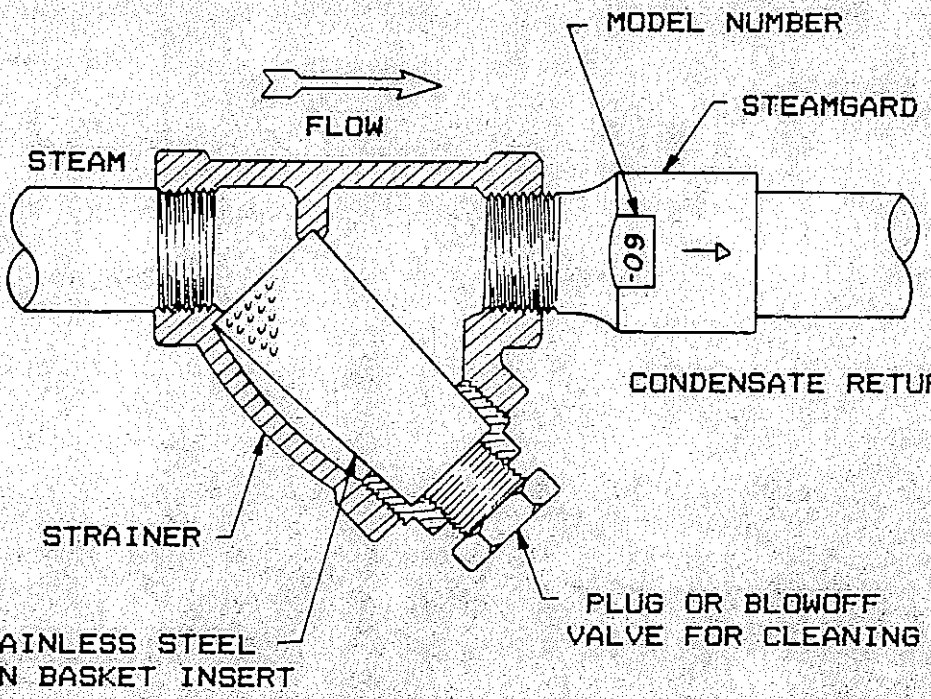
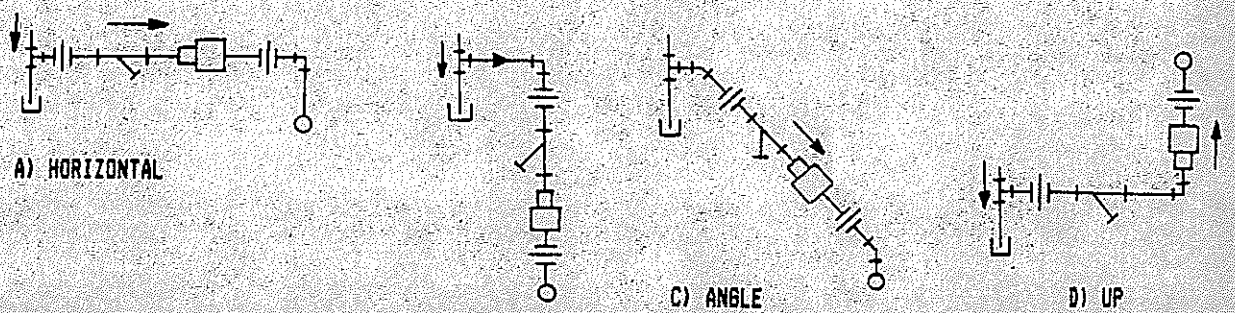
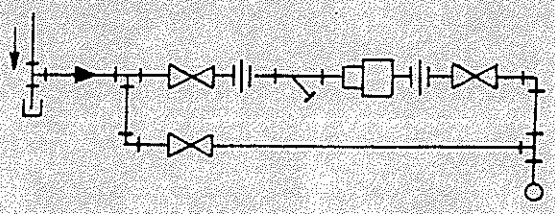
STEAMGARD® INSTALLATION INSTRUCTIONS



STEAMGARD® MUST BE INSTALLED DOWNSTREAM OF A STRAINER WITH A SCREEN BASKET INSERT WITH .020 INCH MAXIMUM OPENINGS (40-MESH).

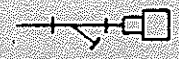


E) HORIZONTAL WITH BYPASS



** NO POSITIONING RESTRICTION **

SYMBOLS:


STRAINER/STEAMGARD ASS'Y


VALVE


UNION

STEAM UNIT HEATERS

- INSTALLATION INSTRUCTIONS
- MODEL SELECTIONS

STEAM UNIT HEATERS

STEAMGARD is a cost effective replacement for conventional steam traps on unit heaters found in virtually all industries.

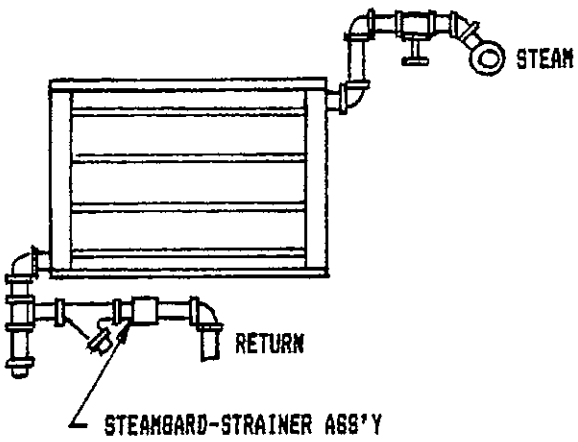
STEAMGARD with its continuous condensate removal and absence of moving parts, can increase heater efficiency.

It improves:

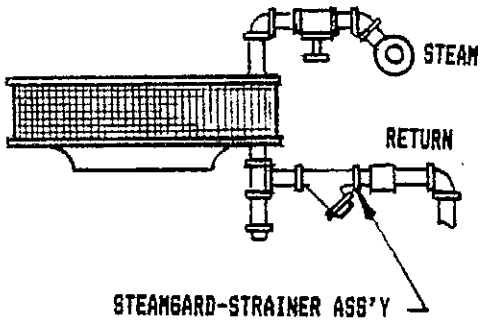
- Heater output

It eliminates:

- Potentially large steam losses of "blowing-through" traps.
- Excessive trap maintenance and repair.



HORIZONTAL UNIT HEATER



VERTICAL UNIT HEATER

VALVES & UNIONS NOT SHOWN (SEE INSTALLATION INSTRUCTIONS FOR ADDITIONAL DETAILS.)

NOTES: For low pressure applications, pay particular attention to condensate return lift when determining the actual pressure differential across the STEAMGARD.

UNIT HEATERS IN MBH

P	-04	-05	-06	-07	-08	-09	-10	-11	-12	-13	-14	-15	P
	MODEL NUMBERS												
2	14	21	30	38	49	70	93	123	159	204	263	336	2
4	20	29	40	52	67	95	127	167	217	279	358	---	4
6	25	35	48	62	80	112	151	199	257	330	---	---	6
8	28	39	54	69	89	125	168	222	288	369	---	---	8
10	30	42	59	75	96	136	182	240	312	---	---	---	10
15	35	48	68	87	112	157	210	277	359	---	---	---	15
20	38	54	74	95	122	172	229	302	---	---	---	---	20
30	43	60	84	107	137	193	259	---	---	---	---	---	30
40	46	65	90	115	148	209	279	---	---	---	---	---	40
50	49	68	96	122	157	221	---	---	---	---	---	---	50
60	52	71	99	127	165	231	---	---	---	---	---	---	60
70	53	74	103	132	170	239	---	---	---	---	---	---	70
80	55	77	107	136	176	247	---	---	---	---	---	---	80
100	57	80	112	143	184	---	---	---	---	---	---	---	100
120	60	84	117	149	191	---	---	---	---	---	---	---	120
150	63	87	122	156	201	---	---	---	---	---	---	---	150

UNIT HEATERS IN LB/HR OF CONDENSATE

P	-04	-05	-06	-07	-08	-09	-10	-11	-12	-13	-14	-15	P
	MODEL NUMBERS												
2	15	22	31	39	51	72	96	127	165	211	272	348	2
4	21	30	42	54	70	99	132	174	226	290	372	---	4
6	26	36	50	65	83	117	157	207	268	344	---	---	6
8	29	41	57	72	93	131	176	232	301	386	---	---	8
10	31	44	62	79	101	143	191	252	327	---	---	---	10
15	37	51	72	92	118	166	222	293	380	---	---	---	15
20	40	57	79	101	130	183	244	322	---	---	---	---	20
30	46	65	90	115	148	208	279	---	---	---	---	---	30
40	50	71	98	125	161	227	304	---	---	---	---	---	40
50	54	75	105	134	172	243	---	---	---	---	---	---	50
60	57	79	110	141	182	256	---	---	---	---	---	---	60
70	59	83	115	147	190	267	---	---	---	---	---	---	70
80	62	86	120	153	197	277	---	---	---	---	---	---	80
100	65	91	127	163	209	---	---	---	---	---	---	---	100
120	69	96	134	171	220	---	---	---	---	---	---	---	120
150	73	102	142	182	234	---	---	---	---	---	---	---	150

NOTES:

BASED ON STANDARD CONDITIONS (2 PSIG STEAM AND 60 DEG.F. ENTERING AIR).

FOR RATINGS IN SQUARE FEET OF E-QUIVALENT D-IRECT R-ADIATION (EDR):

MBH = 0.240 X EDR

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)
MBH = THOUSAND (1000) BTU PER HOUR

EXAMPLE 1

INLET STEAM PRESSURE 10 PSIG
BACK PRESSURE NONE

STANDARD RATING (from spec) 170 MBH

PIPE SIZE OF EXISTING TRAP 1.0 INCH

SELECTION

(1) Use UNIT HEATER (MBH) selection table.
(2) Find a MODEL that corresponds to:

10 PSIG & 170 MBH

(3) Specify: 1.0" SG -B-10 w/ strainer
Capacity 182 MBH

EXAMPLE 2

INLET STEAM PRESSURE 25 PSIG
BACK PRESSURE NONE

STANDARD RATING (from spec) 480 EDR

PIPE SIZE OF EXISTING TRAP 3/4 INCH

CONVERT (EDR) TO (MBH)

MBH = 0.240 X 480 (EDR) = 115 MBH

SELECTION

(1) Use UNIT HEATER (MBH) selection table.
(2) Find a MODEL that corresponds to:

25 PSIG & 115 MBH

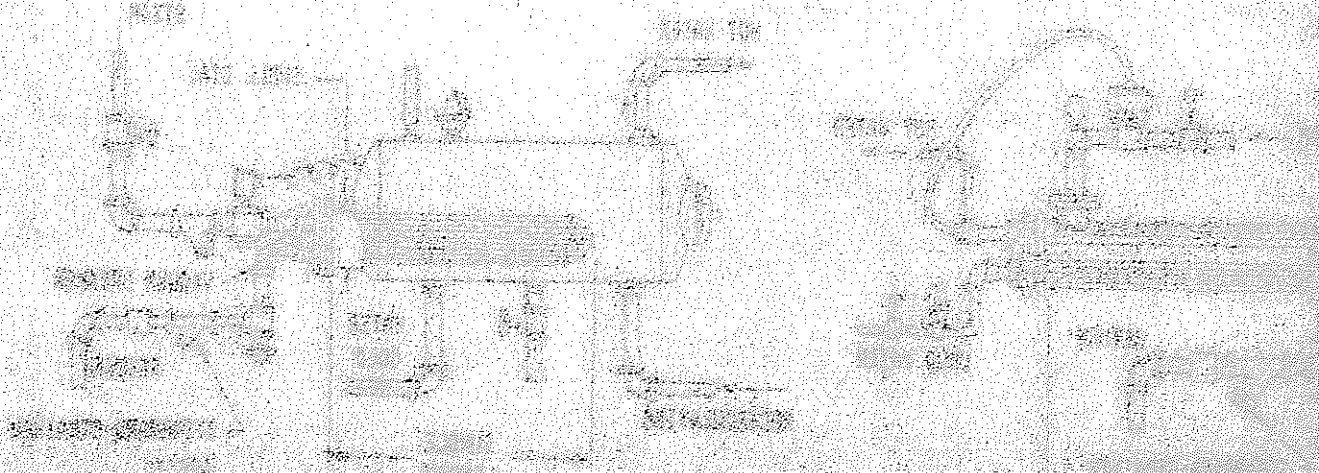
(3) Specify: 3/4" SG -B-08 w/ strainer
Capacity 139 MBH

HEAT EXCHANGERS

AND

DOMESTIC HOT WATER HEATERS

- INSTALLATION INSTRUCTIONS
- MODEL SELECTIONS



HEAT EXCHANGERS

AND

DOMESTIC HOT WATER HEATERS

STEAMGARD's continuous condensate discharge can substantially improve the efficiency of heat exchangers and domestic hot water heaters.

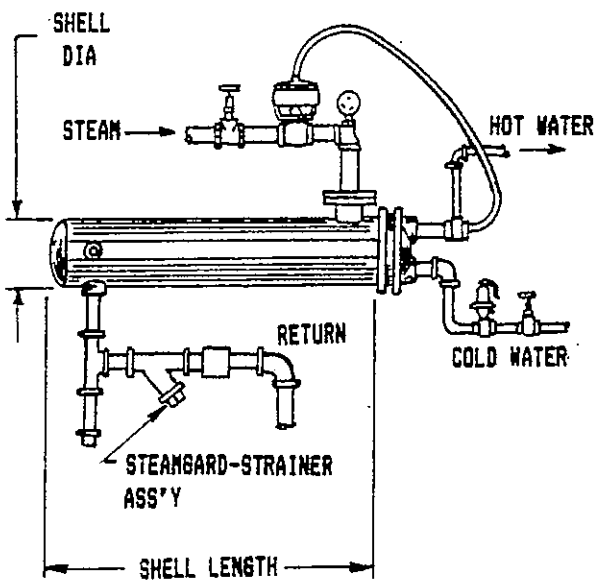
STEAMGARD can result in:

- Improved response to changing demands on equipment
- Substantially reduced steam consumption.

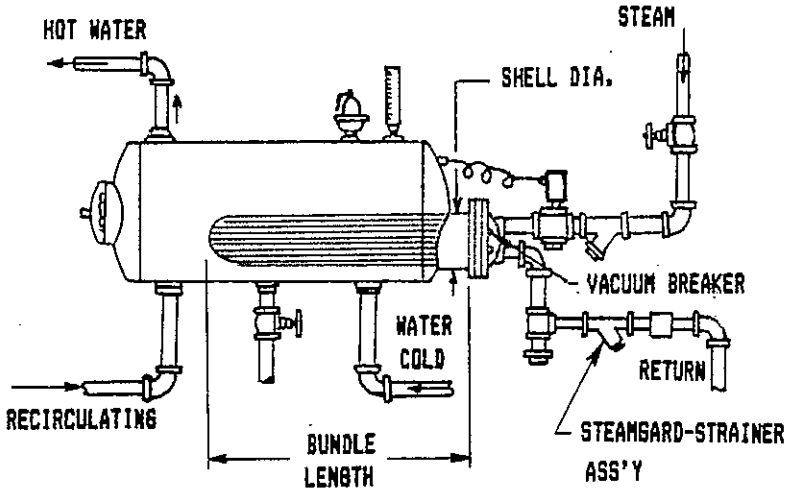
STEAMGARD can eliminate:

- Excessive trap maintenance and repair
- Tube failure due to excessive water hammer.

In this case, we have two (2) diagrams.



TUBE/SHELL HEAT EXCHANGER



DOMESTIC HOT WATER TANK & HEATER UNIT

VALVES & UNIONS NOT SHOWN (SEE INSTALLATION INSTRUCTIONS FOR ADDITIONAL DETAILS.)

NOTES: STEAMGARD should be applied only when heat exchanger or hot water heater has modulating steam control valve.

For low pressure applications, pay particular attention to condensate return lift when determining the actual pressure differential across the STEAMGARD.

