Safety is an indispensable factor when you are considering climate control for your rooms. Whether you are looking for air-conditioning in offices or banks, climate control in sensitive hospital wards, a process climate for IT and production areas or to meet cleanroom requirements. TOUFAN TAHVIEH Air conditioners provide the Perfect solution for all tasks. TOUFAN TAHVIEH is a 10-year old well established company in IRAN with production facility in KARAJ-IRAN, employing over 100 people. The staff of IRAN factory applies innovative approaches and tried-and tested expertise to provide customer needs solutions in line with the constantly increasing demands of the market place. We bring to fruition special projects and meet bespoke requirements, proof of our flexibility. Well thought out, all embracing solutions, from the original idea to advice, planning, development and production, right through to assembly and maintenance. Modern, state of-the-art production plants and consistently applied quality management under DIN EN ISO 9001:2000 guarantee a recognized quality standard for our products. "Just-in-time" delivery included.

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INTRODUCTION

CABINET:
Is made of thick steel for rigidity and is painted in a fully automated oven baked electrostatically powder coating system.

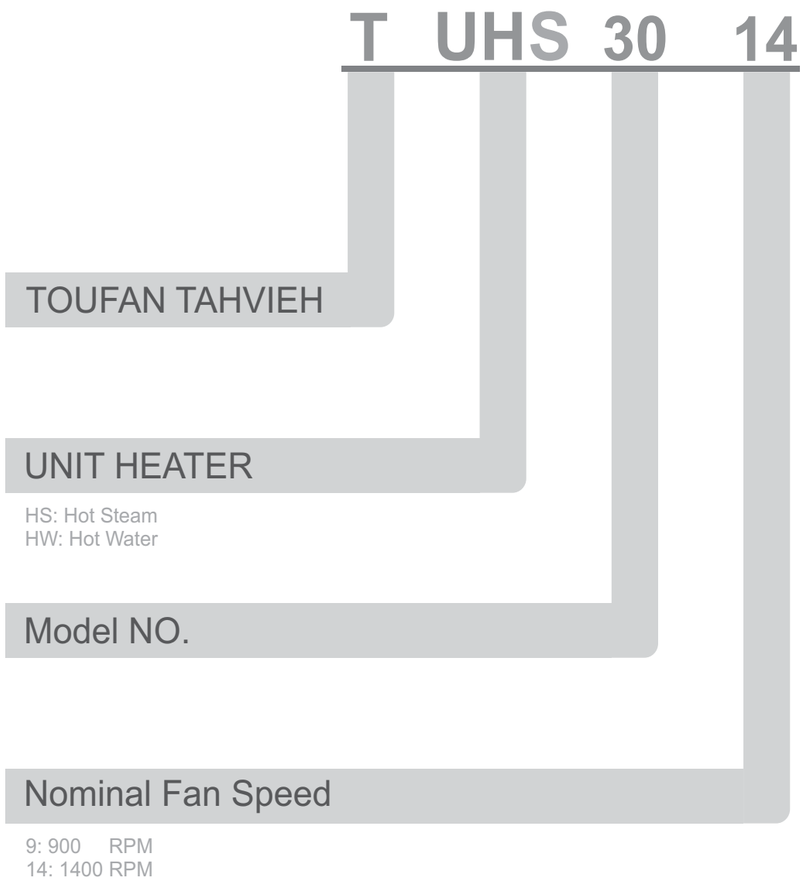
MOTOR:
Is of quality world famous brand single phase 220 volts 50 Hz (3 phase available Swage speed per request) 900 or 1400 RPM or 3 speed.

FAN:
Is of axial type statically and dynamically balanced to achieve lower sound levels and longer life.

HEATING COIL:
Is constructed of 3 rows of copper tubes uniformly expanded into continuous flat plate aluminum fins having spacing of 8 fin per inch (fin plates are turbinated for 20 % higher rating).Circuiting is designed for minimum water pressure drop.

DISCHARGE LOUVER:
Is constructed of heavy gage steel painted similar process as cabinet and equipped with a lever for adjusting the louvers to desired angle of air throw.

