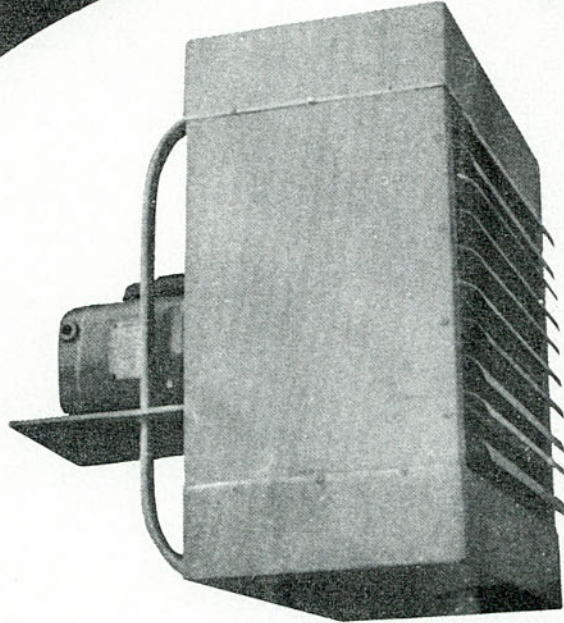




SARAVEL

AIR CONDITIONING, REFRIGERATION
HEATING & VENTILATING



UNIT HEATER

For Steam and hot water heating systems

SARAVEL MANUFACTURING CO.

~~NO. 6 DAMGHAN St., VILLA Ave. TEHRAN, IRAN.~~

TEL. { ~~68000~~
~~68000~~

686255
685694
FACTORY 680583-5

TABLE 1

180°F ENTERING WATER AND 60°F ENTERING AIR					900 R. P. M.	
MODEL NO. HP	B.T.U.PER HOUR	C. F. M.	G. P. M.	FINAL AIR TEMP F°	WTR. TEMP. DROP °F	P. DROP Ft. OF WATER
1 SUH-25 1/12	11600	280	2	98	11.6	0.20
	13750		5	105	5.5	0.40
	14600		7	108	4.2	1.00
1 SUH-100 1/4	47500	1050	7	102	13.5	0.90
	54000		11	107	9.9	2.00
	57500		14	110	8.2	3.50
1 SUH-150 1/3	72000	1650	8	100	18.0	1.00
	83000		14	106	11.8	2.40
	90000		18	110	10.0	3.50
1 SUH-250 1/2	94500	2400	8	96	23.5	0.90
	108500		14	101	15.6	2.20
	120500		18	106	13.3	3.20

TABLE 2

					1450 R. P. M.	
2 SUH-75 1/8	33000	800	3	95	22.0	0.30
	39000		5	105	12.6	0.60
	41600		7	108	11.9	1.40
2 SUH-200 1/2	93000	2250	10	101	18.6	1.00
	109000		12	107	18.2	1.30
	115000		15	110	15.3	2.00
2 SUH-300 3/4	139000	3200	14	100	19.9	1.50
	160000		17	106	18.8	2.20
	174000		20	110	17.4	3.00
2 SUH-400 3/4	173000	4400	18	96	19.2	2.00
	197000		21	101	18.8	2.70
	221000		24	106	18.4	3.50

TABLE 3

60°F ENTERING AIR				900 R.P.M.	
MODEL NO. H.P.	B.T.U./HR.	C. F. M.	Lbs. STEAM	Candensate Lbs./HR	FINAL TEMP.
1 SUHS-25 1/12	21600	280	5	22	131
	24800		15	26	142
	29200		30	31	156
1 SUHS-100 1/4	81000	1050	5	84	131
	93500		15	99	142
	109500		30	106	156
1 SUHS-150 1/3	127000	1650	5	132	131
	146500		15	154	142
	172500		30	185	156
1 SUHS-250 1/2	185000	2400	5	192	131
	214000		15	226	142
	252000		30	270	156

TABLE 4

				1450 R. P. M.	
2 SUHS-75 1/8	61500	800	5	64	131
	71000		15	75	142
	83500		30	90	156
2 SUHS-200 1/2	193500	2250	5	180	131
	200000		15	212	142
	235000		30	254	156
2 SUHS-300 3/4	245000	3200	5	256	131
	274000		15	290	142
	335000		30	360	156
2 SUHS-400 3/4	340000	4400	5	354	131
	392000		15	415	142
	460000		30	496	156

