handled by a fork- lift truck. With this method of handling care must be taken to ensure that the forks are properly aligned with the framework and placed as close to the center of gravity as possible. The wooden beams can be disposed of during the installation of the unit.

To allow lifting by crane, the framework has been provided with 65 mm diameter holes to enable a 50/60mm diameter tube to pass through to attach the slings. To prevent wear on the shell of the box section it is advised to use very long slings (6 m and over). If this is not possible, use a spreader of the type shown opposite.

The tools necessary for handling the units by crane should be supplied by the installer in charge of the site.

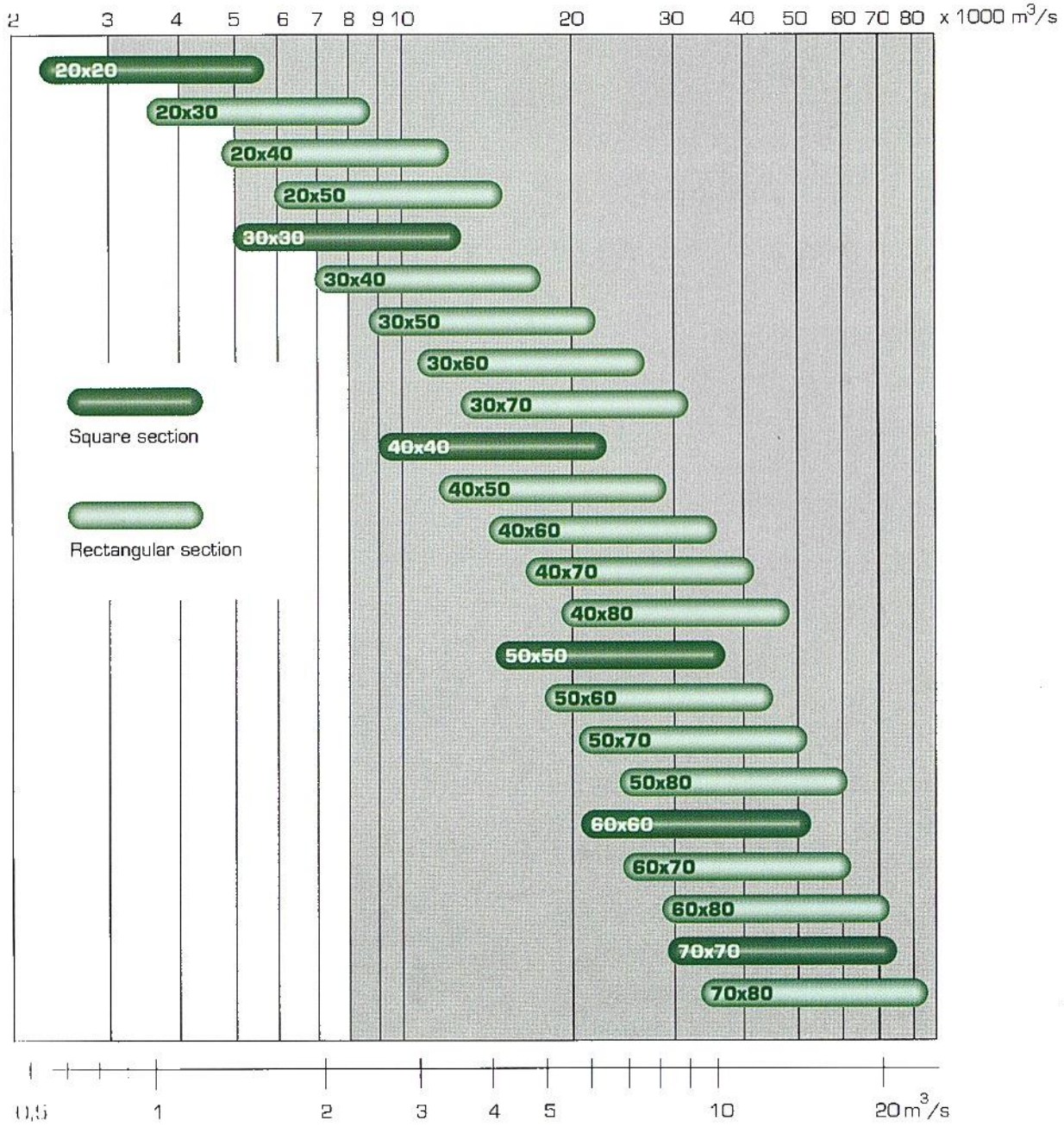


When using chains or ropes to move the unit, no direct pressure must be exerted on the box section. Make sure that no pressure is exerted on manifolds and other projecting parts. Use ropes with a length not less than the longest dimension of the module and position the hook perpendicular to the centre of gravity of the module.

Selection Method:

This diagram can be used to get a quick idea of the size of unit based on the air flow rate. Choose a large unit with low velocity for low energy consumption. Do not exceed 3 m/s if the unit has a cooling coil without

Flow Chart



5. Dampers

Dampers are used for airflow control or for shut-off. As standard, 39UG units are fitted with multiple horizontal opposed-blade dampers made of galvanised steel. The blades are profiled for low pressure drop and strength to withstand the maximum pressure achievable with the fan.
The 16mm diameter control shaft can be fitted with an actuator or a manual setting lever. The dampers are flanged to allow the connection of ducts.
Damper closure should be interlocked with fan operation to avoid damage to the unit.

Operating temperatures range: - 20°C to + 80°C. Maximum recommended velocity is 15m/s but design velocity should be limited to 8 m/s to avoid excessive pressure drop and noise. This is normally managed by the selection program icon.

Optional:
Dampers with blade edge seals.
Stainless steel
Insulated blades for cold climate.

				1/1 (Around 100% of flow rate)					1/2 (Around 50% of flow rate)				
Size 39UG	**H mm**	**Lg mm**	**Ep mm**	**H reg mm**	**Lg Reg mm**	**A mm**	**Weight kg**	**Flow m3/h**	**H reg mm**	**Lg Reg mm**	**A mm**	**Weight kg**	**Flow m3/h**
20x20	773	773	130	512	300	400	12	3200	312	500	400	10	2200
20x30	773	1078	130	512	500	400	16	5200	312	800	400	12	3500
20x40	773	1383	130	512	800	400	20	7100	312	1100	400	16	4800
20x50	773	1688	130	512	1100	400	24	9100	312	1400	400	20	6000
30x30	1078	1078	130	812	500	600	22	8600	312	800	400	16	5200
30x40	1078	1383	130	812	800	600	26	11900	312	1100	400	20	7100
30x50	1078	1688	130	812	1100	600	32	15100	312	1400	400	24	9100
30x60	1078	1993	130	812	1400	600	36	17300	450	1600	400	28	10400
30x70	1078	2298	130	812	1600	800	72	20900	450	1900	600	62	14200
40x40	1383	1383	130	1112	800	800	30	14300	412	1100	400	20	7100
40x50	1383	1688	130	1112	1400	800	36	18100	412	1400	400	24	9100
40x60	1383	1993	130	1112	1400	800	44	24200	600	1600	600	32	13800
40x70	1383	2298	160	1050	1600	800	84	27700	600	1900	600	62	14200
40x80	1383	2603	160	1050	1900	800	96	32100	600	2200	600	70	16400
50x50	1688	1688	130	1412	1100	1000	44	24200	512	1400	600	28	12100
50x60	1688	1993	160	1412	1400	1000	84	29000	750	1600	600	64	17600
50x70	1688	2298	160	1350	1600	1000	96	34500	750	1900	600	72	20900
50x80	1688	2603	160	1350	1900	1000	108	39900	600	2200	600	82	24200
60x60	1993	1993	160	1650	1400	1200	96	34700	900	1600	600	64	17600
60x70	1993	2298	160	1650	1600	1200	112	41200	900	1900	600	72	20900
60x80	1993	2603	160	1650	1900	1200	126	47800	900	2200	600	82	24200
70x70	2298	2298	160	1950	1600	1400	122	48000	900	1900	800	84	27700
70x80	2298	2603	160	1950	1900	1400	136	55600	900	2200	800	96	32100

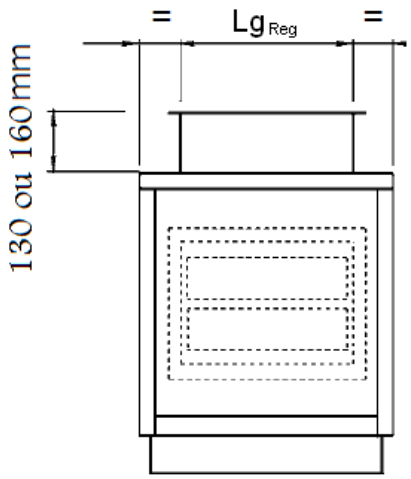
5.1 Mixing sections

In systems where full fresh air is not required but where the airflow rate required to achieve the necessary heating and cooling is greater than the minimum allowable fresh air rate, a mixing section can be installed in order to recover energy. Depending on the arrangement of the unit, two or three way mixing section can be used. Dampers are selected to suit the maximum air flow rate passing through.