PERFORMANCE TABLES ARE LISTED FOR:
Entering air temp. =60 °F
Entering water temp. =180 ° F
Water temp. drop =20 ° F



SELECTION EXAMPLE

Hot Water:

Entering air temp..... .....40 °F
Entering water temp.....195 °F
Heating load..... 80000 Btu/hr
Motor.....900 rpm

Determine:

From table 2 Ent. Air temp of 40°F and Ent. Water temp of 195 °F, the correction factor is 1.24; therefore:
80000/1.24 = 64516 Btu/hr so in the table 1: 65600 Btu/hr
The correction unit capacity = 65600 x 1.24 = 81344 Btu / hr
Then: TUHW -60-9 is selected.
CFM correction factor from table 6 is 1.04 :
Corrected unit air flow rate = (nominal air flow rate) x (correction factor) = 1085 x 1.04 = 1128 CFM
Leaving air temp.=(CORRECTED UNIT CAPACITY(BTU/HR))/(CORRECTED UNIT AIR FLOW RATE×1.085)+ENT.AIR TEMP
Corrected unit capacity (Btu/ hr)
+ Ent. Air temp.
Corrected unit air flow rate x 1.085
=81344/(1128×1.085)+40=106.5

Steam:

Entering air temp.....40°F
Steam Pressure available..... 15 Psig
Heating load..... 90000 Btu/hr
Motor ..... 900 rpm

Determine:

Standard rating for …… unit heater are based on 60 °F entering air temp. since the given conditions are not based on standard conditions , a correction factor should be applied to the heating load.
C.F = 0.975
90000/0.978 = 92024 Btu/hr
so in the table 3: 96000 Btu/hr
Then TUHS-50-9 is selected.

HOT WATER CAPACITIES & CORRECTION FACTOR

TABLE - 1 - HOT WATER UNIT HEATER CAPACITIES

MODEL		MOTOR SIZE(w)	AIR FLOW RATE (M3/HR)	FINAL AIR TEMP(˚C)	WATER FLOW RATE (M3/HR)	WATER PRESS DROP(KPA)	CAPACITY(KW)	CAPACITY MBH
900 RPM	TUHW-30-9	90	1650	41,1	0,83	2,5	10,4	35,5
	TUHW-40-9	90	1650	43,5	0,94	2,6	11,8	40,3
	TUHW-50-9	100	2350	42,5	1,6	4,7	20,1	68,6
	TUHW-60-9	110	2800	44,7	,05	5,6	25,7	87,7
	TUHW-70-9	170	4000	43,7	3	9,0	37,7	128,7
	TUHW-80-9	170	4300	45,8	3,47	9,9	43,6	148,8

MODEL		MOTOR SIZE(w)	AIR FLOW RATE (M3/HR)	FINAL AIR TEMP(˚C)	WATER FLOW RATE (M3/HR)	WATER PRESS DROP(KPA)	CAPACITY(KW)	CAPACITY MBH
1400 RPM	TUHW-30-14	100	1500	44,6	0,67	1,7	8,37	28,6
	TUHW-40-14	135	2300	39	1,24	4,1	15,5	52,9
	TUHW-50-14	160	3450	39,7	1,89	6,3	23,8	81,2
	TUHW-60-14	175	4000	41,6	2,46	7,8	30,9	105,5
	TUHW-70-14	360	6500	40,5	3,64	12,7	45,6	155,6
	TUHW-80-14	370	6800	42,1	4,36	14,9	54,8	187,0

*NOMINAL POWER

ENTERING AIR TEMP.=60 °F ENTERING WATER TEMP.=180 °F WATER TEMP.DROP=20 °F

TABLE- 2 - HOT WATER CORRECTION FACTOR

AIR ENTERING (°F)	WATER ENTERING (°F)										
	150	160	170	175	180	195	205	212	220	230	240
32	0,92	1	1,08	1,16	1,24	1,35	1,42	1,5	1,6	1,68	1,76
40	0,85	0,92	1	1,08	1,16	1,24	1,35	1,42	1,5	1,6	1,68
50	0,74	0,85	0,95	1	1,08	1,16	1,24	1,35	1,42	1,5	1,6
60	0,63	0,74	0,85	0,95	1	1,08	1,16	1,24	1,35	1,42	1,5
70	0,54	0,63	0,74	0,85	0,95	1	1,08	1,16	1,24	1,35	1,42
75	0,48	0,54	0,63	0,74	0,85	0,95	1	1,08	1,16	1,24	1,35