CONVERSION FACTORS STEAM

TABLE 5

ENT. AIR TEMP.	STEAM PRESSURE IN POUNDS PER SQUARE INCH																			
	0	2	5	10	15	20	30	40	50	60	80	100	125	150	175	200				
-30	1.133	1.163	1.200	1.258	1.308	1.348	1.420	1.482	1.532	1.585	1.654	1.717	1.792	1.847	1.903	1.956				
-20	1.082	1.113	1.153	1.211	1.258	1.301	1.373	1.431	1.483	1.528	1.605	1.670	1.740	1.801	1.855	1.903				
-10	1.036	1.066	1.107	1.164	1.212	1.254	1.325	1.384	1.436	1.481	1.558	1.623	1.693	1.755	1.808	1.856				
0	.989	1.020	1.060	1.117	1.166	1.207	1.278	1.338	1.389	1.434	1.512	1.576	1.647	1.708	1.762	1.810				
10	.942	.973	1.013	1.071	1.118	1.161	1.233	1.292	1.342	1.388	1.465	1.530	1.601	1.660	1.715	1.764				
20	.896	.926	.967	1.024	1.073	1.114	1.186	1.244	1.296	1.341	1.418	1.483	1.553	1.615	1.669	1.717				
30	.849	.880	.920	.977	1.026	1.067	1.139	1.198	1.250	1.294	1.372	1.436	1.506	1.568	1.622	1.670				
40	.802	.833	.873	.930	.978	1.021	1.092	1.151	1.202	1.248	1.325	1.390	1.461	1.521	1.575	1.628				
45	.779	.810	.850	.907	.955	.997	1.069	1.128	1.180	1.224	1.302	1.366	1.436	1.496	1.552	1.601				
50	.756	.786	.827	.884	.932	.974	1.045	1.104	1.156	1.201	1.273	1.343	1.414	1.474	1.529	1.576				
55	.732	.763	.803	.861	.908	.951	1.023	1.081	1.133	1.178	1.255	1.320	1.390	1.451	1.505	1.553				
60	.709	.740	.780	.837	.885	.927	1.000	1.058	1.109	1.154	1.231	1.297	1.367	1.427	1.482	1.531				
65	.686	.716	.757	.814	.862	.904	.976	1.034	1.086	1.131	1.209	1.273	1.343	1.407	1.459	1.506				
70	.662	.693	.733	.791	.838	.881	.935	1.011	1.063	1.108	1.186	1.250	1.320	1.380	1.435	1.484				
75	.639	.670	.710	.767	.815	.857	.930	.988	1.040	1.084	1.163	1.226	1.297	1.357	1.412	1.460				
80	.616	.646	.687	.744	.792	.834	.906	.965	1.016	1.061	1.139	1.203	1.273	1.335	1.389	1.436				
85	.592	.623	.663	.720	.768	.811	.883	.941	.993	1.038	1.116	1.180	1.251	1.310	1.365	1.414				
90	.569	.600	.640	.696	.745	.787	.860	.918	.969	1.014	1.093	1.156	1.226	1.288	1.342	1.390				
100	.522	.553	.593	.650	.698	.732	.813	.871	.923	.968	1.045	1.110	1.181	1.240	1.295	1.344				
110	.476	.506	.547	.603	.652	.694	.766	.825	.876	.921	.998	1.063	1.134	1.194	1.248	1.297				
120	.429	.460	.500	.556	.605	.647	.720	.778	.830	.874	.952	1.027	1.086	1.147	1.201	1.251				
140	.336	.366	.407	.464	.512	.554	.626	.685	.737	.781	.858	.923	.993	1.055	1.108	1.156				
160	.242	.273	.313	.370	.418	.460	.533	.591	.642	.688	.765	.831	.901	.961	1.012	1.065				
180	.149	.179	.220	.277	.325	.367	.439	.498	.550	.594	.671	.737	.808	.868	.921	.970				
200	.056	.085	.127	.183	.232	.274	.345	.405	.455	.501	.577	.643	.713	.775	.829	.876				

To determine BTU capacity of Model SUHS heater at any steam pressure and entering air temperature, multiply rated on table 3 and 4 by factor from above table.

For example, steam pressure 15 Lb. and entering air temperature 50° F from Table 5 selected multiply factor .932 and BTU for Model I SUHS - 150 on this condition.

172,500 X .932 = 140,770 BTU/Hr.

