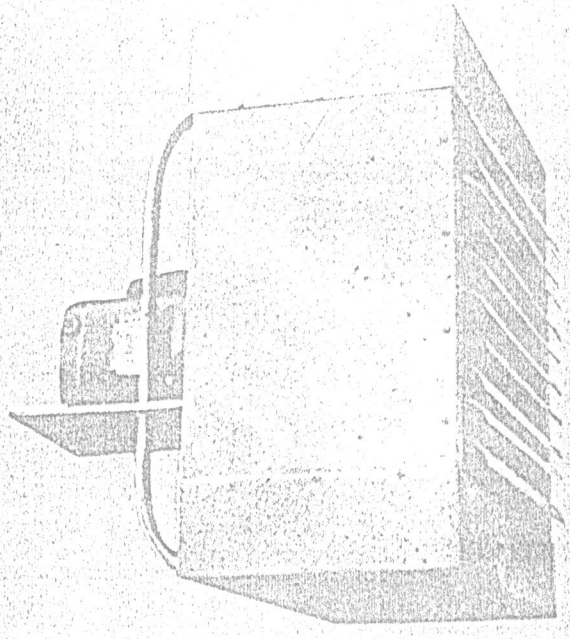
SARAVEL

AIR CONDITIONING, REFRIGERATION
HEATING & VENTILATING

SARAVEL

UNIT HEATER



SARAVEL MANUFACTURING CO.

No. 75, Pardis St., Mollasadra Ave., Vanak Sq., Tehran, Iran.

Cable: 1444 Tel: Office (021) 686255 – 685694

HOT WATER CAPACITIES

TABLE 1

180°F ENTERING WATER AND 60°F ENTERING AIR						
MODEL NO. H.P.	B.T.U. PER HOUR	C.F.M.	G.P.M.	FINAL AIR TEMP°F	WATER TEMP. DROP°F	P.DROP Ft. OF WATER
1SUH-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
1SUH-50 1/8	21000	500	5	100	8.5	0.8
	24500		8	105	6.2	1.4
	26000		10	108	5.2	2.2
1SUH-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
1SUH-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
1SUH-250 1/2	94500	2400	8	96	23.5	0.90
	108500		14	101	15.6	2.20
	120000		18	106	13.3	3.20

TABLE 2

2SUH-75 1/4	33000	800	3	95	22.0	0.30
	39000		5	105	12.6	0.60
	41600		7	108	11.9	1.40
2SUH-125 1/2	60000	1350	6	101	20	1.00
	67000		8	106	16.8	1.4
	73000		11	110	13.3	1.9
2SUH-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
2SUH-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
2SUH-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

DIMENSIONS

HORIZONTAL UNIT HEATER

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نحوه اتصال

TABLE 8 HOT WATER HEATING COIL DIMENSIONS

UNIT	A	B	C	D	E
1SUH-25	400	420	225	575	1"
1SUH-50	450	550	225	575	11/4"
1SUH-100	450	650	225	575	$1\frac{1}{4}$"
1SUH-150	550	700	250	650	$1\frac{1}{2}$"
1SUH-250	650	850	250	650	$1\frac{1}{2}$"
2SUH-75	400	550	250	650	1"
2SUH-125	500	750	250	650	11/4"
2S[illegible]-200	650	850	250	650	$1\frac{1}{4}$"
[illegible]SUH-300	750	950	300	700	$1\frac{1}{2}$"
2SUH-400	900	1050	300	700	2"