TUBE/SHELL HEAT EXCHANGERS (MBH)

P	-08	-09	-10	-11	-12	-13	-14	-15	-16	P
	MODEL NUMBERS									
2	31	46	65	89	119	156	204	265	339	2
4	51	74	102	137	181	235	304	393	500	4
6	65	95	129	173	226	293	379	489	620	6
8	77	112	152	202	265	341	441	568	719	8
10	89	126	171	227	297	383	494	636	804	10
15	109	154	209	277	362	466	601	773	978	15
20	125	178	240	319	417	536	690	887	1122	20
30	152	216	292	386	504	649	836	1074	1357	30
40	175	247	334	442	576	741	954	1225	1549	40
50	193	274	370	489	638	820	1055	1356	1713	50
60	211	298	401	532	693	890	1145	1472	1860	60
70	226	320	431	570	742	953	1226	1574	1990	70
80	240	339	457	604	787	1010	1300	1670	2109	80
100	264	374	503	665	867	1112	1431	1837	2321	100
120	285	405	544	719	935	1201	1545	1984	2506	120
150	315	445	598	790	1029	1321	1699	2181	2754	150

P	-17	-18	-19	-20	-21	-22	-23	-24	-25	P
	MODEL NUMBERS									
2	426	554	704	898	1147	1434	1818	2280	2805	2
4	625	809	1025	1304	1659	2070	2620	3278	4029	4
6	774	1000	1265	1608	2044	2547	3220	4029	4947	6
8	897	1158	1464	1859	2362	2943	3719	4650	5709	8
10	1004	1294	1635	2077	2638	3285	4150	5189	6370	10
15	1219	1572	1986	2522	3203	3988	5038	6297	7729	15
20	1399	1804	2279	2892	3672	4572	5776	7219	8859	20
30	1693	2181	2755	3497	4440	5527	6981	8725	10708	30
40	1930	2487	3141	3986	5060	6299	7956	9943	12201	40
50	2134	2751	3474	4407	5595	6965	8796	10992	13488	50
60	2316	2985	3770	4782	6070	7556	9543	11925	14632	60
70	2478	3193	4033	5116	6493	8082	10207	12754	15650	70
80	2628	3386	4275	5423	6883	8566	10819	13517	16586	80
100	2891	3725	4703	5966	7572	9424	11901	14870	18245	100
120	3121	4020	5076	6439	8172	10170	12843	16047	19689	120
150	3431	4420	5581	7079	8984	11180	14118	17640	21644	150

NOTES:

FOR TUBE/SHELL HEAT EXCHANGERS WITH STEAM IN SHELL ONLY.

CALCULATE HEAT REQUIREMENT FOR WATER IN (MBH) AS FOLLOWS:

Q = 0.5 X GPM X TEMP RISE DEG F

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)
MBH = THOUSAND (1000) BTU PER HOUR
GPM = U.S. GALLONS PER MINUTE

EXAMPLE 1.

INLET STEAM PRESSURE	30 PSIG
BACK PRESSURE	NONE
FLOW RATE (from spec)	800 GPM
TEMPERATURE RISE	20 DEG F
PIPE SIZE OF EXISTING TRAP	2.0 INCH

CALCULATE HEAT REQUIRED:

GPM (U.S. GAL. PER MIN) = 800
TEMPERATURE RISE = 20 DEG F

Q = 0.5 X 800 X 20 = 8000 MBH

SELECTION

(1) Use HOT WATER HEATER (MBH) selection table.

(2) Find a MODEL that corresponds to:

30 PSIG & 8000 MBH

Use MODEL -24 with a capacity of 8725 MBH @ 30 PSI.

(3) Pipe size: 1.0 inch STEAMGARD for traps 1.0" or larger.

(4) Specify: 1.0" S8L-B-24 w/ strainer.

TUBE/SHELL HEAT EXCHANGERS (LB/HR)

P	-08	-09	-10	-11	-12	-13	-14	-15	-16	P
2	32	48	67	92	123	161	211	274	351	2
4	53	77	106	142	188	244	316	409	520	4
6	68	99	135	180	236	306	395	510	646	6
8	81	117	159	211	277	357	461	594	752	8
10	93	132	179	238	312	402	518	667	844	10
15	115	163	221	293	383	493	636	818	1035	15
20	133	190	256	340	444	571	735	945	1195	20
30	164	233	314	416	543	699	900	1156	1461	30
40	190	269	363	481	627	806	1038	1333	1685	40
50	212	301	406	537	700	900	1158	1488	1880	50
60	233	330	444	588	767	985	1267	1628	2057	60
70	252	357	480	635	827	1062	1367	1755	2218	70
80	269	381	513	678	883	1134	1459	1874	2367	80
100	300	425	572	756	985	1264	1626	2088	2637	100
120	328	465	625	826	1075	1381	1776	2280	2880	120
150	367	519	698	922	1201	1541	1983	2545	3214	150

MODEL NUMBERS

P	-17	-18	-19	-20	-21	-22	-23	-24	-25	P
2	441	573	729	930	1187	1484	1882	2360	2904	2
4	650	841	1066	1356	1725	2152	2723	3408	4188	4
6	807	1043	1319	1677	2131	2656	3358	4201	5159	6
8	938	1211	1531	1945	2471	3078	3890	4864	5972	8
10	1053	1358	1716	2179	2768	3447	4355	5445	6684	10
15	1290	1664	2102	2669	3389	4220	5331	6664	8179	15
20	1490	1921	2427	3080	3911	4869	6151	7688	9435	20
30	1822	2348	2966	3764	4779	5949	7515	9392	11526	30
40	2100	2706	3418	4337	5506	6854	8657	10819	13276	40
50	2343	3020	3813	4838	6142	7645	9655	12066	14806	50
60	2562	3302	4170	5290	6715	8358	10556	13191	16186	60
70	2763	3560	4496	5703	7239	9010	11379	14219	17447	70
80	2949	3800	4798	6086	7725	9614	12142	15171	18615	80
100	3285	4233	5344	6780	8605	10709	13524	16898	20733	100
120	3587	4621	5834	7401	9393	11690	14762	18445	22631	120
150	4004	5158	6512	8260	10483	13046	16474	20584	25255	150

NOTES:

FOR TUBE/SHELL HEAT EXCHANGERS WITH STEAM IN SHELL ONLY.

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

EXAMPLE 1

INLET STEAM PRESSURE 20 PSIG
BACK PRESSURE NONE

CONDENSATE (from spec.) 2200 LB/HR

PIPE SIZE OF EXISTING TRAP 2 INCH

SELECTION

(1) Use HEAT EXCHANGER (LB/HR) selection table.
(2) Find a MODEL that corresponds to:

20 PSIG & 2200 LB/HR

Use MODEL -19 with a capacity of 2427 LB/HR @ 20 PSIG

(3) Pipe size: 1.0 inch STEAMGARD for traps 1.0" or larger.

(4) Specify: 1.0" SG -B-19 w/ strainer

HOT WATER HEATERS (MBH)

P	-08	-09	-10	-11	-12	-13	-14	-15	-16	P
	MODEL NUMBERS									
2	25	38	53	72	98	128	169	221	283	2
4	41	62	85	114	151	196	256	331	421	4
6	55	79	108	145	191	246	319	412	524	6
8	65	94	127	170	223	288	373	480	608	8
10	74	106	144	192	251	324	417	537	681	10
15	91	130	176	234	306	395	509	655	829	15
20	105	150	203	269	352	454	585	752	951	20
30	128	183	247	327	427	550	709	910	1152	30
40	147	209	282	374	488	628	809	1039	1314	40
50	163	232	312	415	540	695	896	1150	1454	50
60	178	252	340	450	588	755	972	1248	1578	60
70	191	271	364	483	629	808	1041	1337	1689	70
80	202	288	387	512	667	857	1104	1418	1791	80
100	224	317	426	564	735	944	1214	1560	1971	100
120	242	342	460	609	793	1020	1312	1684	2128	120
150	266	377	506	670	873	1121	1442	1852	2340	150

P	-17	-18	-19	-20	-21	-22	-23	-24	-25	P
	MODEL NUMBERS									
2	356	464	591	755	964	1208	1532	1922	2368	2
4	527	683	866	1102	1404	1752	2217	2775	3412	4
6	655	846	1071	1362	1732	2159	2730	3416	4196	6
8	759	981	1240	1575	2003	2495	3155	3945	4845	8
10	850	1097	1387	1761	2238	2788	3523	4405	5407	10
15	1034	1333	1686	2139	2718	3385	4277	5347	6564	15
20	1187	1531	1933	2455	3117	3882	4904	6131	7525	20
30	1436	1851	2339	2969	3770	4693	5930	7411	9096	30
40	1638	2111	2667	3385	4297	5350	6758	8447	10365	40
50	1812	2336	2950	3743	4753	5916	7472	9339	11460	50
60	1966	2535	3201	4062	5156	6419	8108	10132	12434	60
70	2104	2713	3425	4346	5517	6867	8672	10838	13299	70
80	2231	2875	3631	4606	5848	7279	9192	11487	14095	80
100	2455	3164	3995	5069	6434	8008	10113	12637	15506	100
120	2651	3416	4313	5471	6943	8643	10914	13637	16734	120
150	2915	3755	4741	6014	7634	9501	11998	14992	18395	150

NOTES:

FOR TUBE/SHELL HEAT EXCHANGERS WITH STEAM IN SHELL ONLY.

CALCULATE HEAT REQUIREMENT FOR WATER IN (MBH) AS FOLLOWS:

Q = (1/120) X GPH X TEMP RISE DEG F

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)
MBH = THOUSAND (1000) BTU PER HOUR
GPH = U.S. GALLONS PER HOUR

EXAMPLE 1

INLET STEAM PRESSURE	8 PSIG
BACK PRESSURE	NONE
FLOW RATE	2400 GPH
ENTERING WATER TEMP	40 DEG F
LEAVING WATER TEMP	140 DEG F
PIPE SIZE OF EXISTING TRAP	1-1/4 INCH

CALCULATE HEAT REQUIRED:

GPH = 2400
TEMP RISE = 140 - 40 = 100 DEG F

Q = (1/120) X 2400 X 100 = 2000 MBH

SELECTION

(1) Use HOT WATER HEATER (MBH) selection table.

(2) Find a MODEL that corresponds to:

8 PSIG & 2000 MBH

Use MODEL -21 with a capacity of 2003 MBH @ 8 PSI

(3) Pipe size: 1.0 inch STEAMGARD for traps 1.0" or larger.

(4) Specify: 1.0" SGL-B-21 w/ strainer

HOT WATER HEATERS (LB/HR)

P	-08	-09	-10	-11	-12	-13	-14	-15	-16	P
	MODEL NUMBERS									
2	32	48	67	92	123	161	211	274	351	2
4	53	77	106	142	188	244	316	409	520	4
6	68	99	135	180	236	306	395	510	646	6
8	81	117	159	211	277	357	461	594	752	8
10	93	132	179	238	312	402	518	667	844	10
15	115	163	221	293	383	493	636	818	1035	15
20	133	190	256	340	444	571	735	945	1195	20
30	164	233	314	416	543	699	900	1156	1461	30
40	190	269	363	481	627	806	1038	1333	1685	40
50	212	301	406	537	700	900	1158	1488	1880	50
60	233	330	444	588	767	985	1267	1628	2057	60
70	252	357	480	635	827	1062	1367	1755	2218	70
80	269	381	513	678	883	1134	1459	1874	2367	80
100	300	425	572	756	985	1264	1626	2088	2637	100
120	328	465	625	826	1075	1381	1776	2280	2880	120
150	367	519	698	922	1201	1541	1983	2545	3214	150

P	-17	-18	-19	-20	-21	-22	-23	-24	-25	P
	MODEL NUMBERS									
2	441	573	729	930	1187	1484	1882	2360	2904	2
4	650	841	1066	1356	1725	2152	2723	3408	4188	4
6	807	1043	1319	1677	2131	2656	3358	4201	5159	6
8	938	1211	1531	1945	2471	3078	3890	4864	5972	8
10	1053	1358	1716	2179	2768	3447	4355	5445	6684	10
15	1290	1664	2102	2669	3389	4220	5331	6664	8179	15
20	1490	1921	2427	3080	3911	4869	6151	7688	9435	20
30	1822	2348	2966	3764	4779	5949	7515	9392	11526	30
40	2100	2706	3418	4337	5506	6854	8657	10819	13276	40
50	2343	3020	3813	4838	6142	7645	9655	12066	14806	50
60	2562	3302	4170	5290	6715	8358	10556	13191	16186	60
70	2763	3560	4496	5703	7239	9010	11379	14219	17447	70
80	2949	3800	4798	6086	7725	9614	12142	15171	18615	80
100	3285	4233	5344	6780	8605	10709	13524	16898	20733	100
120	3587	4621	5834	7401	9393	11690	14762	18445	22631	120
150	4004	5158	6512	8260	10483	13046	16474	20584	25255	150

NOTES:

FOR HEATERS WITH TUBING BUNDLES AND STEAM IN TUBINGS ONLY.

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

EXAMPLE 1

INLET STEAM PRESSURE	10 PSIG
BACK PRESSURE	NONE
CONDENSATE	1650 LB/HR
PIPE SIZE OF EXISTING TRAP	1-1/2 INCH

SELECTION

(1) Use HOT WATER HEATER (LB/HR) selection table.

(2) Find a MODEL that corresponds to:

10 PSIG & 1650 LB/HR

Use MODEL -19 with a capacity of 1716 LB/HR @ 10 PSI.

(3) Pipe size: 1.0 inch STEAMGARD for traps 1.0" or larger.

(4) Specify: 1.0" SG -B-19 w/ strainer

STEAM ABSORPTION CHILLERS

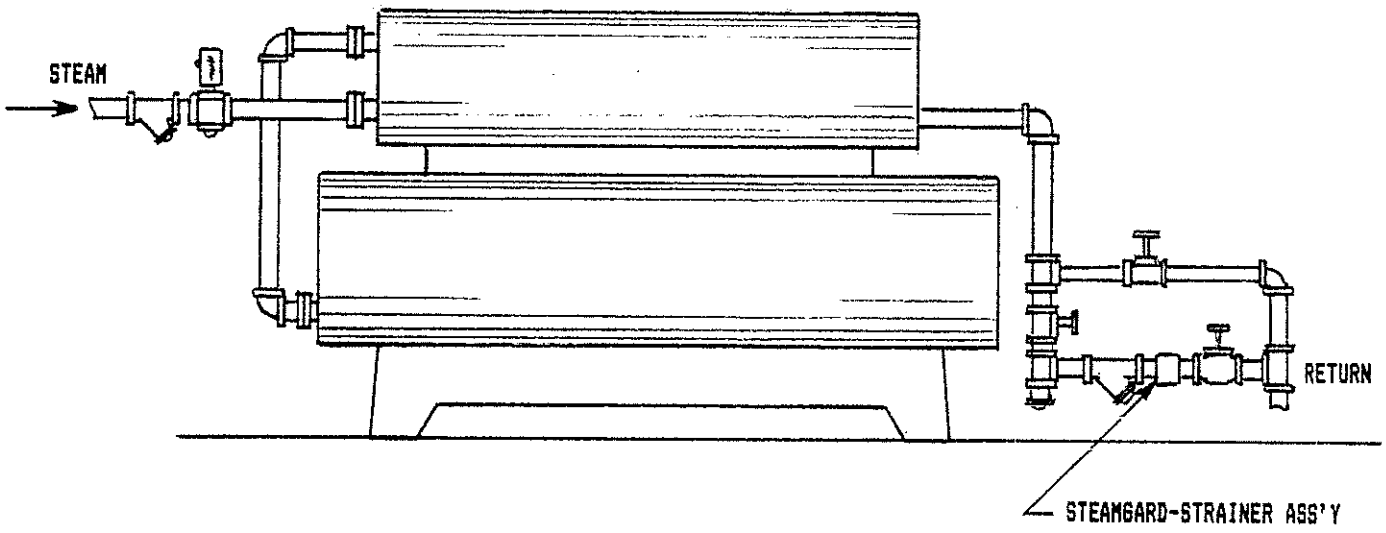
- INSTALLATION INSTRUCTIONS
- MODEL SELECTIONS

STEAM ABSORPTION CHILLERS

STEAMGARD's continuous condensate discharge can substantially improve the efficiency of absorption chillers currently using conventional steam traps. This has been our most spectacular application.