STEAM CAPACITIES

TABLE - 3 - STEAM UNIT HEATER CAPACITIES

	MODEL	MOTOR SIZE(w)	AIR FLOW RATE (M3/HR)	FINAL AIR TEMP(˚C)	STEAM PRESS (BAR)	CONDENSTE KG/HR	CAPACITY(KW)	CAPACITY MBH
900 RPM	TUHS-30-9	90	1650	46,3	0,35	14	8,85	30,2
				60,8	1	21	13	44,4
				71,9	2	27	16,2	55,3
	TUHS-40-9	90	1650	44,9	0,35	19	12,4	42,3
				58,8	1	29	18,3	62,4
				69,4	2	37	22,8	77,8
	TUHS-50-9	100	2350	43,7	0,35	32	21	71,7
				57	1	49	30,9	105,4
				67,2	2	63	38,5	131,4
	TUHS-60-9	110	2800	45,8	0,35	41	26,7	91,1
				60,1	1	63	39,2	133,8
				71	2	80	48,8	166,5
	TUHS-70-9	170	4000	44,6	0,35	60	38,9	132,7
				58,3	1	91	57,2	195,2
				68,8	2	117	71,3	243,3
	TUHS-80-9	170	4300	46,7	0,35	69	44,9	153,2
				61,5	1	105	66,1	225,5
				72,7	2	135	82,3	280,8

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TABLE - 3 - STEAM UNIT HEATER CAPACITIES

	MODEL	MOTOR SIZE(w)	AIR FLOW RATE (M3/HR)	FINAL AIR TEMP(˚C)	STEAM PRESS (BAR)	CONDENSTE KG/HR	CAPACITY(KW)	CAPACITY MBH
1400 RPM	TUHS-30-14	100	1650	42,6	0,35	17	11	37,5
				55,4	1	26	16,2	55,3
				65,2	2	33	20,2	68,9
	TUHS-40-14	135	1650	40,2	0,35	25	16,3	55,6
				51,8	1	38	24	81,9
				60,7	2	49	29,8	101,7
	TUHS-50-14	160	2350	40,8	0,35	38	24,8	84,6
				52,7	1	58	36,5	124,5
				61,8	2	74	45,4	154,9
	TUHS-60-14	175	2800	42,6	0,35	50	32,1	109,5
				55,4	1	75	47,3	161,4
				65,2	2	96	58,8	200,6
	TUHS-70-14	360	4000	41,3	0,35	73	47	160,4
				53,4	1	110	69,2	236,1
				62,7	2	141	86,2	294,1
	TUHS-80-14	370	4300	42,9	0,35	87	56,4	192,4
				55,8	1	132	83,1	283,5
				65,6	2	169	103	351,5

STEAM CORRECTION FACTOR SOUND POWER,CFM CORRECTION FACTOR

TABLE- 4 - STEAM CORRECTION FACTOR

STEAM PRESS. (PSIG)	ENTERING AIR TEMP.(°F)											
	-30	-20	-10	0	10	20	30	40	45	50	55	60
5	1,2	1,153	1,107	1,06	1,013	0,967	0,92	0,873	0,85	0,827	0,703	0,78
15	1,308	1,258	1,212	1,166	1,118	1,073	1,026	0,978	0,955	0,932	0,908	0,885
30	1,42	1,373	1,325	1,278	1,233	1,186	1,139	1,092	1,069	1,045	1,023	1

TABLE-5-SOUND POWER LEVEL (dB)

MODEL		30-9	40-9	50-9	60-9	70-9	80-9	30-14	40-14	50-14	60-14	70-14	80-14
DISTANCE FROM UNIT (m)	1,5	1,5	58	61	63	65	68	61	62	65	66	67	70
	10	41	44	46	47	48	51	44	45	48	49	50	53