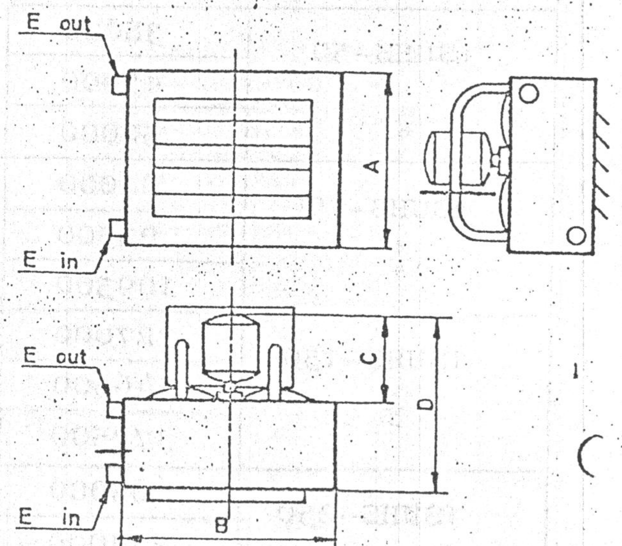


TABLE 9 STEAM HEATING COIL DIMENSIONS

UNIT	A	B	C	D	E
1SUHS-25	420	400	225	575	$1\frac{1}{4}$"
1SUHS-50	550	450	225	575	11/4"
1SUHS-100	650	450	225	575	$1\frac{1}{2}$"
1SUHS-150	700	550	250	650	2"
1SUHS-250	850	650	250	650	2"
2SUHS-75	550	400	250	650	$1\frac{1}{4}$"
2SUHS-125	750	500	275	675	11/2"
2SUHS-200	850	650	275	675	$1\frac{1}{2}$"
2SUHS-300	950	750	325	725	2"
2SUHS-400	1050	900	325	725	$2\frac{1}{2}$"

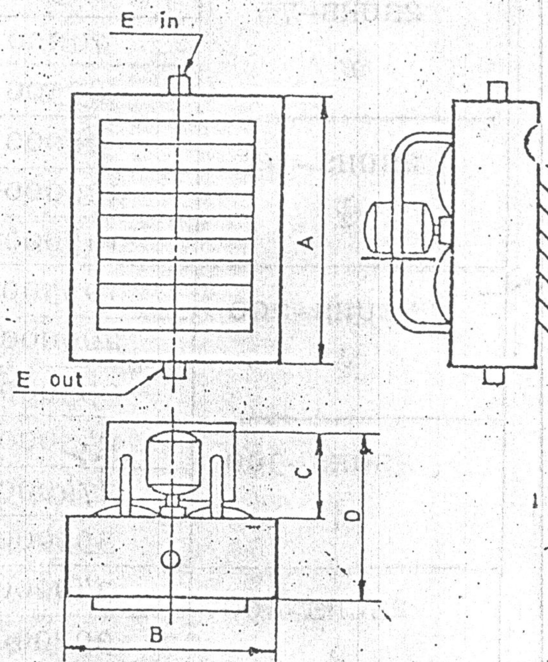


TABLE 3

60°F ENTERING AIR					
MODEL NO. H.P.	B.T.U./HR.	C.F.M.	Lbs. STEAM	CANDENSATE Lbs./HR	FINAL TEMP.
1SUHS-25 1/12	21600	280	5	22	131
	24800		15	26	142
	29200		30	31	156
1SUHS-50 1/8	38000	500	5	39	131
	45000		15	48	142
	52000		30	53	156
1SUHS-100 1/4	81000	1050	5	84	131
	93500		15	99	142
	109500		30	106	156
1SUHS-150 1/3	127000	1650	5	132	131
	146500		15	154	142
	172500		30	185	156
1SUHS-250 1/2	185000	2400	5	192	131
	214000		15	226	142
	252000		30	270	156

TABLE 4

2SUHS-75 1/8	61500	800	5	64	131
	71000		15	75	142
	83500		30	90	156
2SUHS-125 1/2	98000	1350	5	95	131
	120000		15	135	142
	143000		30	155	156
2SUHS-200 1/2	193500	2250	5	180	131
	200000		15	212	142
	235000		30	254	156
2SUHS-300 3/4	245000	3200	5	256	131
	274000		15	290	142
	335000		30	360	156
2SUHS-400 3/4	340000	4400	5	354	131
	392000		15	415	142
	460000		30	496	156