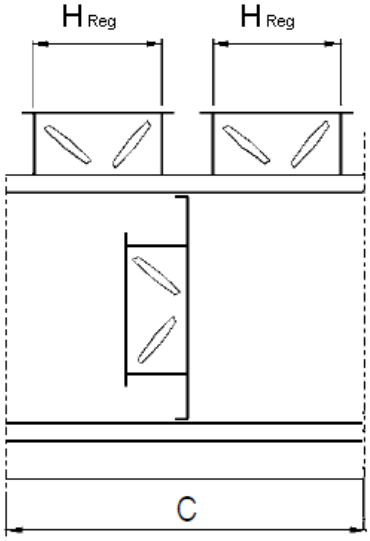
5.2 DIMENSIONS AND WEIGHTS OF MIXING SECTIONS

3 way mixing section

A three-way mixing unit is generally installed in an air conditioning unit, equipped with an exhaust fan when extracted air can be discharged or mixed with fresh air. The purpose of recycling recovered air is to save energy while maintaining the minimum rate of fresh air which is mandated by regulations in force. The standard configuration of three-way mixing units includes one fresh air damper, one discharged air damper and one recycled air damper. By ensuring that a minimum rate of fresh air is maintained, it is possible to select 1/2 dampers (50% of flow rate), otherwise it is possible to select 1/1 dampers (100% of flow rate). The three dampers are individually designed to enable adjustment of mixed air proportions. Dampers are selected as per the maximum air flow ra



Front View



Combined Mixing Unit 1/1 or 1/2

Dimensions, Maximum Flow & Weight of Combined Units (3 identical dampers)

Size 39UG	**H mm**	**Lg mm**	**Ep mm**	**H reg mm**	**Lg Reg mm**	**A mm**	**Weight kg**	**Flow m3/h**	**H reg mm**	**Lg Reg mm**	**A mm**	**Weight kg**	**Flow m3/h**
20x20	773	773	130	512	300	400	28	3200	312	500	400	15	2200
20x30	773	1078	130	512	500	400	24	5200	312	800	400	18	3500
20x40	773	1383	130	512	800	400	30	7100	312	1100	400	24	4800
20x50	773	1688	130	512	1100	400	36	9100	312	1400	400	30	6000
30x30	1078	1078	130	812	500	600	33	8600	312	800	400	24	5200
30x40	1078	1383	130	812	800	600	39	11900	312	1100	400	30	7100
30x50	1078	1688	130	812	1100	600	48	15100	312	1400	400	36	9100
30x60	1078	1993	130	812	1400	600	54	17300	450	1600	400	42	10400
30x70	1078	2298	130	812	1600	800	108	20900	450	1900	600	93	14200
40x40	1383	1383	130	1112	800	800	45	14300	412	1100	400	30	7100
40x50	1383	1688	130	1112	1400	800	54	18100	412	1400	400	36	9100
40x60	1383	1993	130	1112	1400	800	66	24200	600	1600	600	48	13800
40x70	1383	2298	160	1050	1600	800	126	27700	600	1900	600	93	14200
40x80	1383	2603	160	1050	1900	800	144	32100	600	2200	600	105	16400
50x50	1688	1688	130	1412	1100	1000	66	24200	512	1400	600	42	12100
50x60	1688	1993	160	1412	1400	1000	126	29000	750	1600	600	96	17600
50x70	1688	2298	160	1350	1600	1000	144	34500	750	1900	600	108	20900
50x80	1688	2603	160	1350	1900	1000	162	39900	600	2200	600	123	24200
60x60	1993	1993	160	1650	1400	1200	144	34700	900	1600	600	96	17600
60x70	1993	2298	160	1650	1600	1200	168	41200	900	1900	600	108	20900
60x80	1993	2603	160	1650	1900	1200	189	47800	900	2200	600	123	24200
70x70	2298	2298	160	1950	1600	1400	183	48000	900	1900	800	126	27700
70x80	2298	2603	160	1950	1900	1400	204	55600	900	2200	800	1144	32100

5.3 Damper actuator TORQUE

Motor torque for Damper with thickness of 130 mm:

The table gives the necessary torque to close the damper. The figures refer to the damper without edge seal. Where the damper with edge seal is used these figures should be increased by 30%

.

H/L	200	300	400	500	600	700	800	900	1000	1100	1200
200	2	2	2	2	2	2	2	2	2	2	2
300	2	2	2	2	2	2	2	3	3	3	3
400	2	2	3	3	3	3	3	3	3	4	4
500	3	3	3	3	3	4	4	4	4	4	5
600	3	3	4	4	4	4	5	5	5	5	5
700	4	4	4	4	5	5	5	5	6	6	6
800	4	4	5	5	5	6	6	6	6	7	7
900	5	5	5	6	6	6	7	7	7	8	8
1000	5	6	6	6	7	7	7	8	8	8	9
1100	6	6	6	7	7	8	8	8	9	9	10
1200	6	7	7	7	8	8	9	9	10	10	10

5.3 Damper actuator TORQUE

Motor torque for Damper with thickness of 130 mm:

The table gives the necessary torque to close the damper. The figures refer to the damper without edge seal. Where the damper with edge seal is used these figures should be increased by 30%

H/L	200	300	400	500	600	700	800	900	1000	1100	1200
200	2	2	2	2	2	2	2	2	2	2	2
300	2	2	2	2	2	2	2	3	3	3	3
400	2	2	3	3	3	3	3	3	3	4	4
500	3	3	3	3	3	4	4	4	4	4	5
600	3	3	4	4	4	4	5	5	5	5	5
700	4	4	4	4	5	5	5	5	6	6	6
800	4	4	5	5	5	6	6	6	6	7	7
900	5	5	5	6	6	6	7	7	7	8	8
1000	5	6	6	6	7	7	7	8	8	8	9
1100	6	6	6	7	7	8	8	8	9	9	10
1200	6	7	7	7	8	8	9	9	10	10	10

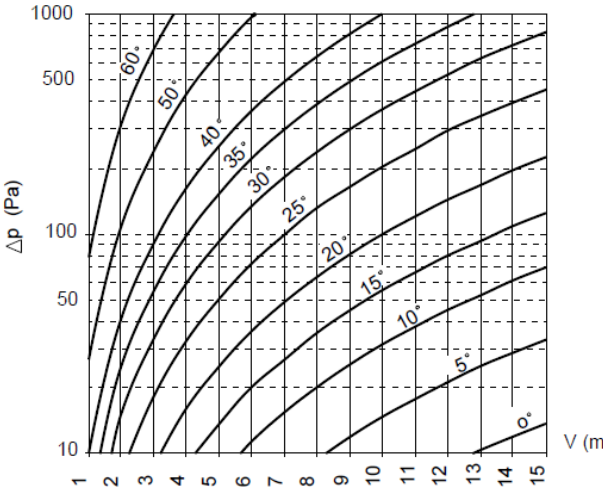
The pressure drop for dampers which thickness of 130 mm :

Here the pressure drop below, given for dampers in open position, connected upstream and downstream :

Vitesse d'air en m/s	4	5	6	7	8
Perte de charge en Pa	2	3	4	5	6

The pressure drop for dampers which thickness of 160 mm ::

Below, the pressure drop are given for dampers connected upstream and downstream (with 0° = open damper) :



6. FILTERS

39UG units can be fitted with a wide range of filter types and fixing arrangements. The filter frames in which the filters are fitted are designed to minimise bypass leakage to a level appropriate for the filter type fitted. Filters are divided into three main categories:

- Pre-Filters or panel filters
- Pocket filters and rigid compact filters
- High efficiency or HEPA filters

A) Pre-filters and panel filters

Acrylic or metallic filter cell, EU2 to EU4

These filters can be manufactured in a pleated version to have a larger filtration surface in the same frame. Filters have a standard thickness of 25 or 48 mm (other thicknesses on request).