Effective condensate removal results in:

- Faster cool-down
- Reduced steam consumption
- Reduced system maintenance.



UNIONS NOT SHOWN (SEE INSTALLATION INSTRUCTIONS FOR ADDITIONAL DETAILS.)

NOTES: STEAMGARD should be applied only when absorber has modulating steam control valve.

Pay particular attention to actual steam pressure and pressure differential across the STEAMGARD when selecting STEAMGARD model.

ABSORPTION CHILLER CAPACITIES IN TONS

20 LB/HR OF STEAM AT MAX. LOAD CONDITIONS

	MODEL NUMBERS								
P	-18	-19	-20	-21	-22	-23	-24	-25	P
2	37	47	59	75	93	118	147	180	2
3	45	57	72	92	114	144	180	221	3
4	52	66	83	106	132	166	207	255	4
5	58	73	93	118	147	186	232	284	5
6	64	80	102	129	161	203	254	311	6
7	69	87	110	140	174	219	274	336	7
8	74	93	118	149	186	234	293	359	8
9	78	98	125	158	197	249	310	381	9
10	82	104	131	167	207	262	327	401	10
11	86	109	138	175	218	275	343	421	11
12	90	114	144	183	227	287	358	439	12
13	93	118	150	190	236	298	372	456	13
14	97	122	155	197	245	309	386	474	14
15	100	127	161	204	253	320	400	490	15

NOTES:

BASED ON COMMON TYPE OF ABSORPTION CHILLERS HAVING A STEAM CONSUMPTION RATE OF (19) TO (20) LB/HR AT MAXIMUM DEMAND CONDITIONS

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

EXAMPLE 1

STEAM "LINE" PRESSURE	14 PSIG
BACK PRESSURE	NONE
COOLING CAPACITY (from spec.)	610 TONS
SIZE OF EXISTING TRAPS (2)	2.0 INCH

SELECTION

(1) Use ABSORPTION CHILLER selection table on the left.
(2) Find MODEL(S) that corresponds to:
10 PSI (see note below)
& 610 TONS
Use (2) MODEL -24 w/ total capacity of 327 x 2 = 654 tons
(3) Pipe size: 1.0 inch STEAMGARD for traps 1.0" or larger.
(4) Specify: (2) 1.0" SGL-B-24 with (2) strainers.

‡‡ To determine the actual pressure differential across the STEAMGARD:
a. assume 2 PSI drop across control valve, and
b. an additional 2 PSI drop through the steam coil in the generator.
Therefore, actual pressure is line pressure, 14 PSIG, less 4 PSI total, or, 10 PSI.

ABSORPTION CHILLER CAPACITIES IN TONS

MULTI-STAGE HIGH EFFICIENCY UNITS

	MODEL NUMBERS										
P	-16	-17	-18	-19	-20	-21	-22	-23	-24	-25	P
10	78	93	120	151	192	244	303	383	478	586	10
15	92	114	147	185	235	298	370	467	584	716	15
20	105	131	169	213	270	343	427	539	673	825	20
30	129	160	206	260	330	419	521	658	821	1008	30
40	148	184	237	300	380	482	600	757	946	1160	40
50	165	206	265	334	423	537	668	844	1054	1293	50
60	181	225	289	365	463	587	730	922	1152	1413	60
70	195	242	312	393	499	633	787	994	1241	1522	70
80	207	258	332	420	532	675	840	1060	1324	1624	80
100	231	288	370	467	592	751	935	1180	1474	1808	100
120	252	314	404	510	646	820	1020	1288	1609	1973	120
150	281	350	451	569	721	915	1138	1437	1795	2202	150

NOTES:

BASED ON MULTI-STAGE HIGH EFFICIENCY ABSORPTION CHILLERS HAVING A STEAM CONSUMPTION RATE OF (12) TO (13) LB/HR AT MAXIMUM DEMAND CONDITIONS.

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

EXAMPLE 2

MULTI-STAGE HIGH EFFICIENCY CHILLER	
INLET STEAM PRESSURE	50 PSIG
COOLING CAPACITY (from spec.)	300 TONS
SIZE OF EXISTING TRAPS (2)	1-1/2 INCH

SELECTION

(1) Use ABSORPTION CHILLER selection table. (lower left)
(2) Find model that corresponds to:
50 PSI & 300 TONS
Use MODEL -21 capacity = 337 TONS.
(3) Pipe size: 1.0 inch STEAMGARD for traps 1.0" or larger.
(4) Specify: 1.0" SGL-B-21 w/ strainer.

‡ Replace (1) existing trap and use remaining trap for standby only, valved closed for normal operation.

STEAM DISTRIBUTION LINES

- INSTALLATION INSTRUCTIONS

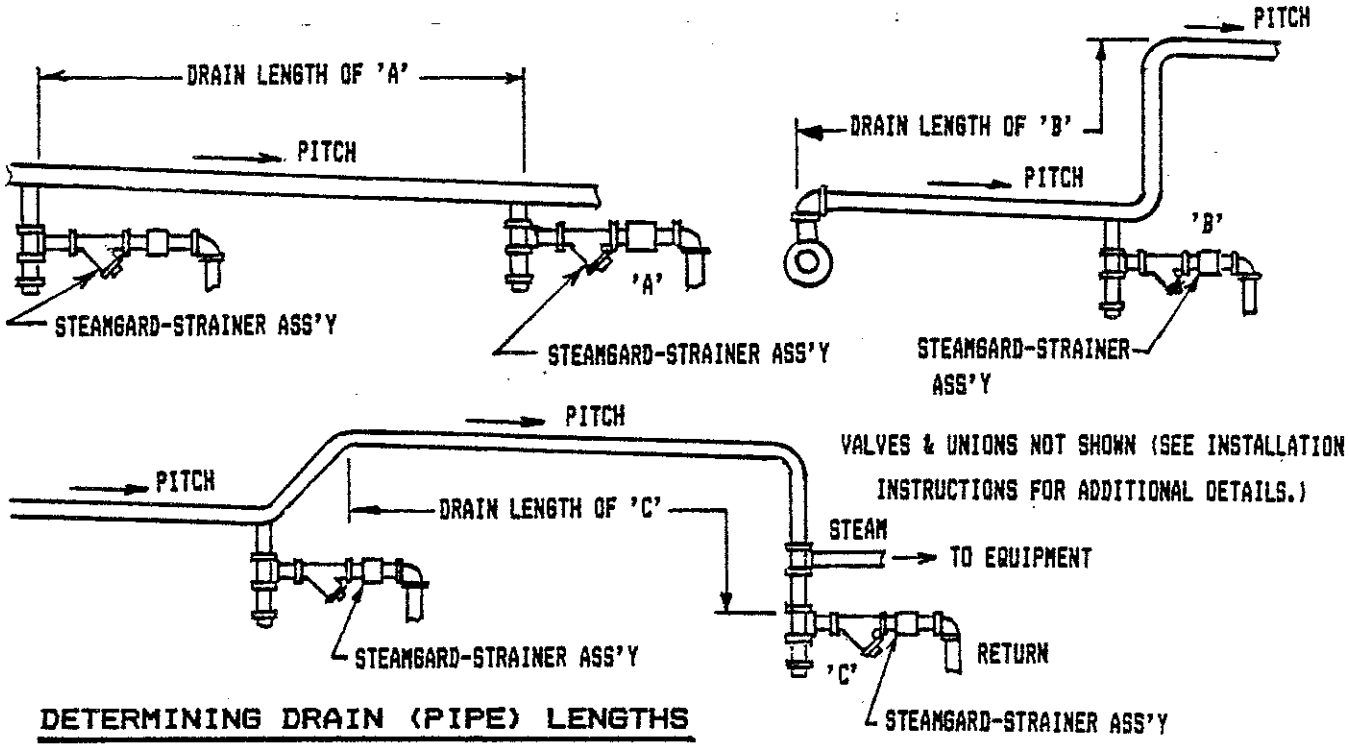
- MODEL SELECTIONS

STEAM DISTRIBUTION LINES

STEAMGARD is an efficient replacement for conventional steam traps used in a wide variety of distribution line drain applications.

STEAMGARD, when properly applied, can eliminate:

- Potentially large steam losses of "blowing-through" traps
- Excessive trap maintenance and repair.



DETERMINING DRAIN (PIPE) LENGTHS

NOTES: For low pressure applications, pay particular attention to condensate return lift when determining the actual pressure differential across the STEAMGARD.

UNINSULATED PIPES (INDOOR) & BARE PIPE RADIATORS

EXAMPLE 1

STEAM LINE PRESSURE	10 PSIG
BACK PRESSURE	NONE
DRAIN (PIPE) LENGTH	100 FEET
PIPE SIZE (IPS)	2 INCH
UNINSULATED (BARE) & "INDOOR" PIPE SIZE OF EXISTING TRAP	3/4 INCH

SELECTION

(1) Use UNINSULATED (BARE) PIPES selection table.
(2) Find a MODEL that corresponds to:

10 PSIG & 100 feet of 2" PIPE.

(3) Specify: 3/4" SG -B-05 w/ strainer
Capacity 110 FEET of 2" PIPE.

EXAMPLE 2. BARE PIPE RADIATOR APPLICATION

STEAM LINE PRESSURE	8 PSIG
BACK PRESSURE	NONE
RADIATOR: (5) 1-1/2" IPS X 40 FT EACH TOTAL LENGTH = 5 X 40 FT =	200 FEET
PIPE SIZE OF EXISTING TRAP	1/2 INCH

SELECTION

(1) Use UNINSULATED (BARE) PIPES selection table.
(2) Find a MODEL that corresponds to:

8 PSIG & 200 feet of 1-1/2" PIPE.

(3) Specify: 1/2" SG -B-07 w/ strainer
Capacity 240 FEET of 1-1/2 PIPE.

UNINSULATED (BARE) PIPES INDOOR IN LINEAR FEET

PRESSURE DIFFERENTIAL (P) = 2 PSI

PIPES	MODEL NUMBERS -05	-06	-07	-08	-09	-10	-11	-12
3/4"	100	150	210	290	430	---	---	---
1.0"	80	120	170	240	350	---	---	---
1-1/4"	60	100	140	190	280	390	---	---
1-1/2"	60	90	120	170	250	350	---	---
2.0"	50	70	100	140	200	280	380	---
2-1/2"	40	60	80	120	170	240	320	430
3.0"	30	50	70	100	140	200	270	360

PRESSURE DIFFERENTIAL (P) = 4 PSI

PIPES	MODEL NUMBERS -04	-05	-06	-07	-08	-09	-10	-11
3/4"	90	150	230	310	420	---	---	---
1.0"	70	120	180	250	340	---	---	---
1-1/4"	60	100	150	200	270	400	---	---
1-1/2"	50	80	130	180	240	350	---	---
2.0"	40	70	110	150	200	290	390	---
2-1/2"	30	60	90	120	170	240	330	440
3.0"	30	50	70	100	140	200	280	370

PRESSURE DIFFERENTIAL (P) = 6 PSI

PIPES	MODEL NUMBERS -04	-05	-06	-07	-08	-09	-10	-11
3/4"	110	180	270	370	---	---	---	---
1.0"	90	150	220	300	400	---	---	---
1-1/4"	70	120	180	240	330	---	---	---
1-1/2"	60	100	160	210	290	420	---	---
2.0"	50	80	130	180	230	340	---	---
2-1/2"	40	70	110	150	200	290	390	---
3.0"	40	60	90	120	160	240	330	440

PRESSURE DIFFERENTIAL (P) = 8 PSI

PIPES	MODEL NUMBERS -04	-05	-06	-07	-08	-09	-10	-11
3/4"	130	200	310	420	---	---	---	---
1.0"	100	170	250	340	450	---	---	---
1-1/4"	80	130	200	270	370	---	---	---
1-1/2"	70	120	180	240	320	---	---	---
2.0"	60	100	150	200	260	380	---	---
2-1/2"	50	80	120	170	220	320	430	---
3.0"	40	70	100	140	180	270	360	---

PRESSURE DIFFERENTIAL (P) = 10 PSI

PIPES	MODEL NUMBERS -04	-05	-06	-07	-08	-09	-10	-11
3/4"	150	230	350	---	---	---	---	---
1.0"	120	190	280	380	---	---	---	---
1-1/4"	100	150	230	300	410	---	---	---
1-1/2"	80	130	200	270	360	---	---	---
2.0"	70	110	160	220	290	420	---	---
2-1/2"	60	90	140	180	240	350	---	---
3.0"	50	80	110	150	200	290	400	---

PRESSURE DIFFERENTIAL (P) = 15 PSI

PIPES	MODEL NUMBERS -03	-04	-05	-06	-07	-08	-09	-10
3/4"	100	180	280	420	---	---	---	---
1.0"	80	150	230	340	450	---	---	---
1-1/4"	70	120	180	280	370	---	---	---
1-1/2"	60	100	160	240	320	430	---	---
2.0"	50	80	130	200	260	350	---	---
2-1/2"	40	70	110	170	220	290	420	---
3.0"	30	60	90	140	180	250	350	---

PRESSURE DIFFERENTIAL (P) = 20 PSI

PIPES	MODEL NUMBERS -03	-04	-05	-06	-07	-08	-09	-10
3/4"	100	180	280	410	---	---	---	---
1.0"	90	150	230	340	450	---	---	---
1-1/4"	70	120	180	270	360	---	---	---
1-1/2"	60	100	160	240	320	420	---	---
2.0"	50	80	130	200	260	340	---	---
2-1/2"	40	70	110	160	220	290	410	---
3.0"	30	60	90	140	180	240	350	---

PRESSURE DIFFERENTIAL (P) = 30 PSI

PIPES	MODEL NUMBERS -02	-03	-04	-05	-06	-07	-08	-09
3/4"	60	120	200	300	450	---	---	---
1.0"	50	90	160	250	370	---	---	---
1-1/4"	40	80	130	200	300	390	---	---
1-1/2"	30	70	110	180	260	350	---	---
2.0"	30	50	90	140	210	280	370	---
2-1/2"	20	50	80	120	180	240	310	450
3.0"	20	40	60	100	150	200	260	370

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

INSULATED PIPES — INDOOR & OUTDOOR

FOR INSULATION MATERIALS OTHER THAN GLASS FIBER

MULTIPLY ACTUAL DRAIN (PIPE) LENGTH BY 1.5
BEFORE LOOKING UP THE SELECTION TABLES

NOTES: Consult ERI for sizing assistance when automatic start-up is frequent.

For low pressure applications, pay particular attention to condensate return lift when determining steam pressure.

INSULATED PIPES INDOOR IN LINEAR FEET

SATURATED STEAM & 1.0 INCH GLASS FIBER INSULATION ONLY

PRESSURE DIFFERENTIAL (P) = 2 PSI

PIPES	MODEL NUMBERS -05	-06	-07	-08	-09	-10	-11	-12
1"	330	---	---	---	---	---	---	---
2"	220	340	480	---	---	---	---	---
3"	160	250	360	490	---	---	---	---
4"	130	210	290	400	590	820	---	---
5"	110	170	240	340	500	690	930	---
6"	90	150	210	290	430	590	800	1060
8"	70	120	170	230	340	470	630	840
10"	60	100	140	190	280	380	520	690
12"	50	80	120	160	230	330	440	590
14"	50	80	110	150	220	300	400	540
16"	40	70	90	130	190	260	360	470

PRESSURE DIFFERENTIAL (P) = 4 PSI

PIPES	MODEL NUMBERS -05	-06	-07	-08	-09	-10	-11	-12
1"	500	---	---	---	---	---	---	---
2"	330	---	---	---	---	---	---	---
3"	250	380	520	---	---	---	---	---
4"	200	310	430	580	840	---	---	---
5"	170	260	360	480	710	970	---	---
6"	140	220	310	410	610	830	1120	1480
8"	110	180	240	330	480	660	890	1170
10"	90	140	200	270	390	540	720	960
12"	80	120	170	230	330	460	620	820
14"	70	110	150	210	310	420	570	750
16"	60	100	140	190	270	370	500	660

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

EXAMPLE 1. 1.0" FIBER GLASS INSULATION (INDOOR)

STEAM LINE PRESSURE	4 PSIG
BACK PRESSURE	NONE
DRAIN (PIPE) LENGTH	150 FEET
PIPE SIZE (IPS)	8 INCH
PIPE SIZE OF EXISTING TRAP	3/4 INCH

SELECTION

(1) Use INSULATED PIPES 1.0" GLASS FIBER INDOOR selection tables.