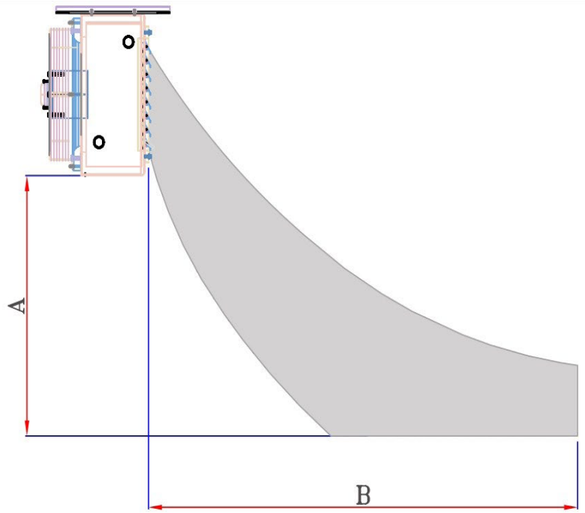
TABLE -6- CFM CORRECTION FACTOR

ENTERING AIR TEMP.(°F)										
0	10	20	30	40	50	60	70	80	90	100
1,13	1,11	1,1	1,06	1,04	1,02	1	0,99	0,97	0,95	0,93

AIR DISTRIBUTION

TABLE- 7 - AIR DISTRIBUTION

MODEL		A(M)	B(M)
900 RPM	TUH-30-9	3	6
	TUH-40-9	3	7,5
	TUH-50-9	3	9
	TUH-60-9	4	12
	TUH-70-9	4	12,5
	TUH-80-9	4,5	13
1400 RPM	TUH-30-14	3	7,5
	TUH-40-14	3	8,5
	TUH-50-14	3,5	11
	TUH-60-14	4,5	12,5
	TUH-70-14	4,5	13
	TUH-80-14	4,5	16



DIMENSIONS , CONNECTIONS & WEIGHTS

TABLE-8-STEAM UNIT HEATER DIMENSIONS & CONNECTIONS

MODEL		A(mm)	B(mm)	C(mm)	STEAM SUPPLY (IN)	SUPPLY HEADER CONDENSATE (IN)	CONDENSATE RETURN (IN)
900 RPM	TUH-30-9	460	405	224	1	1/2	3/4
	TUH-40-9	511	405	224	1 1/4	3/4	1
	TUH-50-9	621	505	224	1 1/2	3/4	1
	TUH-60-9	722	607	224	1 1/2	3/4	1 1/4
	TUH-70-9	823	703	224	1 1/2	3/4	1 1/4
	TUH-80-9	923	803	224	1 1/2	3/4	1 1/4
1400 RPM	TUH-30-14	460	405	224	1	1/2	3/4
	TUH-40-14	511	405	224	1 1/4	3 /4	1
	TUH-50-14	621	505	224	1 1/2	3/4	1
	TUH-60-14	722	607	224	1 1/2	3/4	1 1/4
	TUH-70-14	823	703	224	1 1/2	3/4	1 1/4
	TUH-80-14	923	803	224	1 1/2	3/4	1 1/4

TABLE-9-WATER UNIT HEATER DIMENSIONS & CONNECTIONS

MODEL		A(mm)	B(mm)	C(mm)	Inlet & outlet WATER (IN)
900 RPM	TUH-30-9	460	405	224	1
	TUH-40-9	511	405	224	1
	TUH-50-9	621	505	224	1 1/4
	TUH-60-9	722	607	224	1 1/4
	TUH-70-9	823	703	224	1 1/2
	TUH-80-9	923	803	224	1 1/2
1400 RPM	TUH-30-14	460	405	224	1
	TUH-40-14	511	405	224	1
	TUH-50-14	621	505	224	1 1/4
	TUH-60-14	722	607	224	1 1/4
	TUH-70-14	823	703	224	1 1/2
	TUH-80-14	923	803	224	1 1/2

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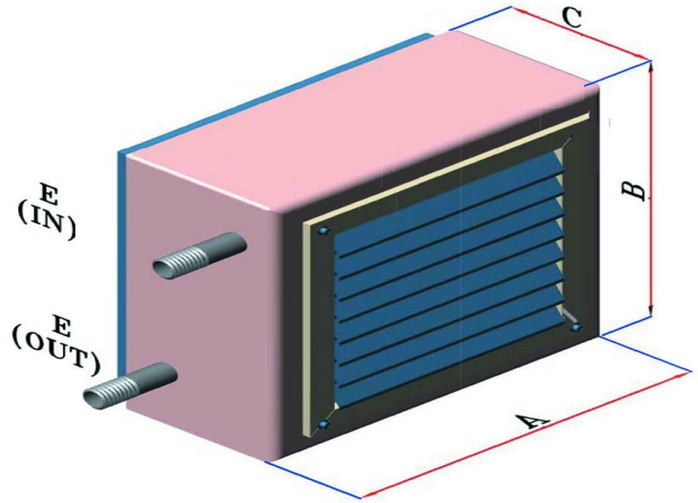


TABLE 10 - UNIT WEIGHTS

MODEL	UNIT WEIGHT (KG)
TUHW-30	30
TUHW-40	35
TUHW-50	41
TUHW-60	51
TUHW-70	61
TUHW-80	70
TUHS-30	32
TUHS-40	37
TUHS-50	42
TUHS-60	54
TUHS-70	64
TUHS-80	73