CONVERSION FACTORS - HOT WATER

TABLE 6

ENTERING AIR TEMPERATURE °F	ENTERING WATER TEMPERATURE										
	150	160	170	180	190	200	210	230	240	250	
30	1.035	1.115	1.210	1.295	1.380	1.465	1.545	1.640	1.720	1.810	1.895
40	.940	1.025	1.105	1.195	1.275	1.360	1.440	1.535	1.620	1.700	1.785
50	.840	.930	1.050	1.090	1.175	1.265	1.345	1.430	1.510	1.600	1.690
60	.743	.835	.920	1.000	1.080	1.165	1.240	1.325	1.405	1.500	1.580
70	.650	.745	.825	.905	.980	1.070	1.150	1.235	1.315	1.395	1.480
80	.570	.650	.735	.815	.895	.980	1.060	1.140	1.220	1.300	1.380
90	.475	.560	.640	.720	.805	.885	.965	1.050	1.130	1.210	1.280
100	.395	.475	.560	.710	.790	.875	.955	1.035	1.115	1.115	1.185

To determine B.T.U. capacity of Unit Heaters at various entering water and air temperature, multiply rated capacity on Table 1 and 2 by factor from above table.

PROPERTIES OF SATURATED STEAM

TABLE 7

PRESSURE Lbs. PER SQ. INCH GAUGE	0	2	3	5	8	10	15	20	25	30	35	40	45	50	60
TEMPERATURE °F	212.00	218.47	221.50	227.16	234.78	239.41	249.73	258.79	266.85	274.08	280.64	286.74	292.37	297.70	307.30
LATENT HEAT B.T.U. PER. Lb.	970.40	966.20	964.27	960.54	955.58	952.45	945.49	939.26	933.63	928.50	923.77	919.27	915.14	911.24	903.91

PRESSURE Lbs. PER SQ. INCH GAUGE	70	75	80	90	100	110	120	125	130	140	150	175	200	225	250
TEMPERATURE °F	316.03	320.00	323.89	331.16	337.86	344.22	350.09	353.00	355.65	360.89	365.92	377.47	387.88	397.27	406.01
LATENT HEAT B.T.U. PER. Lb.	897.28	894.20	891.08	885.42	880.82	874.85	870.05	867.70	865.48	861.12	856.92	847.02	838.00	829.30	820.00

TABLE 8

UNIT	A	B	C	D	E	F	G
1SUH_25	400	420	225	350	170	575	1"
1SUH_100	450	650	225	350	300	575	1 1/4"
1SUH_150	550	700	250	400	370	650	1 1/2"
1SUH_250	650	850	250	400	400	650	1 1/2"
2SUH_75	400	550	250	400	250	650	1"
2SUH_200	650	850	250	400	400	650	1 1/4"
2SUH_300	750	950	300	400	450	700	1 1/2"
2SUH_400	900	1050	300	400	500	700	2"

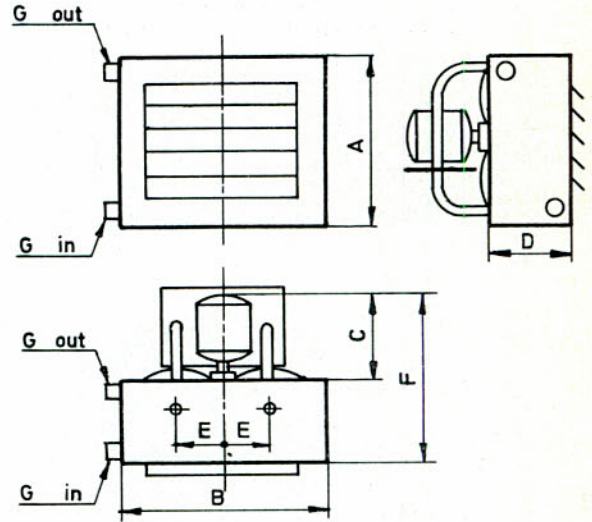
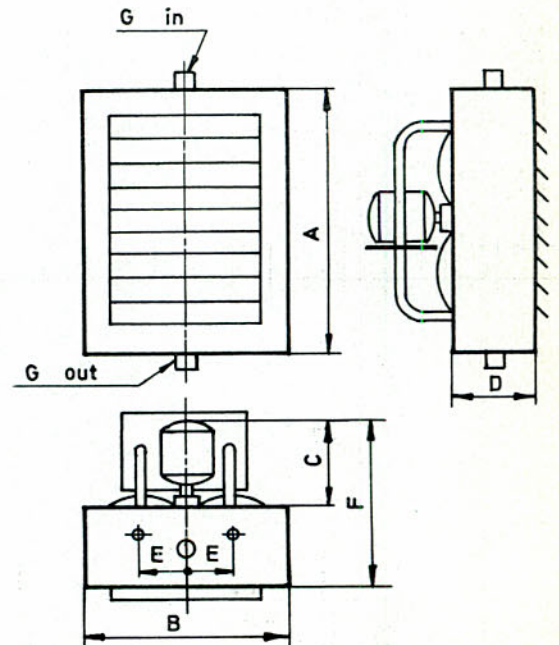