(2) Find a MODEL that corresponds to:

4 PSIG & 150 feet of 8" PIPE.

(3) Specify: 3/4" SG -B-06 w/ strainer
Capacity 180 FEET of 8" PIPE.

PRESSURE DIFFERENTIAL (P) = 6 PSI

PIPES	MODEL NUMBERS -05	-06	-07	-08	-09	-10	-11	-12
1"	630	---	---	---	---	---	---	---
2"	410	---	---	---	---	---	---	---
3"	310	470	640	---	---	---	---	---
4"	250	380	520	700	---	---	---	---
5"	210	320	430	580	850	1160	---	---
6"	180	270	370	500	730	990	1330	---
8"	140	220	290	400	570	790	1050	1390
10"	120	180	240	320	470	640	860	1130
12"	100	150	210	280	400	550	740	970
14"	90	140	190	250	370	500	670	890
16"	80	120	170	220	320	440	600	780

PRESSURE DIFFERENTIAL (P) = 8 PSI

PIPES	MODEL NUMBERS -05	-06	-07	-08	-09	-10	-11	-12
1"	720	---	---	---	---	---	---	---
2"	480	---	---	---	---	---	---	---
3"	350	540	---	---	---	---	---	---
4"	290	440	590	790	---	---	---	---
5"	240	360	490	660	950	---	---	---
6"	210	310	420	570	820	1120	1500	---
8"	160	250	330	450	650	880	1180	1560
10"	130	200	270	370	530	720	970	1270
12"	110	170	230	310	450	620	830	1090
14"	100	160	210	290	410	570	760	1000
16"	90	140	190	250	370	500	670	880

EXAMPLE 2. 1.0" MAGNESIA INSULATION (INDOOR)

STEAM LINE PRESSURE	8 PSIG
BACK PRESSURE	NONE
DRAIN (PIPE) LENGTH	170 FEET

** EQUIVALENT DRAIN LENGTH = 170 X 1.5 = 255 FEET

PIPE SIZE (IPS)	6 INCH
PIPE SIZE OF EXISTING TRAP	3/4 INCH

SELECTION

(1) Use INSULATED PIPES 1.0" GLASS FIBER INDOOR selection tables.

(2) Find a MODEL that corresponds to:

8 PSIG & 255 feet of 6" PIPE.

(3) Specify: 3/4" SG -B-06 w/ strainer
Capacity 310 FEET of 6" PIPE.

INSULATED PIPES INDOOR IN LINEAR FEET

SATURATED STEAM & 1.0 INCH GLASS FIBER INSULATION ONLY

PRESSURE DIFFERENTIAL (P) = 10 PSI

	MODEL NUMBERS							
PIPES	-05	-06	-07	-08	-09	-10	-11	-12
1"	820	---	---	---	---	---	---	---
2"	540	---	---	---	---	---	---	---
3"	400	600	---	---	---	---	---	---
4"	330	490	660	880	---	---	---	---
5"	270	410	550	730	1060	---	---	---
6"	230	350	470	630	910	1240	---	---
8"	180	280	370	500	720	980	1310	1720
10"	150	230	310	410	590	800	1070	1410
12"	130	190	260	350	500	680	920	1200
14"	120	180	240	320	460	630	840	1100
16"	100	160	210	280	410	550	740	970

PRESSURE DIFFERENTIAL (P) = 15 PSI

	MODEL NUMBERS							
PIPES	-04	-05	-06	-07	-08	-09	-10	-11
1"	630	---	---	---	---	---	---	---
2"	420	---	---	---	---	---	---	---
3"	310	490	---	---	---	---	---	---
4"	250	400	600	800	---	---	---	---
5"	210	330	500	670	890	---	---	---
6"	180	290	430	570	760	1100	1490	---
8"	140	230	340	450	600	870	1180	1570
10"	120	180	280	370	490	710	970	1290
12"	100	160	240	320	420	610	820	1100
14"	90	140	220	290	390	560	760	1010
16"	80	130	190	260	340	490	670	890

PRESSURE DIFFERENTIAL (P) = 20 PSI

	MODEL NUMBERS							
PIPES	-04	-05	-06	-07	-08	-09	-10	-11
1"	650	---	---	---	---	---	---	---
2"	430	---	---	---	---	---	---	---
3"	320	500	---	---	---	---	---	---
4"	260	410	610	810	---	---	---	---
5"	220	340	510	680	900	---	---	---
6"	190	290	440	580	770	1110	1510	---
8"	150	230	350	460	610	880	1200	1600
10"	120	190	280	380	500	720	980	1310
12"	100	160	240	320	430	610	840	1110
14"	90	150	220	300	390	560	770	1020
16"	80	130	200	260	350	500	680	900

PRESSURE DIFFERENTIAL (P) = 30 PSI

	MODEL NUMBERS							
PIPES	-03	-04	-05	-06	-07	-08	-09	-10
1"	430	---	---	---	---	---	---	---
2"	290	490	---	---	---	---	---	---
3"	210	360	560	---	---	---	---	---
4"	170	290	460	680	---	---	---	---
5"	140	250	380	570	760	1000	---	---
6"	120	210	330	490	650	860	1240	---
8"	100	170	260	390	510	680	980	1330
10"	80	140	210	320	420	560	800	1090
12"	70	120	180	270	360	480	680	930
14"	60	110	170	250	330	440	630	850
16"	60	90	150	220	290	380	550	750

PRESSURE DIFFERENTIAL (P) = 40 PSI

	MODEL NUMBERS							
PIPES	-03	-04	-05	-06	-07	-08	-09	-10
1"	470	---	---	---	---	---	---	---
2"	310	---	---	---	---	---	---	---
3"	230	390	610	---	---	---	---	---
4"	190	320	490	730	---	---	---	---
5"	160	260	410	610	810	1070	---	---
6"	130	230	350	520	700	920	1320	---
8"	110	180	280	410	550	730	1040	1420
10"	90	150	230	340	450	600	850	1160
12"	70	130	200	290	380	510	730	990
14"	70	120	180	260	350	470	670	910
16"	60	100	160	230	310	410	590	800

PRESSURE DIFFERENTIAL (P) = 50 PSI

	MODEL NUMBERS							
PIPES	-02	-03	-04	-05	-06	-07	-08	-09
1"	250	---	---	---	---	---	---	---
2"	160	330	---	---	---	---	---	---
3"	120	250	410	640	---	---	---	---
4"	100	200	340	520	770	---	---	---
5"	80	170	280	430	640	850	1120	---
6"	70	140	240	370	550	730	960	1380
8"	60	110	190	290	430	580	760	1090
10"	50	90	160	240	360	470	620	890
12"	40	80	130	210	300	400	530	760
14"	40	70	120	190	280	370	490	700
16"	30	60	110	170	250	330	430	620

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

INSULATED PIPES INDOOR IN LINEAR FEET

SATURATED STEAM & 1.0 INCH GLASS FIBER INSULATION ONLY

PRESSURE DIFFERENTIAL (P) = 60 PSI

PIPES	MODEL NUMBERS -02	-03	-04	-05	-06	-07	-08	-09
1"	260	---	---	---	---	---	---	---
2"	170	350	---	---	---	---	---	---
3"	130	260	430	670	---	---	---	---
4"	100	210	350	540	800	---	---	---
5"	90	180	290	450	670	890	1170	---
6"	80	150	250	390	570	760	1000	1440
8"	60	120	200	310	450	600	790	1140
10"	50	100	160	250	370	490	650	930
12"	40	80	140	220	320	420	550	790
14"	40	80	130	200	290	380	510	730
16"	30	70	110	170	260	340	450	640

PRESSURE DIFFERENTIAL (P) = 80 PSI

PIPES	MODEL NUMBERS -02	-03	-04	-05	-06	-07	-08	-09
1"	280	---	---	---	---	---	---	---
2"	190	370	---	---	---	---	---	---
3"	140	280	460	700	---	---	---	---
4"	110	220	370	570	840	---	---	---
5"	90	190	310	480	700	930	---	---
6"	80	160	270	410	600	800	1050	1500
8"	60	130	210	320	480	630	830	1190
10"	50	100	170	270	390	520	680	970
12"	40	90	150	230	330	440	580	830
14"	40	80	140	210	310	400	530	760
16"	40	70	120	180	270	360	470	670

PRESSURE DIFFERENTIAL (P) = 100 PSI

PIPES	MODEL NUMBERS -01	-02	-03	-04	-05	-06	-07	-08
1"	190	300	---	---	---	---	---	---
2"	130	200	390	---	---	---	---	---
3"	90	150	290	480	---	---	---	---
4"	80	120	240	390	600	880	---	---
5"	60	100	200	330	500	730	970	---
6"	50	90	170	280	430	630	830	1090
8"	40	70	130	220	340	500	660	860
10"	40	60	110	180	280	410	540	710
12"	30	50	90	150	240	350	460	600
14"	30	40	90	140	220	320	420	550
16"	20	40	80	120	190	280	370	490

PRESSURE DIFFERENTIAL (P) = 125 PSI

PIPES	MODEL NUMBERS -01	-02	-03	-04	-05	-06	-07	-08
1"	200	310	---	---	---	---	---	---
2"	130	210	410	---	---	---	---	---
3"	100	150	300	490	---	---	---	---
4"	80	120	240	400	610	900	---	---
5"	70	100	200	340	510	750	990	---
6"	60	90	180	290	440	650	850	1120
8"	40	70	140	230	350	510	670	890
10"	40	60	110	190	280	420	550	730
12"	30	50	100	160	240	360	470	620
14"	30	50	90	150	220	330	430	570
16"	20	40	80	130	200	290	380	500

PRESSURE DIFFERENTIAL (P) = 150 PSI

PIPES	MODEL NUMBERS -01	-02	-03	-04	-05	-06	-07	-08
1"	200	330	---	---	---	---	---	---
2"	130	220	420	---	---	---	---	---
3"	100	160	310	510	---	---	---	---
4"	80	130	250	410	630	---	---	---
5"	70	110	210	350	530	770	1020	---
6"	60	90	180	300	450	660	870	1150
8"	50	70	140	240	360	520	690	910
10"	40	60	120	190	290	430	570	740
12"	30	50	100	160	250	370	490	640
14"	30	50	90	150	230	340	440	580
16"	30	40	80	130	200	300	390	510

PRESSURE DIFFERENTIAL (P) = 200 PSI

PIPES	MODEL NUMBERS -01	-02	-03	-04	-05	-06	-07	-08
1"	210	340	---	---	---	---	---	---
2"	140	220	430	---	---	---	---	---
3"	100	170	320	530	---	---	---	---
4"	80	130	260	430	650	---	---	---
5"	70	110	220	360	540	790	1050	---
6"	60	100	190	310	470	680	900	1180
8"	50	80	150	240	370	540	710	930
10"	40	60	120	200	300	440	580	760
12"	30	50	100	170	260	380	500	650
14"	30	50	100	160	240	340	450	600
16"	30	40	80	140	210	300	400	530

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

INSULATED PIPES INDOOR IN LINEAR FEET

SATURATED STEAM & 1.0 INCH GLASS FIBER INSULATION ONLY

PRESSURE DIFFERENTIAL (P) = 250 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	210	350	---	---	---	---	---	---
2"	140	230	450	---	---	---	---	---
3"	100	170	330	540	---	---	---	---
4"	80	140	270	440	660	---	---	---
5"	70	120	220	370	550	810	1070	---
6"	60	100	190	310	480	700	920	1200
8"	50	80	150	250	380	550	720	950
10"	40	60	120	200	310	450	590	780
12"	30	60	110	170	260	380	510	660
14"	30	50	100	160	240	350	460	610
16"	30	40	90	140	210	310	410	540

PRESSURE DIFFERENTIAL (P) = 300 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	210	360	---	---	---	---	---	---
2"	140	240	450	---	---	---	---	---
3"	100	180	340	550	---	---	---	---
4"	80	140	270	440	670	---	---	---
5"	70	120	230	370	560	820	1080	---
6"	60	100	200	320	480	700	930	1210
8"	50	80	160	250	380	560	730	960
10"	40	70	130	210	310	450	600	790
12"	30	60	110	180	270	390	510	670
14"	30	50	100	160	240	360	470	610
16"	30	50	90	140	220	310	410	540

PRESSURE DIFFERENTIAL (P) = 400 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	210	370	---	---	---	---	---	---
2"	140	240	470	---	---	---	---	---
3"	100	180	340	560	---	---	---	---
4"	80	150	280	450	680	---	---	---
5"	70	120	230	380	570	830	1090	---
6"	60	110	200	320	490	710	940	1230
8"	50	80	160	260	390	570	740	980
10"	40	70	130	210	320	460	610	800
12"	30	60	110	180	270	390	520	680
14"	30	50	100	160	250	360	480	620
16"	30	50	90	150	220	320	420	550

PRESSURE DIFFERENTIAL (P) = 500 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	210	370	---	---	---	---	---	---
2"	140	250	470	---	---	---	---	---
3"	100	180	350	560	---	---	---	---
4"	80	150	280	450	680	---	---	---
5"	70	120	230	380	570	830	1090	---
6"	60	110	200	320	490	710	940	1230
8"	50	80	160	260	390	560	740	970
10"	40	70	130	210	320	460	610	790
12"	30	60	110	180	270	390	520	680
14"	30	50	100	160	250	360	470	620
16"	30	50	90	150	220	320	420	550

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

INSULATED PIPES INDOOR IN LINEAR FEET

SATURATED STEAM & 2.0 INCH GLASS FIBER INSULATION ONLY

PRESSURE DIFFERENTIAL (P) = 2 PSI

PIPES	MODEL NUMBERS -05	-06	-07	-08	-09	-10	-11	-12
1"	490	---	---	---	---	---	---	---
2"	350	---	---	---	---	---	---	---
3"	270	430	600	---	---	---	---	---
4"	220	360	500	690	---	---	---	---
5"	190	310	430	590	870	---	---	---
6"	170	270	370	520	760	1060	1430	---
8"	130	210	300	420	610	850	1160	1530
10"	110	180	250	350	510	710	960	1270
12"	100	150	220	300	440	610	830	1100
14"	90	140	200	270	410	560	760	1010
16"	80	130	180	240	360	500	680	900

PRESSURE DIFFERENTIAL (P) = 4 PSI

PIPES	MODEL NUMBERS -05	-06	-07	-08	-09	-10	-11	-12
1"	760	---	---	---	---	---	---	---
2"	540	---	---	---	---	---	---	---
3"	410	640	---	---	---	---	---	---
4"	340	540	740	---	---	---	---	---
5"	290	460	630	850	---	---	---	---
6"	260	400	550	740	1080	1490	---	---
8"	210	320	440	600	870	1200	1620	---
10"	170	270	370	500	730	1000	1340	1770
12"	150	230	320	430	630	860	1160	1530
14"	140	210	290	390	580	790	1070	1410
16"	120	190	260	350	510	700	950	1250

PRESSURE DIFFERENTIAL (P) = 6 PSI

PIPES	MODEL NUMBERS -05	-06	-07	-08	-09	-10	-11	-12
1"	940	---	---	---	---	---	---	---
2"	670	---	---	---	---	---	---	---
3"	520	---	---	---	---	---	---	---
4"	430	660	900	---	---	---	---	---
5"	370	560	760	1030	---	---	---	---
6"	320	490	670	900	1300	---	---	---
8"	260	390	540	720	1050	1440	---	---
10"	210	330	450	600	870	1190	1600	---
12"	180	280	380	520	750	1030	1380	1810
14"	170	260	350	480	690	950	1270	1670
16"	150	230	310	420	610	840	1130	1480