CONVERSION FACTORS STEAM

TABLE 5

ENT. AIR TEMP °F	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	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	0.942	0.973	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	0.896	0.926	0.967	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	0.849	0.880	0.920	0.977	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	0.802	0.833	0.873	0.930	0.978	1.021	1.092	1.151	1.202	1.248	1.325	1.390	1.461	1.521	1.575	1.628
45	0.779	0.810	0.850	0.907	0.955	0.997	1.069	1.128	1.180	1.224	1.302	1.366	1.436	1.496	1.552	1.601
50	0.756	0.786	0.827	0.884	0.932	0.974	1.045	1.104	1.156	1.201	1.273	1.343	1.414	1.474	1.529	1.576
55	0.732	0.763	0.803	0.861	0.908	0.951	1.023	1.081	1.133	1.178	1.255	1.320	1.390	1.451	1.505	1.553
60	0.709	0.740	0.780	0.837	0.885	0.927	1.000	1.058	1.109	1.154	1.231	1.297	1.367	1.427	1.482	1.531
65	0.686	0.716	0.757	0.814	0.862	0.904	0.976	1.034	1.086	1.131	1.209	1.273	1.343	1.407	1.459	1.506
70	0.662	0.693	0.733	0.791	0.838	0.881	0.935	1.011	1.063	1.108	1.186	1.250	1.320	1.380	1.435	1.484
75	0.639	0.670	0.710	0.767	0.815	0.857	0.930	0.988	1.040	1.084	1.163	1.226	1.297	1.357	1.412	1.460
80	0.616	0.646	0.687	0.744	0.792	0.834	0.906	0.965	1.016	1.061	1.139	1.203	1.273	1.335	1.389	1.436
85	0.592	0.623	0.663	0.720	0.768	0.811	0.883	0.941	0.993	1.038	1.116	1.180	1.251	1.310	1.365	1.414
90	0.569	0.600	0.640	0.696	0.745	0.787	0.860	0.918	0.969	1.014	1.093	1.156	1.226	1.288	1.342	1.390
100	0.522	0.553	0.593	0.650	0.698	0.732	0.813	0.871	0.923	0.968	1.045	1.110	1.181	1.240	1.295	1.344
110	0.476	0.506	0.547	0.603	0.652	0.694	0.766	0.825	0.876	0.921	0.998	1.063	1.134	1.194	1.248	1.297
120	0.429	0.460	0.500	0.556	0.605	0.647	0.720	0.778	0.830	0.874	0.952	1.027	1.086	1.147	1.201	1.251
140	0.336	0.366	0.407	0.464	0.512	0.554	0.626	0.685	0.737	0.781	0.858	0.923	0.993	1.055	1.108	1.156
160	0.242	0.273	0.313	0.370	0.418	0.460	0.533	0.591	0.642	0.688	0.765	0.831	0.901	0.961	1.012	1.065
180	0.149	0.179	0.220	0.277	0.325	0.367	0.439	0.498	0.550	0.594	0.671	0.737	0.808	0.868	0.921	0.970
200	0.056	0.085	0.127	0.183	0.232	0.274	0.345	0.405	0.455	0.501	0.577	0.643	0.713	0.775	0.829	0.876

To determine BTU capacity of Model SUHS heaters at any steam pressure and entering air temperature, multiply rated capacity 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 1SUHS–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	220	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	0.940	1.025	1.105	1.195	1.275	1.360	1.440	1.535	1.620	1.700	1.785
50	0.840	0.930	0.050	1.090	1.175	1.265	1.345	1.430	1.510	1.600	1.690
60	0.743	0.835	0.920	1.000	1.080	1.165	1.240	1.325	1.405	1.500	1.580
70	0.650	0.745	0.825	0.905	0.980	1.070	1.150	1.235	1.315	1.395	1.480
80	0.570	0.650	0.735	0.815	0.895	0.980	1.060	1.140	1.220	1.300	1.380
90	0.475	0.560	0.640	0.720	0.805	0.885	0.965	1.050	1.130	1.210	1.280
100	0.395	0.475	0.560	0.710	0.790	0.875	0.955	1.035	1.115	1.115	1.185

To determine BTU 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	828.30	820.00

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.