TABLE 9

UNIT	A	B	C	D	E	F	G
1SUHS_25	420	400	225	350	125	575	1 1/4"
1SUHS_100	650	450	225	350	150	575	1 1/2"
1SUHS_150	700	550	250	400	200	650	2"
1SUHS_250	850	650	250	400	300	650	2"
2SUHS_75	550	400	250	400	125	650	1 1/4"
2SUHS_200	850	650	275	400	225	675	1 1/2"
2SUHS_300	950	750	325	400	250	725	2"
2SUHS_400	1050	900	325	400	325	725	2 1/2"



PIPING DIAGRAM

Piping Suggestion

As the function of a Unit Heater is to transfer heat from steam or hot water to the surrounding space, it is necessary that the steam or hot water be delivered to the unit and removed from it, in the required quantity and condition. The following suggestions are made with a view toward assuring this condition and the resulting rated Unit Heater Performance.

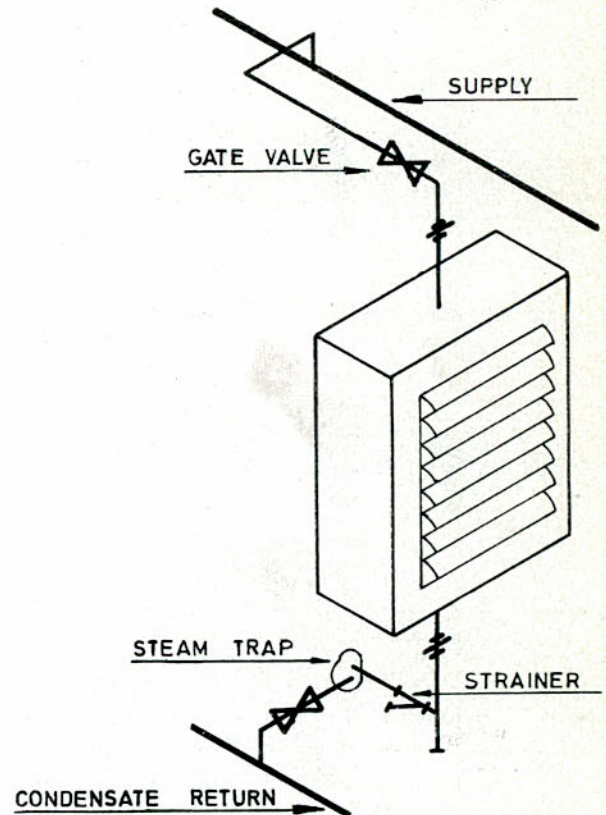
1 - Pipe size should be adequate to handle both steam and or condensate, under the maximum load condition. On hot water systems, piping should be sized properly to handle required flow(GPM) of water.

2 - Return lines should be installed to provide adequate drainage and to avoid the possibility of retaining condensate in the Unit.

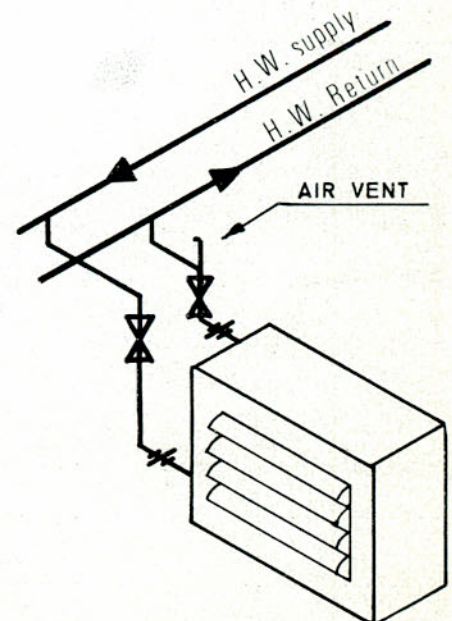
3 - Steam traps with ample capacity to handle the condensate when the Unit is operating under maximum steam pressure and minimum entering air temperature plus a suitable safety factor should be selected.