PRESSURE DIFFERENTIAL (P) = 8 PSI

PIPES	MODEL NUMBERS -05	-06	-07	-08	-09	-10	-11	-12
1"	1090	---	---	---	---	---	---	---
2"	770	---	---	---	---	---	---	---
3"	600	---	---	---	---	---	---	---
4"	500	760	---	---	---	---	---	---
5"	420	640	870	1160	---	---	---	---
6"	370	560	760	1010	1470	---	---	---
8"	300	450	610	820	1180	1620	---	---
10"	250	380	510	680	980	1340	1800	---
12"	210	320	440	590	850	1160	1550	---
14"	200	300	400	540	780	1070	1430	1870
16"	170	270	360	480	690	950	1270	1660

PRESSURE DIFFERENTIAL (P) = 10 PSI

PIPES	MODEL NUMBERS -05	-06	-07	-08	-09	-10	-11	-12
1"	1240	---	---	---	---	---	---	---
2"	870	---	---	---	---	---	---	---
3"	670	---	---	---	---	---	---	---
4"	560	850	---	---	---	---	---	---
5"	480	720	970	---	---	---	---	---
6"	420	630	850	1130	---	---	---	---
8"	340	510	680	910	1310	1790	---	---
10"	280	420	570	760	1090	1490	1990	---
12"	240	360	490	650	940	1280	1710	---
14"	220	340	450	600	870	1180	1580	---
16"	200	300	400	530	770	1050	1400	1840

PRESSURE DIFFERENTIAL (P) = 15 PSI

PIPES	MODEL NUMBERS -04	-05	-06	-07	-08	-09	-10	-11
1"	960	---	---	---	---	---	---	---
2"	680	---	---	---	---	---	---	---
3"	520	---	---	---	---	---	---	---
4"	440	690	---	---	---	---	---	---
5"	370	590	880	1180	---	---	---	---
6"	320	510	770	1030	1360	---	---	---
8"	260	410	620	830	1100	1580	---	---
10"	220	340	510	690	910	1310	1790	---
12"	190	300	440	590	790	1130	1540	---
14"	170	270	410	550	730	1040	1420	1900
16"	150	240	360	480	640	930	1260	1690

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

INSULATED PIPES INDOOR IN LINEAR FEET

SATURATED STEAM & 2.0 INCH GLASS FIBER INSULATION ONLY

PRESSURE DIFFERENTIAL (P) = 20 PSI

PIPES	MODEL NUMBERS -04	-05	-06	-07	-08	-09	-10	-11
1"	990	---	---	---	---	---	---	---
2"	700	---	---	---	---	---	---	---
3"	540	---	---	---	---	---	---	---
4"	450	710	---	---	---	---	---	---
5"	380	600	900	1200	---	---	---	---
6"	330	520	780	1050	1390	---	---	---
8"	270	420	630	840	1120	1610	---	---
10"	220	350	520	700	930	1330	1810	---
12"	190	300	450	600	800	1150	1570	---
14"	180	280	420	560	740	1060	1440	1920
16"	160	250	370	490	650	940	1280	1710

PRESSURE DIFFERENTIAL (P) = 30 PSI

PIPES	MODEL NUMBERS -03	-04	-05	-06	-07	-08	-09	-10
1"	650	---	---	---	---	---	---	---
2"	460	---	---	---	---	---	---	---
3"	360	610	---	---	---	---	---	---
4"	300	510	790	---	---	---	---	---
5"	250	430	680	1000	---	---	---	---
6"	220	380	590	870	1170	1540	---	---
8"	180	300	470	710	940	1250	1790	---
10"	150	250	390	590	780	1030	1480	---
12"	130	220	340	510	670	890	1280	1740
14"	120	200	310	470	620	820	1180	1600
16"	100	180	280	410	550	730	1050	1420

PRESSURE DIFFERENTIAL (P) = 40 PSI

PIPES	MODEL NUMBERS -03	-04	-05	-06	-07	-08	-09	-10
1"	710	---	---	---	---	---	---	---
2"	500	---	---	---	---	---	---	---
3"	390	660	---	---	---	---	---	---
4"	320	550	850	---	---	---	---	---
5"	280	470	730	1080	---	---	---	---
6"	240	410	630	940	1250	---	---	---
8"	190	330	510	760	1000	1330	---	---
10"	160	270	420	630	830	1100	1580	---
12"	140	240	370	540	720	950	1360	1850
14"	130	220	340	500	660	880	1260	1710
16"	110	190	300	440	590	780	1120	1520

PRESSURE DIFFERENTIAL (P) = 50 PSI

PIPES	MODEL NUMBERS -02	-03	-04	-05	-06	-07	-08	-09
1"	370	---	---	---	---	---	---	---
2"	260	---	---	---	---	---	---	---
3"	200	410	700	---	---	---	---	---
4"	170	350	580	900	---	---	---	---
5"	140	290	490	760	1130	---	---	---
6"	130	260	430	670	980	1310	---	---
8"	100	210	350	540	790	1050	1390	---
10"	80	170	290	450	660	880	1160	1660
12"	70	150	250	390	570	760	1000	1430
14"	70	140	230	350	520	700	920	1320
16"	60	120	200	310	470	620	820	1170

PRESSURE DIFFERENTIAL (P) = 60 PSI

PIPES	MODEL NUMBERS -02	-03	-04	-05	-06	-07	-08	-09
1"	400	---	---	---	---	---	---	---
2"	280	---	---	---	---	---	---	---
3"	220	440	---	---	---	---	---	---
4"	180	360	610	---	---	---	---	---
5"	150	310	520	800	1180	---	---	---
6"	130	270	450	700	1030	1360	---	---
8"	110	220	360	560	830	1100	1450	---
10"	90	180	300	470	690	910	1200	1720
12"	80	160	260	400	590	790	1040	1490
14"	70	140	240	370	550	720	960	1370
16"	60	130	210	330	490	640	850	1220

PRESSURE DIFFERENTIAL (P) = 80 PSI

PIPES	MODEL NUMBERS -02	-03	-04	-05	-06	-07	-08	-09
1"	430	---	---	---	---	---	---	---
2"	300	---	---	---	---	---	---	---
3"	230	460	---	---	---	---	---	---
4"	190	390	640	---	---	---	---	---
5"	170	330	550	840	---	---	---	---
6"	140	290	480	730	1080	1430	---	---
8"	120	230	390	590	870	1150	1520	---
10"	100	190	320	490	720	960	1260	1800
12"	80	170	280	420	620	820	1090	1560
14"	80	150	250	390	570	760	1000	1430
16"	70	140	230	350	510	670	890	1270

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

INSULATED PIPES INDOOR IN LINEAR FEET

SATURATED STEAM & 2.0 INCH GLASS FIBER INSULATION ONLY

PRESSURE DIFFERENTIAL (P) = 100 PSI

PIPES	MODEL NUMBERS -01	-02	-03	-04	-05	-06	-07	-08
1"	290	---	---	---	---	---	---	---
2"	200	320	---	---	---	---	---	---
3"	160	250	490	---	---	---	---	---
4"	130	210	410	670	---	---	---	---
5"	110	180	350	570	880	---	---	---
6"	100	150	300	500	770	1120	1490	---
8"	80	120	240	400	620	910	1200	1580
10"	70	100	200	330	510	750	1000	1310
12"	60	90	170	290	440	650	860	1130
14"	50	80	160	270	410	600	790	1040
16"	50	70	140	240	360	530	700	920

PRESSURE DIFFERENTIAL (P) = 125 PSI

PIPES	MODEL NUMBERS -01	-02	-03	-04	-05	-06	-07	-08
1"	300	---	---	---	---	---	---	---
2"	210	330	---	---	---	---	---	---
3"	160	260	510	---	---	---	---	---
4"	130	210	420	700	---	---	---	---
5"	110	180	360	590	910	---	---	---
6"	100	160	310	520	790	1160	1530	---
8"	80	130	250	420	640	930	1230	1620
10"	70	110	210	350	530	770	1020	1350
12"	60	90	180	300	460	670	880	1160
14"	50	80	170	270	420	620	810	1070
16"	50	80	150	240	370	550	720	950

PRESSURE DIFFERENTIAL (P) = 150 PSI

PIPES	MODEL NUMBERS -01	-02	-03	-04	-05	-06	-07	-08
1"	300	---	---	---	---	---	---	---
2"	210	350	---	---	---	---	---	---
3"	170	270	520	---	---	---	---	---
4"	140	220	440	720	---	---	---	---
5"	120	190	370	610	930	---	---	---
6"	100	170	320	530	810	1190	1570	---
8"	80	130	260	430	650	960	1260	1660
10"	70	110	220	360	540	800	1050	1380
12"	60	100	190	310	470	690	900	1190
14"	50	90	170	280	430	630	850	1100
16"	50	80	150	250	380	560	740	970

PRESSURE DIFFERENTIAL (P) = 200 PSI

PIPES	MODEL NUMBERS -01	-02	-03	-04	-05	-06	-07	-08
1"	310	---	---	---	---	---	---	---
2"	220	360	---	---	---	---	---	---
3"	170	280	540	---	---	---	---	---
4"	140	230	450	740	---	---	---	---
5"	120	200	390	630	960	---	---	---
6"	100	170	340	550	830	1220	---	---
8"	80	140	270	440	670	980	1300	1700
10"	70	120	230	370	560	820	1080	1410
12"	60	100	190	320	480	700	930	1220
14"	60	90	180	290	440	650	860	1120
16"	50	80	160	260	390	580	760	1000

PRESSURE DIFFERENTIAL (P) = 250 PSI

PIPES	MODEL NUMBERS -01	-02	-03	-04	-05	-06	-07	-08
1"	320	---	---	---	---	---	---	---
2"	220	370	---	---	---	---	---	---
3"	170	290	560	---	---	---	---	---
4"	140	240	470	760	---	---	---	---
5"	120	210	400	650	980	---	---	---
6"	110	180	350	560	850	1240	---	---
8"	90	140	280	450	690	1000	1320	1740
10"	70	120	230	380	570	830	1100	1440
12"	60	100	200	320	490	720	950	1240
14"	60	100	180	300	450	660	870	1150
16"	50	80	160	270	400	590	770	1020

PRESSURE DIFFERENTIAL (P) = 300 PSI

PIPES	MODEL NUMBERS -01	-02	-03	-04	-05	-06	-07	-08
1"	320	---	---	---	---	---	---	---
2"	220	380	---	---	---	---	---	---
3"	170	300	570	---	---	---	---	---
4"	140	250	470	770	---	---	---	---
5"	120	210	400	650	990	---	---	---
6"	110	180	330	570	860	1260	---	---
8"	90	150	280	460	700	1020	1340	1750
10"	70	120	240	380	580	840	1110	1460
12"	60	110	200	330	500	730	960	1260
14"	60	100	190	300	460	670	880	1160
16"	50	90	170	270	410	590	780	1030

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

INSULATED PIPES INDOOR IN LINEAR FEET

SATURATED STEAM & 2.0 INCH GLASS FIBER INSULATION ONLY

PRESSURE DIFFERENTIAL (P) = 400 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	320	---	---	---	---	---	---	---
2"	230	390	---	---	---	---	---	---
3"	180	300	580	---	---	---	---	---
4"	150	250	480	780	---	---	---	---
5"	130	220	410	670	1010	---	---	---
6"	110	190	360	580	880	1280	---	---
8"	90	150	290	470	710	1030	1360	1780
10"	70	130	240	390	590	860	1130	1480
12"	60	110	210	340	510	740	970	1280
14"	60	100	190	310	470	680	900	1170
16"	50	90	170	270	420	600	800	1040

PRESSURE DIFFERENTIAL (P) = 500 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	320	---	---	---	---	---	---	---
2"	230	400	---	---	---	---	---	---
3"	170	310	580	---	---	---	---	---
4"	150	260	490	780	---	---	---	---
5"	120	220	410	670	1010	---	---	---
6"	110	190	360	580	880	1280	---	---
8"	90	150	290	470	710	1030	1350	1780
10"	70	130	240	390	590	860	1120	1470
12"	60	110	210	340	510	740	970	1270
14"	60	100	190	310	470	680	890	1170
16"	50	90	170	270	410	600	790	1040

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

INSULATED PIPES INDOOR IN LINEAR FEET

SATURATED STEAM & 3.0 INCH GLASS FIBER INSULATION ONLY

PRESSURE DIFFERENTIAL (P) = 40 PSI

	MODEL NUMBERS							
PIPES	-03	-04	-05	-06	-07	-08	-09	-10
1"	870	---	---	---	---	---	---	---
2"	640	---	---	---	---	---	---	---
3"	510	---	---	---	---	---	---	---
4"	430	730	---	---	---	---	---	---
5"	370	630	980	---	---	---	---	---
6"	330	560	860	1280	---	---	---	---
8"	270	460	710	1050	1390	---	---	---
10"	230	380	590	880	1170	1550	---	---
12"	200	330	520	760	1020	1350	1930	---
14"	180	310	480	710	940	1240	1780	---
16"	160	270	430	630	840	1110	1590	---

PRESSURE DIFFERENTIAL (P) = 50 PSI

	MODEL NUMBERS							
PIPES	-02	-03	-04	-05	-06	-07	-08	-09
1"	460	---	---	---	---	---	---	---
2"	340	---	---	---	---	---	---	---
3"	270	540	---	---	---	---	---	---
4"	230	460	770	---	---	---	---	---
5"	200	400	670	1030	---	---	---	---
6"	170	350	590	910	1340	---	---	---
8"	140	290	480	750	1100	1460	---	---
10"	120	240	400	630	920	1230	1620	---
12"	100	210	350	540	800	1070	1410	---
14"	100	190	330	500	740	990	1300	1870
16"	90	170	290	450	660	880	1160	1670

PRESSURE DIFFERENTIAL (P) = 60 PSI

	MODEL NUMBERS							
PIPES	-02	-03	-04	-05	-06	-07	-08	-09
1"	490	---	---	---	---	---	---	---
2"	360	---	---	---	---	---	---	---
3"	280	570	---	---	---	---	---	---
4"	240	490	810	---	---	---	---	---
5"	210	420	700	1080	---	---	---	---
6"	180	370	620	950	1400	---	---	---
8"	150	300	510	780	1150	1520	---	---
10"	130	250	420	650	960	1280	1690	---
12"	110	220	370	570	840	1110	1470	---
14"	100	200	340	530	780	1030	1360	1940
16"	90	180	310	470	690	920	1210	1730

PRESSURE DIFFERENTIAL (P) = 80 PSI

	MODEL NUMBERS							
PIPES	-02	-03	-04	-05	-06	-07	-08	-09
1"	520	---	---	---	---	---	---	---
2"	380	---	---	---	---	---	---	---
3"	300	610	---	---	---	---	---	---
4"	260	520	860	---	---	---	---	---
5"	220	450	740	1140	---	---	---	---
6"	200	390	650	1000	1470	---	---	---
8"	160	320	530	820	1210	1600	---	---
10"	140	270	450	690	1010	1340	1770	---
12"	120	230	390	600	880	1170	1540	---
14"	110	220	360	550	810	1080	1420	---
16"	100	190	320	490	730	960	1270	1820

PRESSURE DIFFERENTIAL (P) = 100 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	360	---	---	---	---	---	---	---
2"	260	410	---	---	---	---	---	---
3"	210	320	640	---	---	---	---	---
4"	180	270	540	900	---	---	---	---
5"	150	240	470	770	1190	---	---	---
6"	130	210	410	680	1050	1530	---	---
8"	110	170	340	560	860	1260	1660	---
10"	90	140	280	470	720	1060	1400	1840
12"	80	120	250	410	630	920	1210	1600
14"	70	120	230	380	580	850	1120	1480
16"	70	100	200	340	520	760	1000	1320