Normally, the frames are made of galvanised steel but other materials may be used or offered in some cases.

Filters comply with standard European dimensions (592x592, 287x592).

Filters can either be mounted in simple U shaped profiles where a low cost version is acceptable or in a universal frames (610x610x**76** mm) supporting filters with a thickness of 25,50,75mm.

The U frame allows filter replacement from the side and has the advantage of being very short.

The Universal frame offers a better degree of tightness but replacement is made from the dirty side, which means an access section must be provided. As an option, the universal frame can be sealed to the casing for improved tightness.

B) Pocket filters and rigid compact filters

Pocket and rigid compact filters are available in efficiency classes from F5 to EU9 – F9 (from 40 % to 95 % ASHRAE).

The filter material is generally glass fibre.

The filters are fitted in universal frames and with standard European dimensions (592x592, 287x592).

Various pocket lengths are available from 360 to 600 depending on type. The rigid filters are 292 long.

It is possible to provide pre-filters on the same support.

C) Absolute filters section:

The 39UG unit can be delivered with an absolute filter section having a fully welded tubular steel support frame to ensure a completely tight and safe seal.

Absolute filters with an efficiency of 95% (EU10 - H10) to 99.99% DOP (EU 13 - H13) must always be installed on the high pressure side of the unit to prevent ingress of contaminated air. It is important to have good pre-filtration; minimum EU 8 - F8.

Seals assembled on the filters ensure tightness. The dimensions used for this type of filter are 610x610x292mm (Cell 1/1), 305x610x292mm (cell 1/2).

It is possible to assemble EU14-H14 (99.999% DOP) filters but it is recommended to assemble these filters outside the unit.

Technical Data

	Average filter efficiency			High efficiency filter		Very High efficiency filter	
	Prefilter			Pocket filter		Absolute filter	
Form	Plan	Plan	Pleated	Flexible	Rigid	Interfacial	Interfacial
Medi	knitting metal	Fiberglass	Pölyester	Fiberglass	Fiberglass	Paper F.d.V.	Paper F.d.V.
Framework	Galvanised	Galvanised	Galvanised	Galvanised	PVC	Galvanised	Galvanised
Efficiency Ashr ae 52-76	73% Gravi.	85% Gravi.	98% Gravi.	64 à 85% OPA	65 à 85% OPA	95% DOP	99,99% DOP
Efficiency EU 4/4 & 4/5	EU2	EU3	EU4	EU6a EU8		EU10	EU13
Efficiency EN 779	G2	G3	G4	F6 à F8	F6 à F8	H10	H13
Class, fire	MO	M1	M1	M2 à M3	M1	M1	M1
Developed surf, filter m2	0,308 or 0,142	0,308 or 0,143	0,826 ou 0,413	6,5 ou 3,3	40 or 20	20 or 14	40 or 20
Height X width mm	595X595 or 295	595X595 or 29	595X595 or 290	592X592 or 287	592X592 or 287	610X610 or 304	610X610 or 305
Thickness mm	48	25	48	547	292	292	292
Unit 1/1 max flow mph	4250 m/h	4250 m/h	6000 m/h	4250 m/h	4250 m/h	4000 m/h	4000 m/h
Unit 1/2 max flow mph	2125 m/h	2125 m/h	3000 m/h	2125 m/h	2125 m/h	2000 m/h	2000 m/h
Suitable for max speed pdc	50 Pa	90 Pa	130 Pa	95-150-165 Pa	100-120-130 Pa	250 Pa	250 Pa
Pdc final recommendation	200 Pa	200 Pa	200 Pa	300 Pa	300 Pa	600 Pa	600 Pa
Max temperature℃	120℃	120℃	90℃	90℃/100% HR	90℃/100% HR	90℃/100% HR 9	0℃/100% HR
Regeneration	washable	No	washable	No	No	No	No
Cap. Retention g/m2	300	1500	300				

Number of cells & Max. Flow Rate as per Size of Unit and Efficiency of Filters

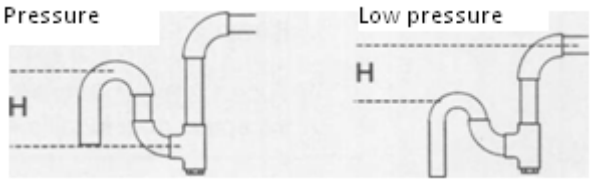
	Average filter & High efficiency				Very High efficiency filter				
	Prefilter & Pocket filter				Absolute filter				
Size	Cell nimber		Front Surface	Maximum Flow	Cell number		Front surface	Maximum Flow	
	1/1	1/2		EU2-G2 à EU9-F9	1/1	1/2		EU10-H10	EU13-H13
20X20	1		0,35 m²	4250 m/h	1		0,37 m²	4000 m/h	4000 m/h
20X30	1	1	0,53 m²	6375 m/h	1	1	0,56 m²	6000 m/h	5500 m/h
20X40	2		0,71 m²	8500 m/h	2		0,74 m²	8000 m/h	8000 m/h
20X50	2	1	0,88 m²	10625 m/h	2	1	0,94 m²	10000 m/h	9500 m/h
30X30	1	2	0,70 m²	8500 m/h	1	2	0,74 m²	8000 m/h	7000 m/h
30X40	2	2	1,05 m²	12750 m/h	2	2	1,12 m²	12000 m/h	11000 m/h
30X50	2	3	1,23 m²	14875 m/h	2	3	1,30 m²	14000 m/h	12500 m/h
30X60	3	3	1,58 m²	19125 m/h	3	3	1,67 m²	18000 m/h	16500 m/h
30X70	3	4	1,75 m²	21250 m/h	3	3	1,67 m²	18000 m/h	16500 m/h
40X40	4		1,42 m²	17000 m/h	4		1,49 m²	16000 m/h	16000 m/h
40X50	4	2	1,76 m²	21250 m/h	4	2	1,86 m²	20000 m/h	19000 m/h
40X60	6		2,12 m²	25500 m/h	6		2,23 m²	24000 m/h	24000 m/h
40X70	6	2	2,42 m²	29750 m/h	6		2,23 m²	24000 m/h	24000 m/h
40X80	8		2,83 m²	34000 m/h	6	2	2,60 m²	28000 m/h	27000 m/h
50X50	4	4	2,11 m²	25500 m/h	4	4	2,23 m²	24000 m/h	22000 m/h
50X60	6	3	2,64 m²	31875 m/h	6	3	2,79 m²	30000 m/h	28500 m/h
50X70	6	5	2,99 m²	36125 m/h	6	3	2,79 m²	30000 m/h	28500 m/h
50X80	8	4	3,52 m²	42500 m/h	6	5	3,16 m²	34000 m/h	31500 m/h
60X60	9		3,19 m²	38250 m/h	9		3,35 m²	36000 m/h	36000 m/h
60X70	9	3	3,70 m²	44625 m/h	9		3,35 m²	36000 m/h	36000 m/h
60X80	12		4,25 m²	51000 m/h	9	3	3,91 m²	42000 m/h	40500 m/h
70X70	9	6	4,22 m²	51000 m/h	9		3,35 m²	36000 m/h	36000 m/h
70X80	12	4	4,94 m²	59500 m/h	9	3	3,91 m²	42000 m/h	40500 m/h

7. HEATING & COOLING COILS

As standard, 39UG can be fitted with coils constructed of copper tubes expanded in aluminium fins. Other fin materials are available on request. The water circuits are arranged for counter flow for optimum performance and low pressure drop.
Coils are available with 1 or more tube rows to suit the capacity required. The fin pitch can also be selected to suit the needs of the application. The connections on water coils are threaded while DX coils have plane pipes for brazing.
Coils are pressure tested to 16 bar, The maximum operating pressure is 16 Bar for water temperatures up to 100°C and 10 bars above that.
Maximum recommended air velocity is 2.5 m/s for cooling coils without droplet eliminator and 3.5 m/s with droplet eliminator.
Heating coils should be provided with a frost protection thermostat and protected by a glycol solution. Cooling coils should be protected by heating coils, drained during the winter or protected by putting glycol in the water.