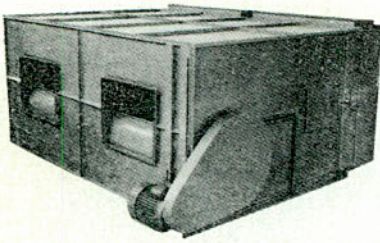
The piping arrangement illustrated on this page are typical, but any arrangement which will permit the Unit Heater to function properly can be considered as good piping practice.

For Steam heating systems

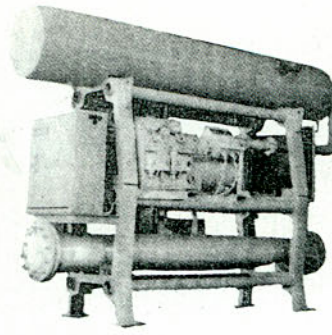


For hot water heating systems

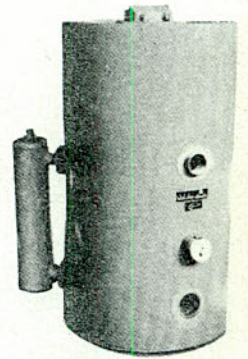




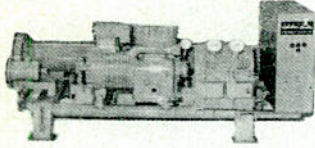
AIR HANDLING UNIT



PACKAGED CHILLER



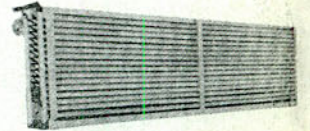
STEAM & HOT WATER BOILER



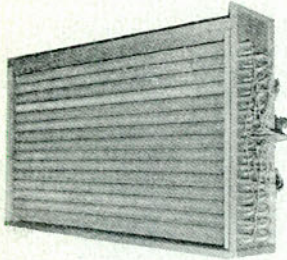
CONDENSING UNIT

SARAVEL PRODUCT

COVERS



STEAM & HOT WATER COIL

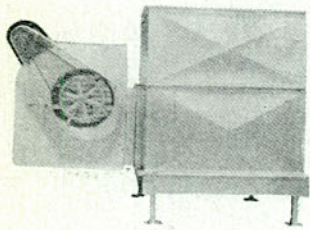


DIRECT EXPANSION COIL

ENTIRE RANGE



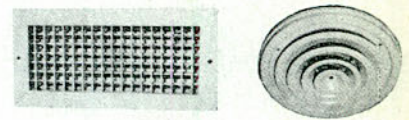
CENTRIFUGAL FAN



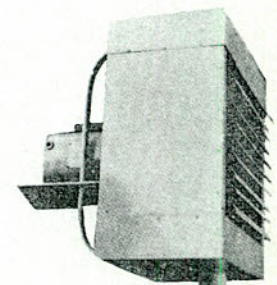
COOLING TOWER

OF

AIR CONDITIONING EQUIPMENT



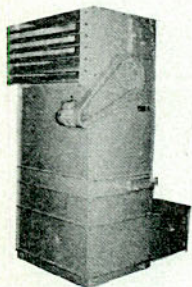
REGISTERS & DIFUSERS



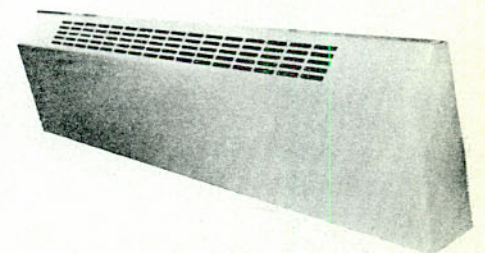
STEAM & HOT WATER
UNIT HEATER

Villa - Damghan No. 6

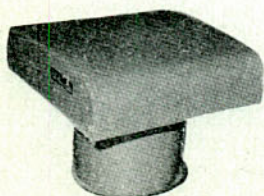
Teheran : Tel. 612224
43952



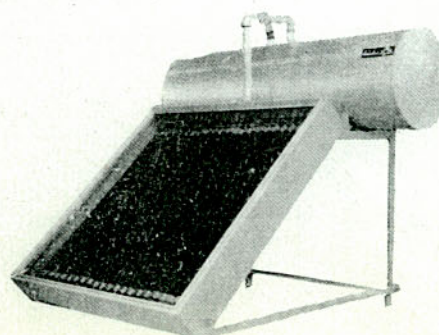
AIR HANDLING UNIT
VERTICAL TYPE



CONVECTOR



ROOF EXHAUST FAN



SOLAR WATER HEATER



HEAT EXCHANGER