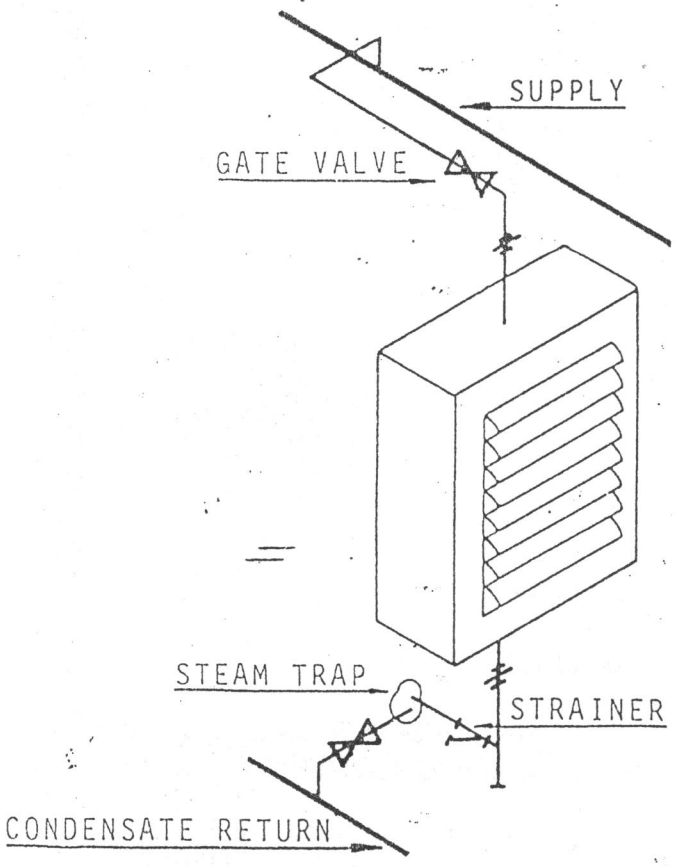
1 – Pipe size should be adequate to handle both steam and or condensate, under the maximum load condition. On hot water systems, piping should be sized properly to handle required flow (GPM) of water.

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

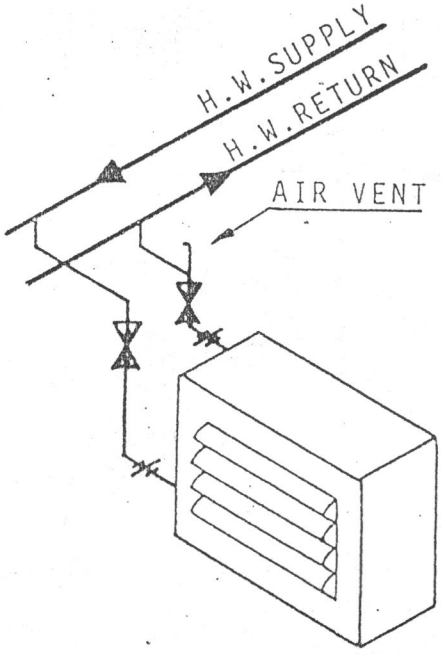
3 – Steam traps with ample capacity to handle the condensate when the Unit is operating under maximum steam pressure and minimum entering air temperature plus a suitable safety factor should be selected.

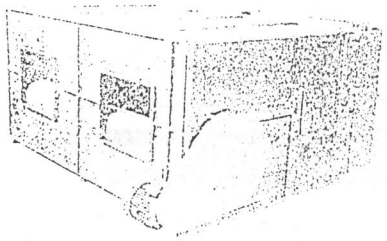
The piping arrangement illustrated on this page are typical, but any arrangement which will permit the Unit Heater to function properly can be considered as good piping practice.