PRESSURE DIFFERENTIAL (P) = 125 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	360	---	---	---	---	---	---	---
2"	270	430	---	---	---	---	---	---
3"	210	340	660	---	---	---	---	---
4"	180	290	560	---	---	---	---	---
5"	160	250	490	800	---	---	---	---
6"	140	220	430	710	1080	1580	---	---
8"	110	180	350	580	880	1290	1710	---
10"	90	150	290	480	740	1090	1430	1890
12"	80	130	260	420	640	940	1250	1640
14"	80	120	240	390	600	870	1150	1520
16"	70	110	210	350	530	780	1030	1350

P = PRESSURE DIFFERENTIAL ACRDSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

INSULATED PIPES INDOOR IN LINEAR FEET

SATURATED STEAM & 3.0 INCH GLASS FIBER INSULATION ONLY

PRESSURE DIFFERENTIAL (P) = 150 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	370	---	---	---	---	---	---	---
2"	270	440	---	---	---	---	---	---
3"	220	350	690	---	---	---	---	---
4"	180	300	580	---	---	---	---	---
5"	160	260	500	830	---	---	---	---
6"	140	230	440	730	1110	---	---	---
8"	110	190	360	600	910	1330	1750	---
10"	100	160	310	500	760	1110	1470	1930
12"	80	140	270	430	660	970	1280	1680
14"	80	130	250	400	610	900	1180	1550
16"	70	110	220	360	550	800	1060	1390

PRESSURE DIFFERENTIAL (P) = 200 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	380	---	---	---	---	---	---	---
2"	280	460	---	---	---	---	---	---
3"	220	370	---	---	---	---	---	---
4"	190	310	600	---	---	---	---	---
5"	160	270	520	850	---	---	---	---
6"	140	240	460	750	1140	---	---	---
8"	120	190	380	610	930	1360	1800	---
10"	100	160	320	520	780	1140	1510	1980
12"	90	140	270	450	680	1000	1310	1720
14"	80	130	250	410	630	920	1210	1590
16"	70	120	230	370	560	820	1080	1420

PRESSURE DIFFERENTIAL (P) = 250 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	390	---	---	---	---	---	---	---
2"	280	480	---	---	---	---	---	---
3"	230	380	---	---	---	---	---	---
4"	190	320	620	---	---	---	---	---
5"	170	280	540	870	---	---	---	---
6"	150	240	470	770	1160	---	---	---
8"	120	200	390	630	950	1390	---	---
10"	100	170	320	530	800	1170	1540	---
12"	90	150	280	460	700	1020	1340	1760
14"	80	140	260	420	640	940	1240	1630
16"	70	120	230	380	580	840	1110	1450

PRESSURE DIFFERENTIAL (P) = 300 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	390	---	---	---	---	---	---	---
2"	290	490	---	---	---	---	---	---
3"	230	390	---	---	---	---	---	---
4"	190	330	630	---	---	---	---	---
5"	170	280	550	880	---	---	---	---
6"	150	250	480	780	1180	---	---	---
8"	120	200	390	640	970	1410	---	---
10"	100	170	330	540	810	1180	1560	---
12"	90	150	290	470	710	1030	1350	1780
14"	80	140	270	430	650	950	1250	1640
16"	70	120	240	380	580	850	1120	1470

PRESSURE DIFFERENTIAL (P) = 400 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	400	---	---	---	---	---	---	---
2"	290	500	---	---	---	---	---	---
3"	230	400	---	---	---	---	---	---
4"	200	340	650	---	---	---	---	---
5"	170	290	560	900	---	---	---	---
6"	150	260	490	790	1200	---	---	---
8"	120	210	400	650	980	1430	---	---
10"	100	180	340	550	830	1200	1580	---
12"	90	150	290	470	720	1050	1370	1800
14"	80	140	270	440	660	970	1270	1670
16"	70	130	240	390	590	860	1130	1490

PRESSURE DIFFERENTIAL (P) = 500 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	390	---	---	---	---	---	---	---
2"	290	---	---	---	---	---	---	---
3"	230	400	---	---	---	---	---	---
4"	190	340	650	---	---	---	---	---
5"	170	290	560	900	---	---	---	---
6"	150	260	490	790	1200	---	---	---
8"	120	210	400	650	980	1430	---	---
10"	100	180	340	550	820	1200	1580	---
12"	90	160	290	470	720	1040	1370	1800
14"	80	140	270	440	660	960	1270	1660
16"	70	130	240	390	590	860	1130	1480

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

INSULATED PIPES OUTDOOR IN LINEAR FEET

SATURATED STEAM & 1.0 INCH GLASS FIBER INSULATION ONLY

PRESSURE DIFFERENTIAL (P) = 2 PSI

	MODEL NUMBERS							
PIPES	-05	-06	-07	-08	-09	-10	-11	-12
1"	190	310	---	---	---	---	---	---
2"	130	210	290	400	---	---	---	---
3"	100	150	210	290	430	600	---	---
4"	80	120	170	240	350	490	670	880
5"	60	100	150	200	300	410	560	740
6"	60	90	120	170	250	350	480	630
8"	40	70	100	140	200	280	380	500
10"	40	60	80	110	160	230	310	410
12"	30	50	70	90	140	190	260	350
14"	30	40	60	90	130	180	240	320
16"	20	40	60	80	110	160	210	280

PRESSURE DIFFERENTIAL (P) = 4 PSI

	MODEL NUMBERS							
PIPES	-05	-06	-07	-08	-09	-10	-11	-12
1"	300	---	---	---	---	---	---	---
2"	200	310	430	---	---	---	---	---
3"	150	230	320	430	630	---	---	---
4"	120	190	260	350	510	700	---	---
5"	100	160	220	290	430	590	790	1040
6"	90	130	190	250	370	500	680	900
8"	70	110	150	200	290	400	540	710
10"	60	90	120	160	240	330	440	580
12"	50	70	100	140	200	280	370	490
14"	40	70	90	130	190	260	340	450
16"	40	60	80	110	160	230	300	400

PRESSURE DIFFERENTIAL (P) = 6 PSI

	MODEL NUMBERS							
PIPES	-05	-06	-07	-08	-09	-10	-11	-12
1"	380	---	---	---	---	---	---	---
2"	250	390	---	---	---	---	---	---
3"	190	290	390	530	---	---	---	---
4"	150	230	320	430	620	850	---	---
5"	130	200	270	360	520	710	950	---
6"	110	170	230	310	450	610	820	1080
8"	90	130	180	240	350	480	650	850
10"	70	110	150	200	290	390	530	700
12"	60	90	130	170	230	340	450	590
14"	60	80	120	160	230	310	410	550
16"	50	70	100	140	200	270	370	480

PRESSURE DIFFERENTIAL (P) = 8 PSI

	MODEL NUMBERS							
PIPES	-05	-06	-07	-08	-09	-10	-11	-12
1"	430	---	---	---	---	---	---	---
2"	300	450	---	---	---	---	---	---
3"	220	330	450	600	---	---	---	---
4"	180	270	370	490	710	---	---	---
5"	150	230	310	410	590	810	1080	---
6"	130	190	260	350	510	690	930	1220
8"	100	150	210	280	400	550	730	970
10"	80	130	170	230	330	450	600	790
12"	70	110	150	190	280	380	510	670
14"	60	100	130	180	260	350	470	620
16"	60	90	120	160	230	310	410	550

PRESSURE DIFFERENTIAL (P) = 10 PSI

	MODEL NUMBERS							
PIPES	-05	-06	-07	-08	-09	-10	-11	-12
1"	510	---	---	---	---	---	---	---
2"	340	---	---	---	---	---	---	---
3"	250	380	510	670	---	---	---	---
4"	200	310	410	550	790	---	---	---
5"	170	260	340	460	660	900	1200	---
6"	150	220	290	390	570	770	1030	1360
8"	120	170	230	310	450	610	820	1070
10"	90	140	190	250	370	500	670	880
12"	80	120	160	220	310	430	570	750
14"	70	110	150	200	290	390	520	690
16"	60	100	130	180	250	340	460	610

PRESSURE DIFFERENTIAL (P) = 15 PSI

	MODEL NUMBERS							
PIPES	-04	-05	-06	-07	-08	-09	-10	-11
1"	400	---	---	---	---	---	---	---
2"	260	410	---	---	---	---	---	---
3"	190	310	460	610	---	---	---	---
4"	160	250	370	500	680	---	---	---
5"	130	210	310	420	560	800	1090	---
6"	110	180	270	360	480	690	930	1250
8"	90	140	210	280	380	540	740	990
10"	70	120	170	230	310	440	600	810
12"	60	100	150	200	260	380	520	690
14"	60	90	140	180	240	350	470	630
16"	50	80	120	160	210	310	420	560

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

INSULATED PIPES OUTDOOR IN LINEAR FEET

SATURATED STEAM & 1.0 INCH GLASS FIBER INSULATION ONLY

PRESSURE DIFFERENTIAL (P) = 20 PSI

	MODEL NUMBERS							
PIPES	-04	-05	-06	-07	-08	-09	-10	-11
1"	420	---	---	---	---	---	---	---
2"	280	440	---	---	---	---	---	---
3"	210	330	490	650	---	---	---	---
4"	170	260	400	530	700	---	---	---
5"	140	220	330	440	590	840	1140	---
6"	120	190	280	380	500	720	980	1310
8"	100	150	220	300	400	570	780	1030
10"	80	120	180	240	320	470	630	850
12"	70	100	160	210	280	400	540	720
14"	60	100	140	190	250	370	500	660
16"	50	80	130	170	220	320	440	580

PRESSURE DIFFERENTIAL (P) = 30 PSI

	MODEL NUMBERS							
PIPES	-03	-04	-05	-06	-07	-08	-09	-10
1"	290	---	---	---	---	---	---	---
2"	190	320	---	---	---	---	---	---
3"	140	240	370	560	---	---	---	---
4"	110	200	300	450	600	800	---	---
5"	100	160	250	380	500	670	960	---
6"	80	140	220	320	430	570	820	1120
8"	60	110	170	260	340	450	650	880
10"	50	90	140	210	280	370	530	720
12"	50	80	120	180	240	320	450	620
14"	40	70	110	160	220	290	420	570
16"	40	60	100	140	190	260	370	500

PRESSURE DIFFERENTIAL (P) = 40 PSI

	MODEL NUMBERS							
PIPES	-03	-04	-05	-06	-07	-08	-09	-10
1"	320	---	---	---	---	---	---	---
2"	210	360	---	---	---	---	---	---
3"	160	260	410	610	---	---	---	---
4"	130	210	330	490	660	870	---	---
5"	110	180	280	410	550	720	1040	---
6"	90	150	240	350	470	620	890	1210
8"	70	120	190	280	370	490	710	960
10"	60	100	150	230	300	400	580	780
12"	50	80	130	200	260	340	490	670
14"	50	80	120	180	240	310	450	610
16"	40	70	110	160	210	280	400	540

PRESSURE DIFFERENTIAL (P) = 50 PSI

	MODEL NUMBERS							
PIPES	-02	-03	-04	-05	-06	-07	-08	-09
1"	170	340	---	---	---	---	---	---
2"	110	230	380	---	---	---	---	---
3"	80	170	280	440	650	---	---	---
4"	70	140	230	360	530	700	---	---
5"	60	110	190	300	440	580	770	1100
6"	50	100	160	260	380	500	660	950
8"	40	80	130	200	300	400	520	750
10"	30	60	110	170	240	320	430	610
12"	30	50	90	140	210	280	360	520
14"	20	50	80	130	190	250	330	480
16"	20	40	70	110	170	220	290	420

PRESSURE DIFFERENTIAL (P) = 60 PSI

	MODEL NUMBERS							
PIPES	-02	-03	-04	-05	-06	-07	-08	-09
1"	180	370	---	---	---	---	---	---
2"	120	240	410	---	---	---	---	---
3"	90	180	300	460	680	---	---	---
4"	70	150	240	380	550	730	---	---
5"	60	120	200	310	460	610	810	1160
6"	50	100	170	270	400	530	690	990
8"	40	80	140	210	310	420	550	790
10"	30	70	110	170	260	340	450	640
12"	30	60	100	150	220	290	380	550
14"	30	50	90	140	200	270	350	500
16"	20	50	80	120	180	240	310	440

PRESSURE DIFFERENTIAL (P) = 80 PSI

	MODEL NUMBERS							
PIPES	-02	-03	-04	-05	-06	-07	-08	-09
1"	200	400	---	---	---	---	---	---
2"	130	260	440	---	---	---	---	---
3"	100	190	320	490	---	---	---	---
4"	80	160	260	400	590	780	---	---
5"	70	130	220	340	490	650	860	---
6"	60	110	190	290	420	560	740	1060
8"	40	90	150	230	340	440	590	840
10"	40	70	120	190	270	360	480	690
12"	30	60	100	160	230	310	410	590
14"	30	60	100	150	210	280	370	540
16"	30	50	80	130	190	250	330	470

P = PRESSURE DIFFERENTIAL ACRDSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

INSULATED PIPES OUTDOOR IN LINEAR FEET

SATURATED STEAM & 1.0 INCH GLASS FIBER INSULATION ONLY

PRESSURE DIFFERENTIAL (P) = 100 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	140	210	---	---	---	---	---	---
2"	90	140	280	460	---	---	---	---
3"	70	100	210	340	520	---	---	---
4"	50	80	170	280	430	620	830	---
5"	50	70	140	230	360	520	690	910
6"	40	60	120	200	310	450	590	780
8"	30	50	100	160	240	350	470	620
10"	30	40	80	130	200	290	380	500
12"	20	30	70	110	170	250	330	430
14"	20	30	60	100	150	230	300	390
16"	20	30	50	90	140	200	260	350

PRESSURE DIFFERENTIAL (P) = 125 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	140	230	---	---	---	---	---	---
2"	90	150	290	480	---	---	---	---
3"	70	110	220	360	550	---	---	---
4"	60	90	180	290	440	650	860	---
5"	50	80	150	240	370	540	720	940
6"	40	60	130	210	320	470	620	810
8"	30	50	100	160	250	370	490	640
10"	30	40	80	130	210	300	400	520
12"	20	40	70	120	180	260	340	450
14"	20	30	60	110	160	240	310	410
16"	20	30	60	90	140	210	280	360

PRESSURE DIFFERENTIAL (P) = 150 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	150	240	---	---	---	---	---	---
2"	100	160	310	500	---	---	---	---
3"	70	120	230	370	570	---	---	---
4"	60	90	180	300	460	680	890	---
5"	50	80	150	250	390	560	740	980
6"	40	70	130	220	330	490	640	840
8"	30	50	100	170	260	380	510	660
10"	30	40	90	140	210	310	410	540
12"	20	40	70	120	180	270	350	460
14"	20	30	70	110	170	250	320	430
16"	20	30	60	100	150	220	290	380

PRESSURE DIFFERENTIAL (P) = 200 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	150	250	---	---	---	---	---	---
2"	100	170	320	---	---	---	---	---
3"	70	120	240	390	590	---	---	---
4"	60	100	190	320	480	700	---	---
5"	50	80	160	260	400	590	780	1020
6"	40	70	140	230	350	510	670	870
8"	30	60	110	180	270	400	530	690
10"	30	50	90	150	220	330	430	570
12"	20	40	80	130	190	280	370	480
14"	20	40	70	120	170	260	340	440
16"	20	30	60	100	150	230	300	390

PRESSURE DIFFERENTIAL (P) = 250 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	160	260	---	---	---	---	---	---
2"	100	170	340	---	---	---	---	---
3"	80	130	250	400	610	---	---	---
4"	60	100	200	330	500	730	---	---
5"	50	90	170	270	420	610	800	1050
6"	40	80	140	240	360	520	690	900
8"	40	60	110	190	280	410	540	710
10"	30	50	90	150	230	340	440	580
12"	20	40	80	130	200	290	380	500
14"	20	40	70	120	180	260	350	460
16"	20	30	60	110	160	230	310	400

PRESSURE DIFFERENTIAL (P) = 300 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	160	270	---	---	---	---	---	---
2"	110	180	340	---	---	---	---	---
3"	80	130	250	410	630	---	---	---
4"	60	110	210	340	510	740	---	---
5"	50	90	170	280	430	620	820	1070
6"	50	80	150	240	370	530	700	920
8"	40	60	120	190	290	420	550	730
10"	30	50	100	160	240	340	450	590
12"	30	40	80	130	200	290	390	510
14"	20	40	80	120	180	270	350	470
16"	20	30	70	110	160	240	310	410