Cooling coils

Cooling coils are installed over trays to collect the condensate from the coil. The connection on the tray is a plain 40mm pipe. It is essential to connect the tray to the drain via a adequately sized trap to avoid flooding in the unit. The design of the trap depends on the position of the coil in relation to the fan.



Heating COIL

Special attention is paid to the connection of intake manifolds to enable free expansion of tubes, as the temperature can vary greatly.

DIRECT expansion (DX) cooling COILS

DX Coils are available for R407c or R410a, have plain copper connections are supplied with the liquid line distributer but the expansion valve is not included. Other refrigerants can be accommodated on special request.
The connections are arranged with the gas suction side on the air inlet side of the coil to ensure a contra flow. As coil performance is dependent on the correct selection of the expansion vale we recommend that the manufacturer's instructions are followed.
If the coil area is selected to be relatively small for the capacity, then the evaporating temperature can fall below zero. In such a case, ice will form on the coil surfaces and it will be necessary to defrost the coil from time to time. Note that as ice forms the pressure drop increases and this drives the ice forming even faster so frequent defrosting for short periods is to be favoured. One way to achieve a quick defrost is to use hot gas injection.

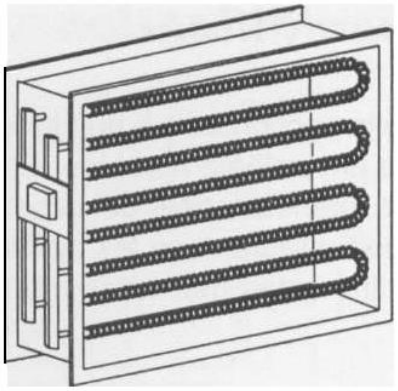
Droplet eliminator

A droplet eliminator can be fitted downstream of the coil if the air velocity exceeds 2,5 m/s.

Recommendations for proper installation of cooling coils:

Properly size and make the connection for condensates.
Protect the coils from clogging by providing upstream filtration.
Specify sufficient access from all sides to the coil for maintenance.
Provide for free expansion of connecting tubes – especially for hot coils.
Do not regulate the water flow rate on coils that can freeze.
Do not take the load of the piping and connection valves directly on the intake manifolds.
Take measures to avoid freezing of coils in winter, particularly during halts.

7.1 Electric Coils



Electric coils are made of finned tubes containing electric resistance elements prewired to a connection box for 400V – 3 phase supply. The frame is made of galvanised steel. Compared with a plain element heater, this design offers the advantages of better safety, better protection from air particulates, overheating, longer life and easy replacement in case of defect.
Tubes are made of stainless steel AISI 321 and fins are made of AISI 430 with specific power of 7 W/m^2.

The heater includes a high temperature protection thermostat with manual reset. The heater operation must be interlocked with the fan with a fan stop delay to ensure adequate cooling of the heater.

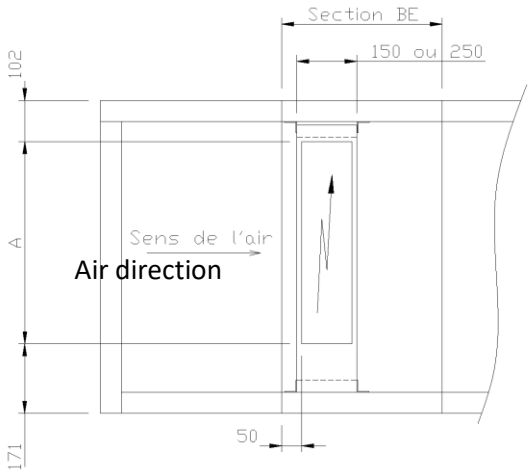
Size 39UG	Length Resistance L in mm	Power Resistance kW	Number of Resistance	Power range kW	P. mini/ Speed kW	Wing Height mm	Winged Length mm	Front Surface m^2	Flow rate m^3/h	Max number of Resistance Per row
20x20	450	2	3 - 24	6 - 48	6	600	470	0.27	2050	12
20x30	825	4	3 - 27	12 - 108	12	600	835	0.47	3650	9
20x40	1015	5	3 - 21	15 - 105	15	600	1070	0.61	4650	9
20x50	1200	5	3 - 27	15 - 135	15	600	1375	0.78	5950	9
30x30	825	4	3 - 33	12 - 132	12	885	835	0.73	5350	18
30x40	1015	5	3 - 36	15 - 180	15	885	1070	0.94	6850	18
30x50	1200	5	6 - 42	30 - 210	15	885	1375	1.20	8800	18
30x60	1645	7	6 - 42	42 - 294	21	885	1680	1.47	10750	18
30x70	1645	7	6 - 42	42 - 294	21	885	1985	1.73	12650	18
40x40	1015	5	3 - 42	15 - 210	15	1190	1070	1.24	9200	24
40x50	1200	5	3 - 54	15 - 270	15	1190	1375	1.59	11800	24
40x60	1645	7	3 - 54	21 - 378	21	1190	1680	1.94	14400	24
40x70	1645	7	3 - 54	21 - 378	21	1190	1985	2.29	17050	24
40x80	2245	7	6 - 60	42 - 420	21	1190	2290	2.64	19600	24
50x50	1645	5	6 - 72	30 - 360	15	1495	1375	2.01	14800	33
50x60	1645	7	6 - 66	42 - 462	21	1495	1680	2.45	18100	33
50x70	1645	7	6 - 66	42 - 462	21	1495	1985	2.90	21400	33
50x80	2245	7	9 - 66	63 - 462	21	1495	2290	3.34	24650	33
60x60	1645	7	6 - 66	42 - 462	21	1800	1680	2.73	21800	36
60x70	1645	7	6 - 66	42 - 462	21	1800	1985	3.24	25750	36
60x80	1645	7	6 - 66	42 - 462	21	1800	2290	3.75	29700	36
70x70	1645	7	6 - 66	42 - 462	21	2105	1985	3.75	30100	42
70x80	1645	7	6 - 66	42 - 462	21	2105	2290	4.34	34750	42

The resistances are always grouped in three to obtain a wiring of Tri 400V. For electric coils which are more powerful, two coils are assembled in series. Please consult us.
Minimum speed of passage of air is 2 m/s for safe usage and longevity.

7.2 Length of the section

Dimensions	Coil thickness in mm	Anti-Ray screen in mm	Casing Length
1 Row	150	71	200-400-400
2 Rows	250	71	400-400-400
3 Rows	350	71	400-600-600

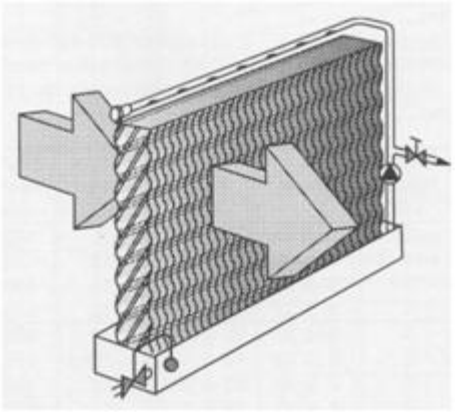
Flap position for wiring



Height of flaps

MOD	A
H20	500 mm
H30	805 mm
H40	1110 mm
H50	1415 mm
H60	1720 mm
H70	2025 mm
H80	2330 mm

8. HUMIDIFICATION



During cold weather, heated ventilation air becomes extremely dry and this can become uncomfortable as well as pose a health threat. The low humidity can also lead to problems with static electricity. Humidifiers can be installed in the AHU to avoid these problems.