For Steam heating systems

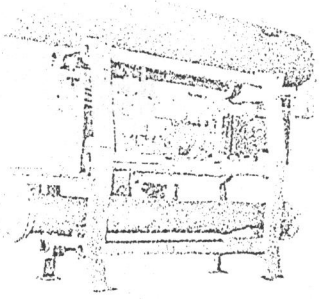


For hot water heating systems

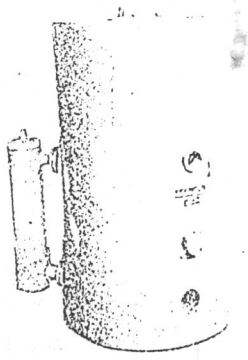




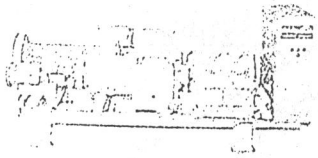
AIR HANDLING UNIT



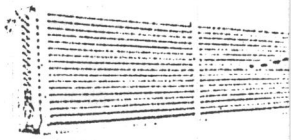
PACKAGED CHILLER



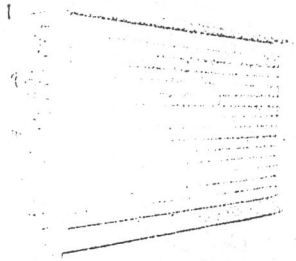
STEAM & HOT WATER BOILER



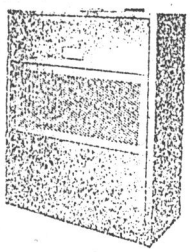
CONDENSING UNIT



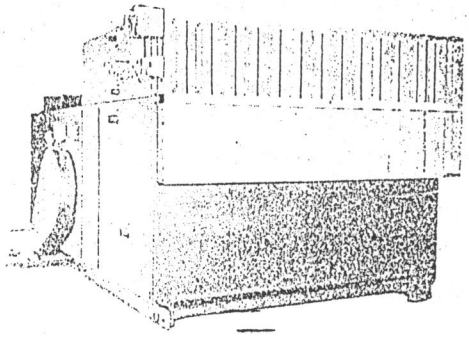
STEAM & HOT WATER COI



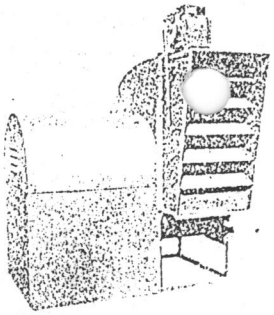
DIRECT EXPANSION COIL



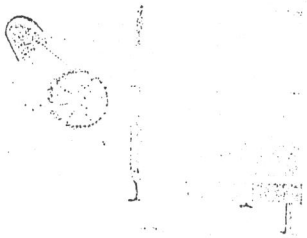
PACKAGED AIR CONDITIONER



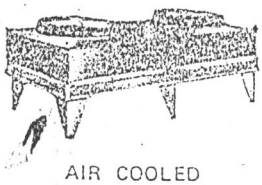
BLOW–THRU MULTIZONE



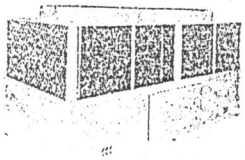
UTILITY FAN WITH MOTORIZED BACKDRAFT DAMPER



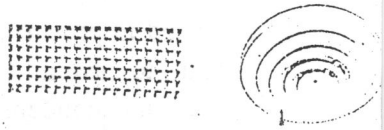
COOLING TOWER



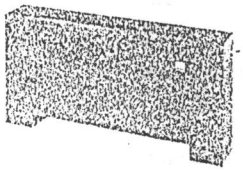
AIR COOLED CONDENSER



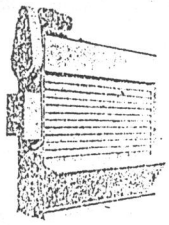
AIR COOLED WATER CHILLER



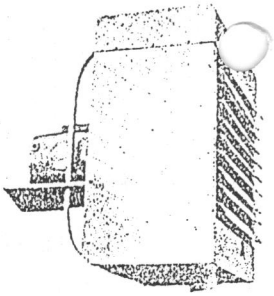
REGISTERS & DIFUSERS



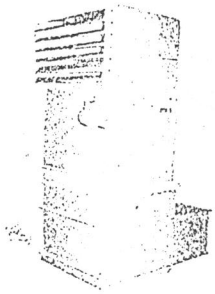
FAN & COIL UNITS



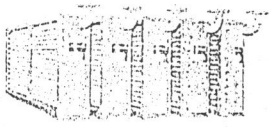
AUTOMATIC AIR FILTER



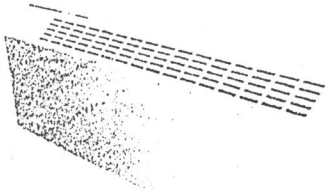
STEAM & HOT WATER UNIT HEATER



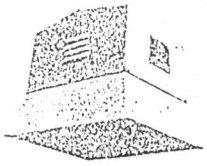
AIR HANDLING UNIT VERTICAL TYPE



INDUSTRIAL HEATING AND COOLING COILS

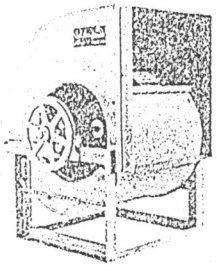


CONVECTOR



ROOF POWER VENTILATOR

INDUSTRIAL UNIT HEATER



CENTRIFUGAL FAN