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

INSULATED PIPES OUTDOOR IN LINEAR FEET

SATURATED STEAM & 1.0 INCH GLASS FIBER INSULATION ONLY

PRESSURE DIFFERENTIAL (P) = 400 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	160	280	---	---	---	---	---	---
2"	110	190	360	---	---	---	---	---
3"	80	140	260	430	640	---	---	---
4"	70	110	210	350	520	760	---	---
5"	50	90	180	290	440	640	840	1100
6"	50	80	150	250	380	550	720	950
8"	40	60	120	200	300	430	570	750
10"	30	50	100	160	240	350	470	610
12"	30	40	90	140	210	300	400	520
14"	20	40	80	130	190	280	360	480
16"	20	40	70	110	170	240	320	420

PRESSURE DIFFERENTIAL (P) = 500 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	160	290	---	---	---	---	---	---
2"	110	190	360	---	---	---	---	---
3"	80	140	270	430	650	---	---	---
4"	70	110	220	350	530	770	---	---
5"	50	100	180	290	440	640	840	1110
6"	50	80	160	250	380	550	730	950
8"	40	60	120	200	300	440	570	730
10"	30	50	100	150	230	360	470	620
12"	30	50	90	140	210	300	400	530
14"	20	40	80	130	190	280	370	480
16"	20	40	70	110	170	250	320	420

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

INSULATED PIPES OUTDOOR IN LINEAR FEET

SATURATED STEAM & 2.0 INCH GLASS FIBER INSULATION ONLY

PRESSURE DIFFERENTIAL (P) = 2 PSI

	MODEL NUMBERS							
PIPES	-05	-06	-07	-08	-09	-10	-11	-12
1"	290	---	---	---	---	---	---	---
2"	210	330	470	---	---	---	---	---
3"	160	260	360	500	---	---	---	---
4"	130	210	300	410	610	850	---	---
5"	110	180	260	350	520	720	980	---
6"	100	160	220	310	450	630	860	1130
8"	80	130	180	250	370	510	690	920
10"	70	110	150	210	300	420	570	760
12"	60	90	130	180	260	360	490	660
14"	50	80	120	160	240	340	450	600
16"	50	80	110	150	210	300	400	540

PRESSURE DIFFERENTIAL (P) = 4 PSI

	MODEL NUMBERS							
PIPES	-05	-06	-07	-08	-09	-10	-11	-12
1"	460	---	---	---	---	---	---	---
2"	320	500	---	---	---	---	---	---
3"	250	390	540	---	---	---	---	---
4"	210	320	450	610	880	---	---	---
5"	180	280	380	520	750	1040	---	---
6"	160	240	330	450	660	900	1210	1600
8"	130	190	270	360	530	730	980	1290
10"	100	160	220	300	440	600	810	1070
12"	90	140	190	260	380	520	700	930
14"	80	130	180	240	350	480	650	850
16"	70	110	160	210	310	430	570	760

PRESSURE DIFFERENTIAL (P) = 6 PSI

	MODEL NUMBERS							
PIPES	-05	-06	-07	-08	-09	-10	-11	-12
1"	580	---	---	---	---	---	---	---
2"	410	---	---	---	---	---	---	---
3"	320	480	660	---	---	---	---	---
4"	260	400	550	740	---	---	---	---
5"	230	340	470	630	920	---	---	---
6"	200	300	410	550	800	1090	1470	---
8"	160	240	330	440	640	880	1180	1560
10"	130	200	270	370	530	730	980	1290
12"	110	170	240	320	460	630	850	1110
14"	100	160	220	290	420	580	780	1030
16"	90	140	190	260	380	520	690	910

PRESSURE DIFFERENTIAL (P) = 8 PSI

	MODEL NUMBERS							
PIPES	-05	-06	-07	-08	-09	-10	-11	-12
1"	680	---	---	---	---	---	---	---
2"	480	---	---	---	---	---	---	---
3"	370	560	---	---	---	---	---	---
4"	310	470	630	850	---	---	---	---
5"	260	400	540	720	1040	---	---	---
6"	230	350	470	630	910	1240	---	---
8"	190	280	380	510	730	1000	1340	1760
10"	150	230	320	420	610	830	1110	1460
12"	130	200	270	360	530	720	960	1260
14"	120	190	250	330	480	660	880	1160
16"	110	160	220	300	430	590	790	1030

PRESSURE DIFFERENTIAL (P) = 10 PSI

	MODEL NUMBERS							
PIPES	-05	-06	-07	-08	-09	-10	-11	-12
1"	770	---	---	---	---	---	---	---
2"	540	---	---	---	---	---	---	---
3"	420	630	---	---	---	---	---	---
4"	350	530	710	---	---	---	---	---
5"	300	450	610	810	1160	---	---	---
6"	260	390	530	700	1010	1380	---	---
8"	210	320	430	570	820	1120	1490	---
10"	170	260	350	470	680	930	1240	1620
12"	150	230	300	410	590	800	1070	1400
14"	140	210	280	370	540	740	980	1290
16"	120	190	250	330	480	650	870	1150

PRESSURE DIFFERENTIAL (P) = 15 PSI

	MODEL NUMBERS							
PIPES	-04	-05	-06	-07	-08	-09	-10	-11
1"	600	---	---	---	---	---	---	---
2"	420	---	---	---	---	---	---	---
3"	330	520	---	---	---	---	---	---
4"	270	430	650	860	---	---	---	---
5"	230	370	550	740	980	---	---	---
6"	200	320	480	640	850	1230	---	---
8"	160	260	390	520	690	990	1330	1800
10"	140	210	320	430	570	820	1120	1490
12"	120	180	280	370	490	710	970	1290
14"	110	170	250	340	450	650	890	1190
16"	100	150	230	300	400	580	790	1050

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

INSULATED PIPES OUTDOOR IN LINEAR FEET

SATURATED STEAM & 2.0 INCH GLASS FIBER INSULATION ONLY

PRESSURE DIFFERENTIAL (P) = 20 PSI

	MODEL NUMBERS							
PIPES	-04	-05	-06	-07	-08	-09	-10	-11
1"	640	---	---	---	---	---	---	---
2"	450	---	---	---	---	---	---	---
3"	350	550	---	---	---	---	---	---
4"	290	460	680	---	---	---	---	---
5"	250	390	580	780	1030	---	---	---
6"	220	340	510	680	900	1290	---	---
8"	170	270	410	550	730	1040	1420	---
10"	150	230	340	450	600	870	1180	1570
12"	130	200	290	390	520	750	1020	1350
14"	120	180	270	360	480	690	940	1250
16"	100	160	240	320	420	610	830	1110

PRESSURE DIFFERENTIAL (P) = 30 PSI

	MODEL NUMBERS							
PIPES	-03	-04	-05	-06	-07	-08	-09	-10
1"	430	---	---	---	---	---	---	---
2"	310	---	---	---	---	---	---	---
3"	240	400	630	---	---	---	---	---
4"	200	340	530	780	---	---	---	---
5"	170	290	450	670	890	1180	---	---
6"	150	250	390	580	770	1020	1470	---
8"	120	200	320	470	620	830	1190	1610
10"	100	170	260	390	520	690	990	1340
12"	80	140	230	340	450	590	850	1150
14"	80	130	210	310	410	550	780	1060
16"	70	120	180	270	370	480	700	940

PRESSURE DIFFERENTIAL (P) = 40 PSI

	MODEL NUMBERS							
PIPES	-03	-04	-05	-06	-07	-08	-09	-10
1"	480	---	---	---	---	---	---	---
2"	340	---	---	---	---	---	---	---
3"	260	440	690	---	---	---	---	---
4"	220	370	580	850	---	---	---	---
5"	190	320	490	730	970	---	---	---
6"	160	280	430	630	840	1110	1600	---
8"	130	220	340	510	680	900	1290	1750
10"	110	180	290	420	560	750	1070	1450
12"	90	160	250	370	490	640	920	1250
14"	90	150	230	340	450	590	850	1150
16"	80	130	200	300	400	530	750	1020

PRESSURE DIFFERENTIAL (P) = 50 PSI

	MODEL NUMBERS							
PIPES	-02	-03	-04	-05	-06	-07	-08	-09
1"	260	---	---	---	---	---	---	---
2"	180	370	---	---	---	---	---	---
3"	140	280	480	---	---	---	---	---
4"	120	240	400	620	---	---	---	---
5"	100	200	340	520	770	1030	---	---
6"	90	180	300	460	670	900	1180	---
8"	70	140	240	370	540	720	950	1370
10"	60	120	200	310	450	600	790	1140
12"	50	100	170	260	390	520	680	980
14"	50	90	160	240	360	480	630	900
16"	40	80	140	220	320	420	560	800

PRESSURE DIFFERENTIAL (P) = 60 PSI

	MODEL NUMBERS							
PIPES	-02	-03	-04	-05	-06	-07	-08	-09
1"	280	---	---	---	---	---	---	---
2"	190	390	---	---	---	---	---	---
3"	150	300	510	---	---	---	---	---
4"	130	250	420	650	---	---	---	---
5"	110	220	360	550	820	1080	---	---
6"	90	190	310	480	710	940	1240	---
8"	80	150	250	390	570	760	1000	1440
10"	60	130	210	320	480	630	830	1190
12"	50	110	180	280	410	540	720	1030
14"	50	100	170	260	380	500	660	950
16"	40	90	150	230	340	450	590	840

PRESSURE DIFFERENTIAL (P) = 80 PSI

	MODEL NUMBERS							
PIPES	-02	-03	-04	-05	-06	-07	-08	-09
1"	300	---	---	---	---	---	---	---
2"	210	420	---	---	---	---	---	---
3"	160	330	540	---	---	---	---	---
4"	140	270	450	700	---	---	---	---
5"	120	230	390	590	870	1150	---	---
6"	100	200	340	520	760	1010	1330	---
8"	80	160	270	420	610	810	1070	1530
10"	70	140	230	350	510	670	890	1270
12"	60	120	190	300	440	580	770	1100
14"	50	110	180	280	400	540	710	1010
16"	50	100	160	240	360	480	630	900

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

INSULATED PIPES OUTDOOR IN LINEAR FEET

SATURATED STEAM & 2.0 INCH GLASS FIBER INSULATION ONLY

PRESSURE DIFFERENTIAL (P) = 100 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	210	320	---	---	---	---	---	---
2"	150	230	450	---	---	---	---	---
3"	110	180	350	580	---	---	---	---
4"	90	150	290	480	740	---	---	---
5"	80	120	250	410	630	920	---	---
6"	70	110	220	360	550	800	1060	1400
8"	60	90	170	290	440	650	860	1130
10"	50	70	140	240	370	540	710	930
12"	40	60	120	210	320	460	610	810
14"	40	60	110	190	290	430	560	740
16"	30	50	100	170	260	380	500	660

PRESSURE DIFFERENTIAL (P) = 125 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	210	340	---	---	---	---	---	---
2"	150	240	470	---	---	---	---	---
3"	120	190	370	600	---	---	---	---
4"	100	160	310	500	770	---	---	---
5"	80	130	260	430	650	960	---	---
6"	70	120	230	370	570	840	1100	1450
8"	60	90	180	300	460	670	890	1170
10"	50	80	150	250	380	560	740	970
12"	40	70	130	220	330	480	640	840
14"	40	60	120	200	300	440	590	770
16"	30	50	110	180	270	390	520	690

PRESSURE DIFFERENTIAL (P) = 150 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	220	360	---	---	---	---	---	---
2"	160	250	500	---	---	---	---	---
3"	120	200	380	630	---	---	---	---
4"	100	160	320	520	800	---	---	---
5"	90	140	270	450	680	1000	---	---
6"	70	120	240	390	590	870	1140	1500
8"	60	100	190	310	480	700	920	1210
10"	50	80	160	260	400	580	770	1010
12"	40	70	140	220	340	500	660	870
14"	40	60	130	210	320	460	610	800
16"	40	60	110	180	280	410	540	710

PRESSURE DIFFERENTIAL (P) = 200 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	230	380	---	---	---	---	---	---
2"	160	270	---	---	---	---	---	---
3"	130	210	400	660	---	---	---	---
4"	100	170	340	550	830	---	---	---
5"	90	150	290	470	710	1040	---	---
6"	80	130	250	410	620	900	1190	1570
8"	60	100	200	330	500	730	960	1260
10"	50	90	170	270	410	610	800	1050
12"	40	70	140	240	360	520	690	900
14"	40	70	130	220	330	480	630	830
16"	40	60	120	190	290	430	560	740

PRESSURE DIFFERENTIAL (P) = 250 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	240	400	---	---	---	---	---	---
2"	170	280	---	---	---	---	---	---
3"	130	220	420	680	---	---	---	---
4"	110	180	350	570	860	---	---	---
5"	90	150	300	480	730	1070	---	---
6"	80	130	260	420	640	930	1230	---
8"	60	110	210	340	520	750	990	1300
10"	50	90	170	280	430	630	820	1080
12"	50	80	150	240	370	540	710	930
14"	40	70	140	220	340	500	650	860
16"	40	60	120	200	300	440	580	750

PRESSURE DIFFERENTIAL (P) = 300 PSI

	MODEL NUMBERS							
PIPES	-01	-02	-03	-04	-05	-06	-07	-08
1"	240	---	---	---	---	---	---	---
2"	170	290	---	---	---	---	---	---
3"	130	220	430	700	---	---	---	---
4"	110	190	360	580	880	---	---	---
5"	90	160	310	500	750	1090	---	---
6"	80	140	270	430	650	950	1250	---
8"	70	110	210	350	530	770	1010	1330
10"	50	90	180	290	440	640	840	1100
12"	50	80	150	250	380	550	720	950
14"	40	70	140	230	350	510	670	880
16"	40	70	130	200	310	450	590	780

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

INSULATED PIPES OUTDOOR IN LINEAR FEET

SATURATED STEAM & 2.0 INCH GLASS FIBER INSULATION ONLY

PRESSURE DIFFERENTIAL (P) = 400 PSI

PIPES	MODEL NUMBERS -01	-02	-03	-04	-05	-06	-07	-08
1"	250	---	---	---	---	---	---	---
2"	170	300	---	---	---	---	---	---
3"	130	230	440	---	---	---	---	---
4"	110	190	370	600	---	---	---	---
5"	100	170	320	510	770	1130	---	---
6"	80	140	280	450	670	980	1290	---
8"	70	120	220	360	540	790	1040	1360
10"	60	100	180	300	450	660	860	1130
12"	50	80	160	260	390	570	750	980
14"	40	80	150	240	360	520	690	900
16"	40	70	130	210	320	460	610	800

PRESSURE DIFFERENTIAL (P) = 500 PSI

PIPES	MODEL NUMBERS -01	-02	-03	-04	-05	-06	-07	-08
1"	250	---	---	---	---	---	---	---
2"	180	310	---	---	---	---	---	---
3"	140	240	450	---	---	---	---	---
4"	110	200	380	610	---	---	---	---
5"	100	170	320	520	780	1130	---	---
6"	80	150	280	450	680	990	1300	---
8"	70	120	230	360	550	800	1050	1370
10"	60	100	190	300	460	660	870	1140
12"	50	80	160	260	390	570	750	980
14"	40	80	150	240	360	530	690	910
16"	40	70	130	210	320	470	610	800

INSULATED PIPES OUTDOOR IN LINEAR FEET

SATURATED STEAM & 3.0 INCH GLASS FIBER INSULATION ONLY

PRESSURE DIFFERENTIAL (P) = 10 PSI

PIPES	MODEL NUMBERS -05	-06	-07	-08	-09	-10	-11	-12
1"	950	---	---	---	---	---	---	---
2"	700	---	---	---	---	---	---	---
3"	550	---	---	---	---	---	---	---
4"	470	700	---	---	---	---	---	---
5"	400	610	820	1090	---	---	---	---
6"	360	540	720	960	1390	---	---	---
8"	290	440	590	790	1130	1550	---	---
10"	240	370	500	660	950	1300	1740	---
12"	210	320	430	570	830	1130	1510	1980
14"	200	300	400	530	770	1040	1400	1830
16"	180	260	360	470	680	930	1250	1640