8.1 Evaporative Humidifiers

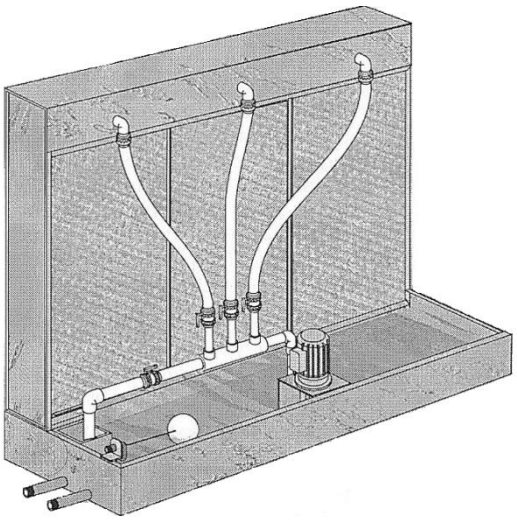
Adiabatic humidification offering efficiencies of either up to 60% or up to 85%. The humidification cells are made of corrugated materials which provide a large hygroscopic surface. Water is brought to the upper part of the humidifier and run through it forming a film on the entire surface, ensuring excellent contact with air. The humidifier includes the necessary water distribution system with pump, suction strainer, filter, a float valve, mains water connections and drain

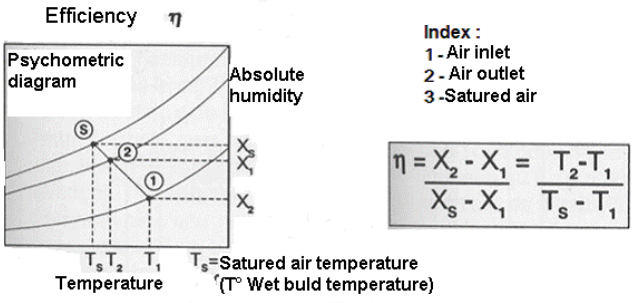
The components of the humidifier are easy to dismantle for maintenance.

The basin is made of galvanised steel sheets and is welded, water-tight and coated with a bituminous layer. The basin has threaded connections.
Electric supply of 230 or 240 V 50Hz
Minimum air speed: 1 m/s. Beyond 3,5 m/s provide a droplet separator.

Advantages:
-Less consumption of water, water/air ratio of about 0,07 kg/kg.
-The humidifier avoids the usage of jets (with all associated maintenance) and the pump functions with a lower manometric height.
-The response time is fast.
-The length of the humidifier section is limited to 4 #200 or 800 mm
Disadvantages:
Requires proper maintenance and treatment of water.
Requires a coil for reheating upstream of the humidifier (Adiabatic system).
Options:
Droplet separator
Construction in stainless steel
95% efficiency on request (thickness = 300mm). Contact us for the length.

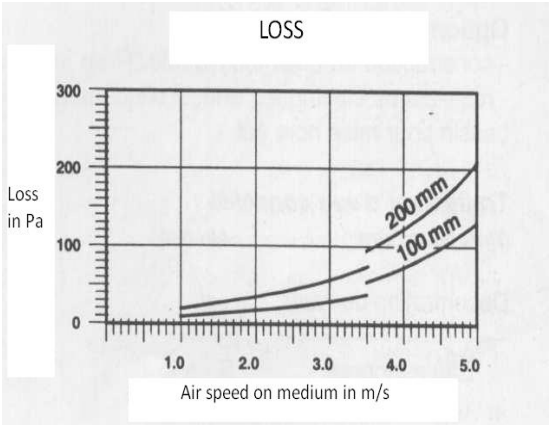
Wet Deck Humidifier





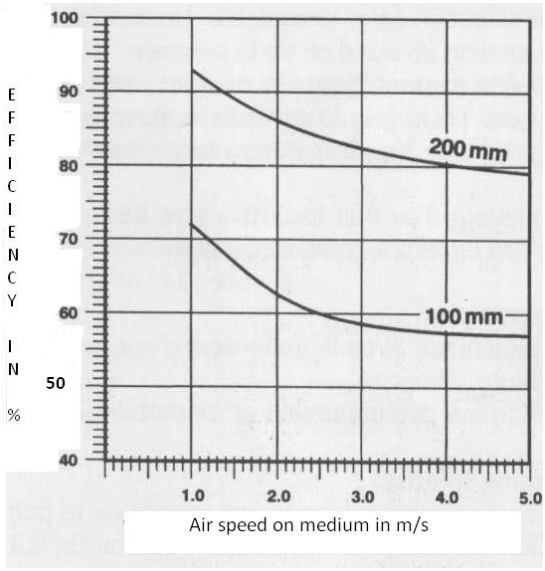
			Width AHU						
			20	30	40	50	60	70	80
Height AHU	20	H in mm L in mm S in m^1	478 600 0.29	478 900 0.43	478 1200 0.57	478 1500 0.72			
	30	H in mm L in mm S in m'		778 900 0.70	778 1200 0.93	778 1500 1.17	778 1800 1.40	778 2100 1.63	
	40	H in mm L in mm S in m^2			1078 1200 1.29	1078 1500 1.62	1078 1800 1.94	1078 2100 2.26	1078 2400 2.59
	50	H in mm L in mm S in m^1				1298 1500 1.95	1298 1800 2.34	1298 2100 2.73	1298 2400 3.12
	60	H in mm L in mm S in m^2					1598 1800 2.88	1598 2100 3.36	1598 2400 3.84
	70	H in mm L in mm S in m^2						1898 2100 3.99	1898 2400 4.56

H = Height
L = Width
S = Front Surf.



Power and Flow Rate of Pumps

			Width AHU						
			20	30	40	50	60	70	80
Height AHU	20	Qv Pump 100 mm 200 mm Pwr. kW	4 4 0.07	6 6.5 0.07	8 8 0.07	10 10.5 0.07			
	30	Qv Pump 100 mm 200 mm Pwr. kW		6 6.5 0.07	8 8 0.07	10 10.5 0.07	12 12.5 0.07	14 14.5 0.07	
	40	Qv Pump 100 mm 200 mm Pwr. kW			8 9 0.07	10.5 12 0.21	12 14 0.21	14 16.5 0.21	16 18 0.21
	50	Qv Pump 100 mm 200 mm Pwr. kW				10.5 13.5 0.21	12 15 0.21	14.5 18.5 0.21	16 20 0.21
	60	Qv Pump 100 mm 200 mm Pwr. kW					12 18 0.21	15 21.5 0.21	16 24 0.21
	70	Qv Pump 100 mm 200 mm Pwr. kW						16.5 25 0.21	18 28 0.21



A droplet separator must be added on the medium (non-wet surface) if the speed is > 3.5 m/s.

Intensity: Engine 0.07 kW 3-phase 380 V = 0.2 A

Engine 0.21 kW 3-phase 380 V = 0.43 A

8.2 Air washer

Adiabatic system with one or two rows of nozzles ensuring backflow spray with a water-tight chamber with a **length of 1800mm for all models.** The water tank is outside the air flow. On request, it is possible to provide two rows of nozzles, parallel or opposed. Humidification rate: from 70 to 95%.
The entry of water is avoided due to the usage of a droplet separator installed upstream of the humidification area. The separators are made of polypropylene. Another separator is installed upstream of the ramp to avoid entry of water used for backflow spray.

All internal metallic surfaces are protected by a polyurethane coat. The connections on the water tray are threaded to the gas pedal. The suction strainer and the float are standard supplies. The pump (230 - 400 V /3/50 Hertz) can be installed as an option and connected to the exterior of the unit. The basin is made of galvanised steel sheets, welded and coated with a bituminous layer.

Internal pipes, ramps and nozzles are made of polypropylene for easy maintenance. The internal cone of the nozzles is made of stainless steel. Standard assembly includes an access door with a trap and IP 65 lighting. The air washer section of the 39UG unit can be delivered separately in one block or can be a part of a section which must be assembled on site with other blocks. The design of the air washer is the same as that of upstream and downstream blocks. **Nevertheless, the unit will be higher (305mm) throughout its length due to the washer deck. Please check with our Sales agency to select the washer.**

An air washer **must always be installed in the fan suction area.**
Efficiency is calculated the same way as for evaporative humidifiers.

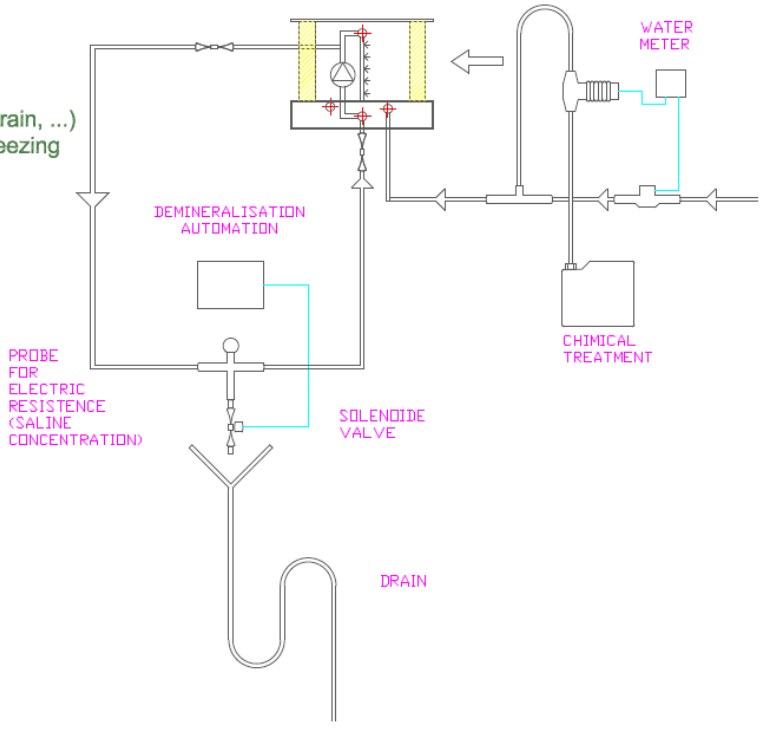
Advantages:
- Hygienic with adequate water treatment (waste water washer)
- Highly efficient
- Filtration of impurities and certain gases like SO_2.