PIPNG DIAGRAMS

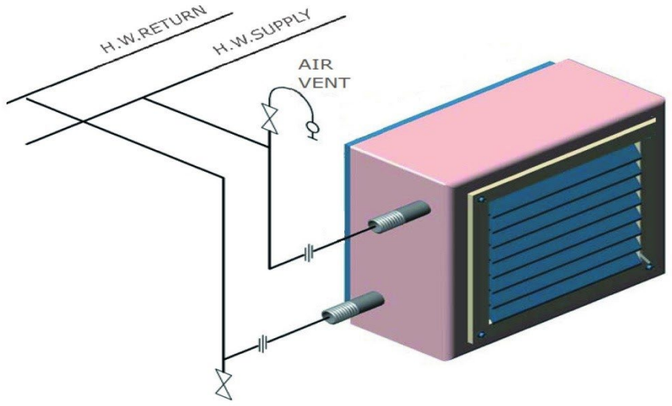


FIGURE-3-HOT WATER UNIT HEATER PIPING DIAGRAM

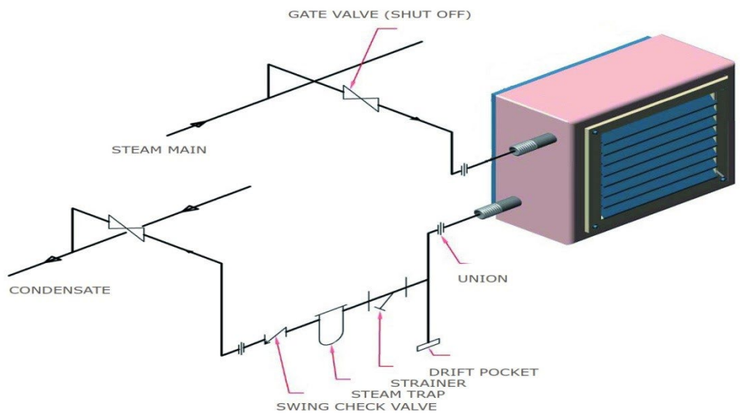
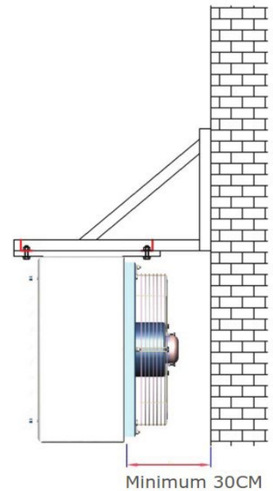
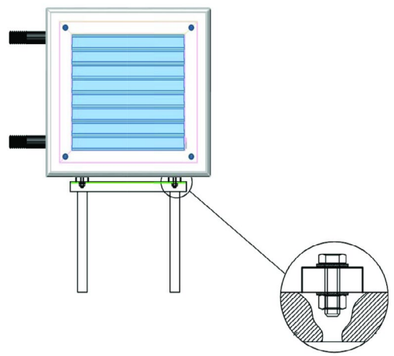
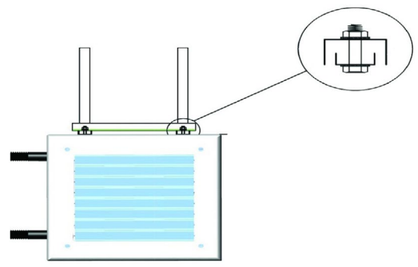


FIGURE-4- STEAM UNIT HEATER PIPING DIAGRAM

MOUNTING DETAILS







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ELECTRICAL WIRING DIAGRAMS

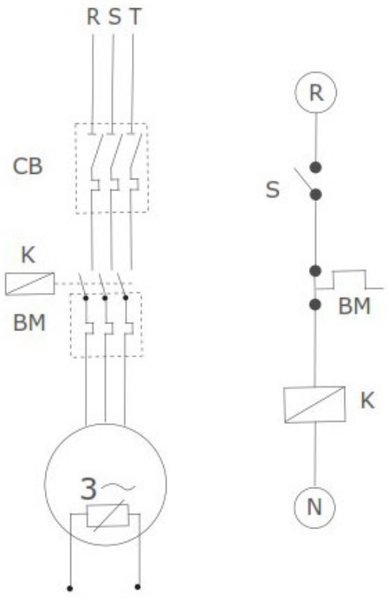

FIGURE 5 - 3 PHASE ELECTRIC MOTOR

FIGURE 6 - 1 PHASE ELECTRIC MOTOR

LEGEND:
MCB: MINIATURE CIRCUIT BREAKER
CB: CIRCUIT BREAKER
K: CONTACTOR
BM: THERMAL OVERLOAD RELAY
S: MAIN SWITCH
M: ELECTRIC MOTOR

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