- **Disadvantages:**
- Large pressure range of the pump 2 to 3 Bar. (Electric consumption)
- Water consumption (water/air ratio de 0,3 à 1,5 kg/kg).
- Requires proper maintenance coil for reheating upstream of the washer (adiabatic system).

Options :
Construction in stainless steel (internal sheet metal, drain, ...)
Electric resistance for anti-freeze in the basin for defreezing
Recommended treatment ofair :

$$\frac{\text{Deconcentration of water}}{\text{Evaporated water}} = \frac{s}{S - s}$$

s = Calcium concentration in still water
S = Calcium concentration in circulating water



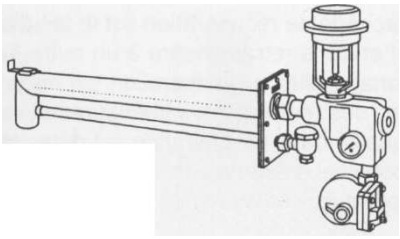
8.3 Steam Humidifier

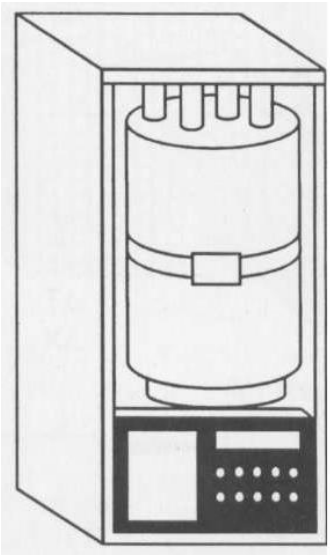
Isothermal steam injection system including steam production without smell, impurities, microbes, viruses or bacteria.

Steam humidifiers are designed to be connected to distributors placed in the air conditioning unit. If the steam generator is supplied, it will be made of immersed electrodes which can function in normal untreated water.

The steam generator also includes a solenoid valve for water supply, purge and an independent regulation system. Other components can change in number, function and appearance as per the brand, model and size. Standard generators can produce up to 42 kg/h of steam, and together up to 126 kg/h.

To enable proper absorption of steam in the air, it is necessary to provide minimum distance upstream of the distributors. Provide a drain channel for condensates in the free area. Further details are available on request.





9. HEAT RECOVERY

We are leader in the field of heat recovery and the Our 39UG unit is available with the full range of systems.

9.1 Plate heat exchangers

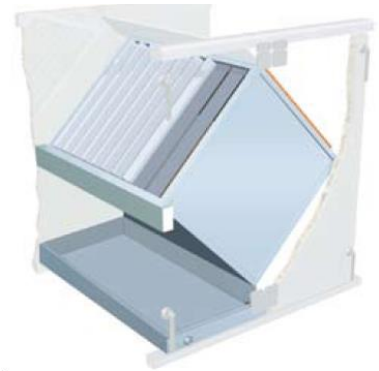


Plate heat exchangers can transfer heat from the exhaust air to the supply air without risk of transfer of exhaust air to the supply air which means odour transfer is avoided. Plate heat exchangers have no moving parts and therefore require little maintenance other than simple cleaning.
Plate heat exchangers are best suited to small airflows as larger units demand a lot of space.
The rate of leakage between the flows is lower than 1% under 1000 Pa of differential pressure.
The temperature efficiency, pressure drop and the annual energy recovery can be calculated in our selection program Acon
To control the supply air temperature and to facilitate defrosting, an aluminium bypass damper can be fitted.
The temperature efficiency available is typically around 50%

9.11 Counterflow Plate heat exchangers

These devices are similar to plate heat exchangers but the air paths are longer offering higher efficiency but at the cost of a higher pressure drop for the same velocity.
The temperature efficiency available is typically around 80%

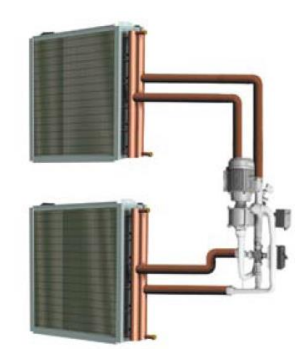
9.2 Rotary energy recovery systems

Rotary heat exchangers can be made to recover both sensitive and latent heat, which mean moisture is transferred as well as temperature with the advantage that cooling energy can be recovered during the summer period to reduce the installed capacity of the chiller and the annual energy cost. Where cooling recovery is not wanted, a sensible only version is available.

Rotary heat exchangers are very compact and offer high energy recovery efficiency but there is a risk of some small transfer of exhaust air to the supply air. In most comfort HVAC installations this is acceptable.
The temperature and moisture efficiency, pressure drop and the annual energy recovery can be calculated in our selection program Acon

The temperature efficiency available is typically around 75 to 80%

9.3 Heat Recovery coils



By circulating a liquid through coils placed in the exhaust air and supply air heat can be transferred from the exhaust to the supply air with the advantage that there is no risk of any transfer of air and the airstreams do not need to be adjacent to each other.
The liquid circulation system consists mainly of a pump and a control valve to regulate the temperature of the supply air and to facilitate defrosting during the winter. Since the liquid temperature can fall well below zero degrees centigrade, it is a mixture water and glycol to prevent freezing.
The temperature and moisture efficiency, pressure drop and the annual energy recovery can be calculated in our selection program icon

The temperature efficiency available is typically around 50 to 60%

9.4 Heat pipe (rare)

The heat pipe consist of a number of independent vertical tubes sealed with a quantity of refrigerant inside. The upper part functions as a condenser while the lower part is the evaporator. The lower part serving as an evaporator and the upper part serving as a condenser. The warm extract air passes through the lower part and the heat is used to evaporate the refrigerant; which then rises to the upper part where the cool outdoor air condenses it to liquid which then falls down to the lower part.
The heat exchanger offers good heat recovery with no moving parts and is compact.
The function of the heat exchanger puts demands on the position of the supply air and exhaust air; which may be a disadvantage. A version for side-by-side installation is also available and there we use inclined tubes.
The temperature and moisture efficiency, pressure drop and the annual energy recovery can be calculated in our selection program icon

The temperature efficiency available is typically around xx%

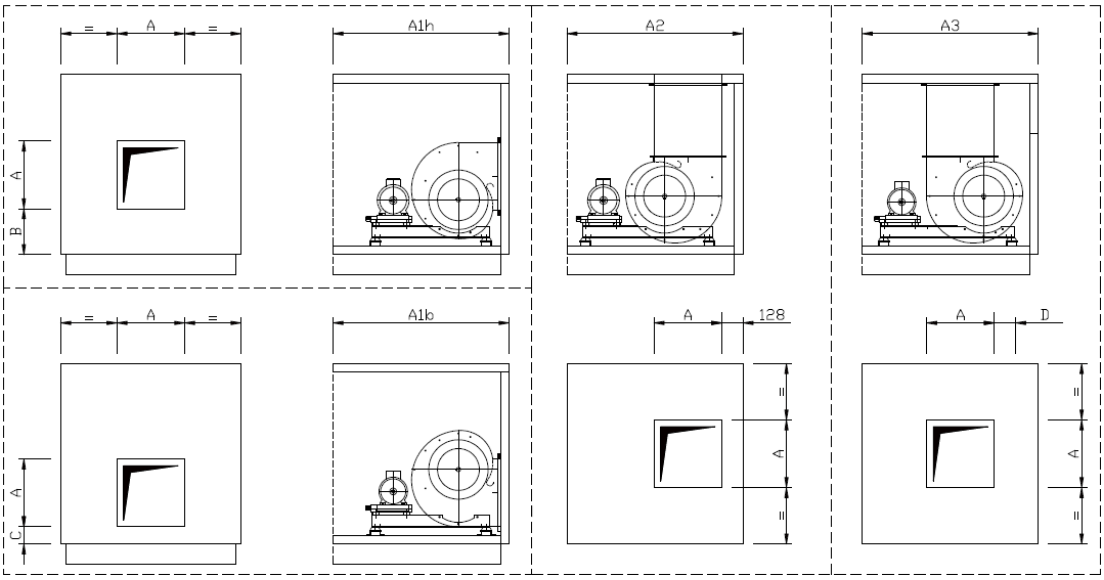
10. Fans

We are able to offer a range of fans optimised to suit the requirements of the project. The tradition belt driven fan is available offering a simple installation if a frequency inverter and airflow control is not wanted. Of course, such fans can be fitted with a frequency inverter but then we would recommend our plenum fan to avoid the belt drive system that demands a lot of service and creates dust. Ask for the our plenum fan if you want a high efficiency and the lowest running cost.

10.1 Belt-driven centrifugal fan

Centrifugal fans are available with two impeller types; forward or backward curved. The forward curved type has an impeller with many small blades curved in the direction of rotation and has the advantage of being compact and low cost but with relatively low operating efficiency. The backward curved type has blades curved backwards in the direction of rotation and has the advantage of a high efficiency and stable operation under varying pressure conditions.
The operating speed of the fan is calculated from the required airflow rate and the total pressure of the fan by our selection program Icon and all technical details are provided. From this we select the drive system ensuring that the forces on the bearings and the starting time of the motor are within limits.
To avoid vibration and noise in the casing of the unit and the transmittance to the building, the fans are mounted on ant vibration mounts.
The direction of discharge from the fan is selectable in order to suit the design of the ductwork and to minimise pressure losses.
A range of accessories including guards and airflow sensors are available for these fans.
Fans larger than size 450 are constructed with a more robust frame in order to withstand the additional forces involved.

10.11 Dimensions & Weight of Fans



Type Vent.	h. AxisMot. [mm]	Length Std mm			Dimensions				Weight GMV			
		A1h/b [mm]	A2 [mm]	A3 [mm]	A [mm]	B [mm]	C [mm]	E [mm]	Action		Reaction	
									Std	Renf.	Std	Renf.
160	80-90	600	800	800	205	233,5	136	223	39	-	-	39
	100	800	800	800								
180	112	800	800	800	229	235,5	134	223	40	-	-	40
200	112	800	800	800	256	238	130	223	42	-	-	42
225	112	800	800	1000	288	252	129	223	53	-	-	53
250	112	1000	1000	1000	322	257	128	243	56	-	-	56
280	132	1000	1000	1200	361	245,5	103	238	96	-	-	96
315	132	1000	1200	1200	404	265	104	263	101	-	-	101
355	132	1200	1400	1200	453	306	128	303	115	-	-	115
400	132	1200	1400	1400	507	328	131	323	123	-	-	123
450	132	1200	1400	1400	569	348	127	343	191	-	-	191
	160-180	1400	1600	1400				-		-	-	-
500	132	1400	1600	1600	638	448	176	383	-	234	-	264
	160-180	1600	1600	1600								
560	132	1600	1180	1800	714	481,5	178	415	-	307	-	391
	160-180	1600	1800	1800								
630	132	1800	1800	1800	800	532	188	460	-	338	-	412
	160-180	1800	1800	1800								
	200-225	2000	2200	2200								
710	132	1800	2000	2000	896	581	187	500	-	574	-	758
	160-180	1800	2000	2000								
	200	2200	2400	2400								
	225	2200	2400	2400								
800	132	2000	2200	2200	1007	656	207	550	-	647	-	837
	160-180	2000	2200	2200								
	200-225	2400	2600	2600								
900	132	2200	2400	2400	1130	713,5	208	600	-	821	-	957
	160-180	2200	2400	2400								
	200-225	2600	2800	2600								
	250	2800	3000	2800								
1000	132	2200	2400	2400	1267	738	207	650	-	879	-	1049
	160-180	2200	2600	2400								
	200-225	2600	2800	2800								
	250	2800	3000	3000								

10.2 Plenum fans (first)

Centriflow Plus® with asynchronous motor

Plenum fans are direct driven which gives the advantage of a lower service cost and dust free operation. The plenum fan offers efficiency up to 77% so no compromise on energy consumption is made. The fans are driven by efficient motors, which give a highly energy-saving unit. The plenum fan is equipped with 4 measurement points for measurement of the air flow, which gives a very high accuracy of measurement. Since the fan can be balanced to produce low levels of vibration, it is suitable for applications where vibration-free running is called for. The outlet direction can be forwards, upwards or to the rear side of the unit.
The complete fan unit, mounted on vibration dampers, is permitted to have a vibration velocity of max. 7.1mm/s measured on the bearing shields of the motor.

The Control Master is a complete control system for ventilation units. The flexible equipment is available both as a compact standard design and as a classic customised solution for wall mounting or integration into the air handling unit.

Simplicity
The Control Master has been developed to be easy to plan, install and use. Because of this an eQ air handling unit with a factory installed control system is a practical solution for consultants, installation engineers and end users.
The integrated control equipment is supplied programmed, configured and tested, together with all the necessary field components. Of course the control system conforms to EU directives (MD, EMC and LVD) and is CE marked.

The Control Master is the perfect solution for both small installations with straightforward control functions, and also for large installations with data communication requirements. The Control Master supports communication via open standard protocols, which allows its simple and cost effective integration with building automation systems. Connection to other systems is carried out by the system integrator.

Using ACON the project design of the Control Master system is straightforward. This program automatically selects the control equipment for the unit you have chosen. Shunts are dimensioned for the relevant air heater and air cooler. Frequency converters are dimensioned for the relevant motor, drive system and fan. A simple yet effective solution that saves time.

Not only is time saved on project design but also on installation. The Control Master is self-contained and requires no major on-site electrical installation. The control equipment is ready to go as soon as the unit is installed. Installing a control system for a high quality air handling unit requires experience and expertise of air handling.

The production of the Control Master is characterised by a rigorous quality assurance system to ensure an approved and electrically safe product. Naturally the standardised design is also a guarantee of cost effectiveness, reliability and high quality.

11. Silencer

The silencer is made of a series of acoustic absorbers installed vertically and parallel to the air flow. These absorbers are made of high-density rock wool, covered with an anti-tear canvas. A perforated metal sheet can be added on request. The speed of air passing between the acoustic absorbers must not exceed 10 m/s, to avoid the risk of noise regeneration
The standard modular absorbers have a thickness of 200 mm (100 mm against walls). The length of the absorbers is determined by the required level of noise reduction. Standard lengths are 540, 940, 1140, 1540, 1940.

The sound power level at the inlet and outlet as well as at the casing is calculated by our selection program. The tolerances given there are in accordance with relevant standards.

	63	125	250	500	1000	2000	4000	8000
Sound power reduction of silencers								
L= 540 mm	-2	-6	-13	-20	-21	-20	-16	-12
L= 940 mm	-4	-10	-23	-35	-38	-35	-29	-20
L= 1140 mm	-5	-12	-26	-40	-43	-41	-34	-24
L= 1540 mm	-6	-14	-30	-44	-46	-45	-39	-26
L= 1940 mm	-8	-16	-35	-46	-50	-50	-46	-29
Sound power reduction of components								
Pre-filter	-1	-1	-1	-1	-1	-1	-1	-2
Pocket filter	-1	-1	-1	-1	-1	-1	-2	-2
Absolute filter	-3	-3	-4	-4	-5	-7	-11	-18
Batt (1-4 Rangs)	-1	-1	-2	-3	-4	-4	-6	-8
Batt (5-8 Rangs)	-2	-2	-3	-3	-6	-6	-9	-12
Wet Deck Hum. (65%)	-3	-2	-2	-2	-4	-5	-9	-10
Wet Deck Hum. (85%)	-3	-2	-2	-3	-5	-6	-12	-15
Plate-type recovery system	-2	-2	-3	-4	-4	-6	-7	-8

Note :

Weighing dBA	-26	-16	-9	"3	o	1	1	

12. RECOMMENDED SPECIFICATIONS

CASING CONSTRUCTION

The structure shall be made of a self-supporting flanged panel system with 2 mm U profiles inside the panels from module size 40.
The sandwich type panels shall be filled with 50 mm of rock wool (110kg/m3) or a variant of stiff polyurethane foam (35 Kg/m3), glued under pressure between two steel metal sheets.
Optional: Panels shall be thermal bridge free
All panels shall be made of 0.75 mm thick galvanized steel
Optional: lacquered in white colour (RAL 9010). Sheet metal, stainless steel 304 L, 316 L, plastic-coated metal sheets inside and/or outside.

Internally the casing shall be completely smooth for easy cleaning and minimum risk of bacteria growth.
The metallic chassis and the angles are bolted to the panels and form a rigid assembly.
The casing performance shall conform with the requirements of EN 1886 and shall be certified by Eurovent with the following classes
Mechanical strength 2,1mm/m CLASS D1

Air Tightness 0,01 L /s/m2 under -400Pa and 0,07 L /s/m² 700Pa CLASS L1
Heat Transmission 0,9 W/m²/K CLASS T2
Thermal bridging factor 0,7 W/m²/K CLASS TB2

The Noise reduction through the panel (measurement as per test R = D L x 10 Log S/A, where D L is the difference in the level of sound pressure through the panel in dB, S the panel surface in m2 and A is the acoustic absorption of the test room in m2), shall not be less than:

Frequency Hz	125	250	500	1000	2000	4000	
Reduction	19	21	22	25	23	39	For Polyurethane foam or
	25	21	30	34	33	38	For Rock wool

In order to give the entire unit a flat and stable structure as well as to facilitate handling and lifting, the casing shall be fixed on a chassis made of galvanised sheet metal of minimum 3 mm

Alternative: welded steel profile base frame

DAMPERS

All dampers shall be constructed with opposed blades linked together with an external linkage system and with a control shaft for actuator or manual setting lever.
The blades shall be mounted in maintenance free nylon bearings. The frame of the dampers shall be flanges with bolt holes at the corners.
Dampers shall be air tight to class XX

Options: Electric actuators shall be fitted in the factory, common linkage for mixing or economizing, extra tight dampers to class YY

FILTERS

Filter sections shall be provided to incorporate the following combinations:
Panel-type pre-filters made of synthetic material or fibre glass, class EU2-G2 - EU4-G4 (65 à 95% in the Gravi. test) installed in universal frames or in sliders with frontal or lateral access (EU4-G4 is a standard supply).

Pocket/bag filters made of synthetic material or fibre glass, grade EU5-F5 to EU9-F9 (40 to 95% in the Opacimetric test) assembled in universal frames and seals to avoid any by-pass of air, leakage rate < 2% less than 400 Pa of differential pressure (EU7-F7 is a standard supply).

High-efficiency terminal filters compact in nature, grade EU10-H10 to EU13-H13 (HEPA - 95 à 99.99% NaCl fixed on tubs bolted or fastened to a sheet metal of galvanised steel which is very thick, (structure is completely air-tight, platform is an option).

Optional accessories: Inclined pressure gauges, magnahelic gauges

ELECTRIC COILS

Electric coils shall be made of low temperature-resistant stainless steel with spiral wings fixed on a frame made of galvanised sheet metal which are very thick and assembled on sliders. They shall be supplied with a safety thermostat that can be reset manually and are selected for regulations at stages or progressive regulation.
Options: high temperature thermostat, low air velocity cut off switch, fan start/stop interlock.

COILS

Cooling and heating coils shall be made of copper tubes expanded in aluminium fins mounted in a galvanized steel frame.
Optional: copper fins, other fin finish, stainless steel frame

Headers shall be of steel (or copper) with air purging and water draining connections. The water connections shall be threaded. The coils shall be pressure tested to 30 bars for a service pressure of 16 bars below 100°C. Hot and cold coils are assembled in a slide-valve to facilitate dismantling. Cooling coils shall be installed over a condensate drain pan made of painted galvanised steel – or stainless steel and assembled in sliders. Intermediate condensate trays shall be fitted as appropriate to avoid droplet entrainment. A droplet eliminator shall be fitted where air the air velocity exceeds 2.5 m/s
Optional: A droplet eliminator made of PPTM shall be installed where air velocities exceed 2.0 m/s.

BELT DRIVEN FANS

Belt driven fans shall have impellers with backward curved blades for high efficiency. The belt drive shall be selected for the fan speed needed to achieve the total pressure and flow rate. Impellers shall be statically and dynamically balanced to degree 6.3. Bearings shall be selected for a calculated mean life of 20,000 operating hours under normal usage conditions. The belt drive shall be protected by a guard.
The fan shall be mounted on anti-vibration mounts made of rubber.
Alternative: The fan shall be mounted on stel spring anti vibration mounts.
The fan discharge shall be connected to the unit casing by means of an airtight flexible connection.

HEAT RECOVERY

Plate heat exchanger

A plate heat exchanger shall be fitted in the unit. The heat exchanger shall be made of aluminium foil and shall have a bypass leakage rate of not more than 1%. The plate heat exchanger section shall be fitted with a drain tray. Face and bypass dampers shall be fitted to allow temperature control and defrosting function.
The temperature efficiency of the plate heat exchanger shall be not less than 50%
The pressure drop through the plate heat exchanger shall not exceed xxPa

Rotary heat exchanger

A rotary heat exchanger shall be fitted in the unit. The heat exchanger shall be made of aluminium foil. A purge sector shall be provided to minimise the quantity of exhaust air carry over to the supply air. The rotor shall be belt driven by a variable speed drive to allow control of the supply air temperature. A rotation sensor shall be included to provide a feedback signal of operation.
The unit shall be fitted with a damper in the extract air to allow pressure adjustment and ensure no leakage from exhaust to supply air.
Option: The heat exchanger shall have a hygroscopic surface treatment to allow the transfer of moisture and cooling recovery.
The temperature efficiency of the rotary heat exchanger shall be not less than 75%
The pressure drop through the rotary heat exchanger shall not exceed xxPa

Liquid coupled heat exchangers

SILENCER

Silencers shall be made of non-hygroscopic insulation material, resistant to erosion (up to 20 m/s) and mounted in a galvanised steel frame. The sound reduction of the silencer shall be XX
Option: perforated, stainless sheet metal, glass cloth, plastic film.

INSPECTION WINDOWS AND LIGHTS

Inspection windows with a diameter of 200mm or more shall be fitted in doors. Sections requiring inspection shall be fitted with lamps with IP rating 54. The lamps shall be wired to externally mounted switches or connection boxes.

Options: - IP65 Lighting and switches.

EXTERNAL UNITS

A roof shall be added to units located outside. This overhanging roof shall be made of flat steel plates finished to that of the unit.

Intake/discharge hood

Hoods shall be designed to avoid the entry of water in the casing (Rainwater, etc.) ,include grilles and be made of galvanised steel or prelaquered steel as per the external finishing of the unit.

ELECTRICAL TEST

Following electrical test shall be conducted for all products to enhance the product safety;

- Electrical continuity test.
- Insulation resistance test.

Description	Results		Remarks
**Check the control panel / JB wiring against approved electrical wiring diagram.	Yes ☐	No ☐	
**Check termination of breakers & contactors, both power & control cables are tightened into their respective terminals (if any)	Yes ☐	No ☐	
**Control panel component verification against bill of materials.	Yes ☐	No ☐	
**Dry test of control panel against control philosophy.	Yes ☐	No ☐	
**Check the wiring between control panel and unit components (Motors, heaters and instruments) against approved electrical wiring diagram.	Yes ☐	No ☐	
**Check electrical continuity between earthing point of control panel and unit body.	Yes ☐	No ☐	
Check independent earthing connections of unit components (Motors, Heaters) to unit body.	Yes ☐	No ☐	
Check the electrical continuity of the earthing connections of major components body to other metal parts of the units.	Yes ☐	No ☐	
**Check the electrical continuity of the earthing connection of main components and earthing point of control panel.	Yes ☐	No ☐	
Checking the insulation resistance is higher than 0.5mω for Motors (max 500vdc).	Yes ☐	No ☐	
Checking the insulation resistance is higher than 0.5mω heaters (max 500vdc).	Yes ☐	No ☐	

** Only applicable for the units with control panel.

Manufacturer reserves the rights to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.