PRESSURE DIFFERENTIAL (P) = 15 PSI

PIPES	MODEL NUMBERS -04	-05	-06	-07	-08	-09	-10	-11
1"	740	---	---	---	---	---	---	---
2"	540	---	---	---	---	---	---	---
3"	430	680	---	---	---	---	---	---
4"	360	570	860	---	---	---	---	---
5"	310	500	740	990	---	---	---	---
6"	280	440	650	880	1160	---	---	---
8"	230	360	540	720	950	1370	---	---
10"	190	300	450	600	800	1150	1570	---
12"	170	260	390	520	700	1000	1370	1820
14"	150	240	360	480	640	930	1260	1690
16"	140	220	320	430	580	830	1130	1500

PRESSURE DIFFERENTIAL (P) = 20 PSI

PIPES	MODEL NUMBERS -04	-05	-06	-07	-08	-09	-10	-11
1"	790	---	---	---	---	---	---	---
2"	580	---	---	---	---	---	---	---
3"	460	---	---	---	---	---	---	---
4"	390	610	---	---	---	---	---	---
5"	340	530	790	1050	---	---	---	---
6"	300	460	690	930	1230	---	---	---
8"	240	380	570	760	1010	1450	---	---
10"	200	320	480	640	840	1210	1630	---
12"	180	280	410	550	730	1060	1440	1910
14"	160	260	380	510	680	980	1330	1770
16"	150	230	340	460	610	870	1190	1590

PRESSURE DIFFERENTIAL (P) = 30 PSI

PIPES	MODEL NUMBERS -03	-04	-05	-06	-07	-08	-09	-10
1"	530	---	---	---	---	---	---	---
2"	390	---	---	---	---	---	---	---
3"	310	530	---	---	---	---	---	---
4"	260	450	700	---	---	---	---	---
5"	230	390	610	900	1200	---	---	---
6"	200	340	530	790	1060	1400	---	---
8"	160	280	440	630	870	1150	1650	---
10"	140	240	370	550	730	960	1380	1980
12"	120	200	320	470	630	840	1200	1630
14"	110	190	300	440	580	770	1110	1510
16"	100	170	260	390	520	690	990	1350

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ INCH (PSI)

INSULATED PIPES OUTDOOR IN LINEAR FEET

SATURATED STEAM & 3.0 INCH GLASS FIBER INSULATION ONLY

PRESSURE DIFFERENTIAL (P) = 40 PSI

PIPES	MODEL NUMBERS -03	-04	-05	-06	-07	-08	-09	-10
1"	590	---	---	---	---	---	---	---
2"	430	---	---	---	---	---	---	---
3"	340	580	---	---	---	---	---	---
4"	290	490	770	---	---	---	---	---
5"	250	430	660	980	---	---	---	---
6"	220	380	580	860	1150	1520	---	---
8"	180	310	480	710	940	1240	1790	---
10"	150	260	400	590	790	1050	1500	---
12"	130	220	350	520	690	910	1300	1770
14"	120	210	320	480	640	840	1210	1640
16"	110	190	290	430	570	750	1080	1460

PRESSURE DIFFERENTIAL (P) = 50 PSI

PIPES	MODEL NUMBERS -02	-03	-04	-05	-06	-07	-08	-09
1"	310	---	---	---	---	---	---	---
2"	230	470	---	---	---	---	---	---
3"	180	370	620	---	---	---	---	---
4"	160	320	530	820	---	---	---	---
5"	130	270	460	710	1050	---	---	---
6"	120	240	400	620	920	1220	---	---
8"	100	200	330	510	750	1000	1320	---
10"	80	170	280	430	630	840	1110	1590
12"	70	140	240	370	550	730	970	1380
14"	70	130	220	340	510	680	890	1280
16"	60	120	200	310	450	600	800	1140

PRESSURE DIFFERENTIAL (P) = 60 PSI

PIPES	MODEL NUMBERS -02	-03	-04	-05	-06	-07	-08	-09
1"	340	---	---	---	---	---	---	---
2"	250	500	---	---	---	---	---	---
3"	200	400	660	---	---	---	---	---
4"	170	340	560	870	---	---	---	---
5"	140	290	490	750	1100	---	---	---
6"	130	260	430	660	970	1290	---	---
8"	100	210	350	540	800	1050	1370	---
10"	90	180	290	450	670	890	1170	1670
12"	80	150	260	390	580	770	1020	1450
14"	70	140	240	360	540	710	940	1340
16"	60	130	210	330	480	640	840	1200

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

PRESSURE DIFFERENTIAL (P) = 80 PSI

PIPES	MODEL NUMBERS -02	-03	-04	-05	-06	-07	-08	-09
1"	370	---	---	---	---	---	---	---
2"	270	---	---	---	---	---	---	---
3"	210	430	---	---	---	---	---	---
4"	180	360	600	---	---	---	---	---
5"	160	310	520	800	1180	---	---	---
6"	140	280	460	710	1040	1370	---	---
8"	110	230	380	580	850	1130	1480	---
10"	100	170	320	490	710	940	1250	1780
12"	80	170	270	420	620	820	1080	1550
14"	80	150	250	390	570	760	1000	1430
16"	70	140	230	350	510	680	890	1280

PRESSURE DIFFERENTIAL (P) = 100 PSI

PIPES	MODEL NUMBERS -01	-02	-03	-04	-05	-06	-07	-08
1"	250	400	---	---	---	---	---	---
2"	190	290	---	---	---	---	---	---
3"	150	230	460	---	---	---	---	---
4"	130	200	390	640	---	---	---	---
5"	110	170	330	550	850	---	---	---
6"	100	150	290	490	750	1090	1450	---
8"	80	120	240	400	610	900	1190	1560
10"	70	100	200	330	510	750	1000	1310
12"	60	90	180	290	450	650	870	1140
14"	50	80	160	270	410	610	800	1050
16"	50	70	150	240	370	540	710	940

PRESSURE DIFFERENTIAL (P) = 125 PSI

PIPES	MODEL NUMBERS -01	-02	-03	-04	-05	-06	-07	-08
1"	260	---	---	---	---	---	---	---
2"	190	310	---	---	---	---	---	---
3"	150	240	480	---	---	---	---	---
4"	130	210	410	670	---	---	---	---
5"	110	180	350	580	880	---	---	---
6"	100	160	310	510	780	1140	1510	---
8"	80	130	250	420	640	930	1230	1620
10"	70	110	210	350	540	790	1040	1360
12"	60	90	190	300	470	680	900	1190
14"	50	90	170	280	430	630	830	1100
16"	50	80	150	250	380	560	740	980

INSULATED PIPES OUTDOOR IN LINEAR FEET

SATURATED STEAM & 3.0 INCH GLASS FIBER INSULATION ONLY

PRESSURE DIFFERENTIAL (P) = 150 PSI

PIPES	MODEL NUMBERS -01	-02	-03	-04	-05	-06	-07	-08
1"	270	---	---	---	---	---	---	---
2"	200	320	---	---	---	---	---	---
3"	160	260	500	---	---	---	---	---
4"	130	220	430	700	---	---	---	---
5"	120	190	370	600	920	---	---	---
6"	100	170	320	530	810	1180	1560	---
8"	80	140	270	430	660	970	1280	1680
10"	70	110	220	370	560	810	1070	1410
12"	60	100	190	320	480	710	930	1230
14"	60	90	180	290	450	650	860	1140
16"	50	80	160	260	400	580	770	1010

PRESSURE DIFFERENTIAL (P) = 200 PSI

PIPES	MODEL NUMBERS -01	-02	-03	-04	-05	-06	-07	-08
1"	280	---	---	---	---	---	---	---
2"	210	340	---	---	---	---	---	---
3"	160	270	530	---	---	---	---	---
4"	140	230	460	730	---	---	---	---
5"	120	200	390	630	960	---	---	---
6"	110	180	340	560	840	1230	---	---
8"	90	140	280	460	690	1010	1330	1750
10"	70	120	230	380	580	850	1120	1470
12"	60	100	200	330	510	740	970	1280
14"	60	100	190	310	470	680	900	1180
16"	50	90	170	270	420	610	800	1060

PRESSURE DIFFERENTIAL (P) = 250 PSI

PIPES	MODEL NUMBERS -01	-02	-03	-04	-05	-06	-07	-08
1"	290	---	---	---	---	---	---	---
2"	210	360	---	---	---	---	---	---
3"	170	280	550	---	---	---	---	---
4"	140	240	460	760	---	---	---	---
5"	120	210	400	650	990	---	---	---
6"	110	190	350	580	870	1270	---	---
8"	90	150	290	470	720	1040	1370	1800
10"	80	130	240	400	600	880	1150	1520
12"	70	110	210	340	520	760	1000	1320
14"	60	100	200	320	480	700	930	1220
16"	50	90	170	280	430	630	830	1090

PRESSURE DIFFERENTIAL (P) = 300 PSI

PIPES	MODEL NUMBERS -01	-02	-03	-04	-05	-06	-07	-08
1"	300	---	---	---	---	---	---	---
2"	220	370	---	---	---	---	---	---
3"	170	290	560	---	---	---	---	---
4"	150	250	480	770	---	---	---	---
5"	130	210	410	670	1010	---	---	---
6"	110	190	360	590	890	1300	---	---
8"	90	160	300	480	730	1070	1400	---
10"	80	130	250	410	610	890	1160	1550
12"	70	110	220	350	530	780	1020	1340
14"	60	100	200	330	490	720	950	1240
16"	50	90	180	290	440	640	850	1110

PRESSURE DIFFERENTIAL (P) = 400 PSI

PIPES	MODEL NUMBERS -01	-02	-03	-04	-05	-06	-07	-08
1"	300	---	---	---	---	---	---	---
2"	220	390	---	---	---	---	---	---
3"	180	310	580	---	---	---	---	---
4"	150	260	490	800	---	---	---	---
5"	130	220	430	690	1040	---	---	---
6"	110	200	380	610	920	1340	---	---
8"	90	160	310	500	750	1100	1440	---
10"	80	140	260	420	630	920	1210	1590
12"	70	120	230	360	550	800	1050	1380
14"	60	110	210	340	510	740	970	1280
16"	60	100	190	300	450	660	870	1140

PRESSURE DIFFERENTIAL (P) = 500 PSI

PIPES	MODEL NUMBERS -01	-02	-03	-04	-05	-06	-07	-08
1"	300	---	---	---	---	---	---	---
2"	220	390	---	---	---	---	---	---
3"	180	310	590	---	---	---	---	---
4"	150	260	500	810	---	---	---	---
5"	130	230	430	700	1050	---	---	---
6"	110	200	380	610	930	1330	---	---
8"	90	160	310	500	760	1110	1450	---
10"	80	140	260	420	640	930	1220	1600
12"	70	120	230	370	550	810	1060	1390
14"	60	110	210	340	510	750	980	1290
16"	60	100	190	300	460	670	880	1150

P = PRESSURE DIFFERENTIAL ACROSS STEAMGARD IN POUNDS PER SQ.INCH (PSI)

PART OF 10005

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

05/10/82

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - R. BARANSKI
APPLICATIONS ENGR - M. TROY

PROPOSAL #10236
REVISION LETTER 'A'
SHEET 01 OF SHEET 01

GLENBROOK NORTH HIGH SCHOOL

>> ADDITION TO PROPOSAL #10005 05/10/82 <<

1	GYM FAN ROOM SOUTH (1) --3/4 -- - TAG # 31	IN<BK> = 9< -3> PSIG HORIZ UH - MODINE H345L 16" X 16"	(1) 3/4 SG -B-O
2	GYM FAN ROOM NORTH (1) 1---- -- - TAG # 23	IN<BK> = 9< -3> PSIG AHU - COIL REHEAT 20 X 42	(1) 1.0 SG -B-O
3	GYM FAN ROOM NORTH (1) --3/4 -- - TAG # 24	IN<BK> = 9< -3> PSIG HORIZ UH - MODINE H345L 16" X 16"	(1) 3/4 SG -B-O
4	FAN ROOM 538 NORTH (1) --3/4 -- -	IN<BK> = 9< -3> PSIG DRIP - 3" X 6 LF AFTER PRV/BEFORE COIL 3" X 6 LF AFTER PRV/BEFORE COIL	(1) 3/4 SG -B-O
5	FAN ROOM 538 NORTH NO TRAP.....<NONE>	IN<BK> = 9< -3> PSIG AHU - COIL REHEAT FROM C-R (TRAP MISSING)	(1) 1/2 SG -B-O
6	FAN ROOM 538 NORTH (1) --3/4 -- -	IN<BK> = 9< -3> PSIG HORIZ UH - HERMAN NELSON #1421A 16" X 16"	(1) 3/4 SG -B-O
7	FAN ROOM 528 SOUTH (1) --3/4 -- -	IN<BK> = 9< -3> PSIG DRIP - 3" X 6 LF FEED TO COIL .	(1) 3/4 SG -B-O
8	FAN ROOM 528 SOUTH (1) --3/4 -- -	IN<BK> = 9< -3> PSIG HORIZ UH - HERMAN NELSON #1421A 16" X 16"	(1) 3/4 SG -B-O
9	FAN ROOM 528 SOUTH (1) --3/4 -- -	IN<BK> = 9< -3> PSIG AHU - COIL PREHEAT CP-1 12 X 18	(1) 3/4 SG -B-O

ENGINEERING RESOURCES, INC.

CHICAGO, ILLINOIS

05/05/82

BILL OF MATERIALS

PROPOSAL #10233
REVISION LETTER 'A'

GLENBROOK NORTH HIGH SCHOOL

ITEM	QTY	SIZE	DESCRIPTION	PRICE @	TTL AMOUNT
1.	(2)	1/2 INCH	SG -B-09	$ 69.90	$ 139.80
2.	(1)	3/4 INCH	SG -B-06	79.90	79.90
3.	(1)	3/4 INCH	SG -B-12	79.90	79.90
4.	(1)	1.0 INCH	SG -B-11	97.10	97.10
5.	(1)	1.0 INCH	SG -B-13	97.10	97.10
6.	(2)	1/2 INCH	STRAINERS 40-MESH SS SCREEN	11.50	23.00
7.	(2)	3/4 INCH	STRAINERS 40-MESH SS SCREEN	11.50	23.00
8.	(2)	1.0 INCH	STRAINERS 40-MESH SS SCREEN	22.20	44.40
			TOTAL MATERIALS -	$	584.20

QUANTITIES BASED ON REQUEST FOR QUOTATION OF A STEAMBARD# SYSTEM FOR THE LISTED EQUIPMENT AND ASSOCIATED STEAM DISTRIBUTION LINES. THE ACTUAL NUMBER OF EQUIPMENT AND LINES MAY CHANGE 'BILL OF MATERIALS.' MATERIALS WILL BE SHIPPED AND BILLED TO TAKE INTO CONSIDERATION THESE CHANGES IN ACCORDANCE WITH THE PRICE LIST IN EFFECT AT TIME OF ORDER.

STEAMBARD IS A REGISTERED TRADEMARK OF ERI

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

05/05/82

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - R. BARANSKI
APPLICATIONS ENGR - M. TROY

PROPOSAL #10233
REVISION LETTER 'A'
SHEET 01 OF SHEET 01

GLENBROOK NORTH HIGH SCHOOL

>> KITCHEN <<

1	INCOMING FEED	IN<BK> = 9< -3> PSIG		(1) 3/4 SG -B-O
	(1) --3/4 MH B #11 TAG #132	DRIP - 3" X 150 LF		
2	AIR HANDLER UNIT	IN<BK> = 9< -3> PSIG		(1) 1.0 SG -B-1
	(1) 1-1/4 MH B #8 TAG #133	PREHEAT COIL - MARLO COIL CO. MODEL F-10 SERIAL #M65669 100%OA DUCT COIL 18" X 5'		
3	AIR HANDLER UNIT	IN<BK> = 9< -3> PSIG		(1) 1.0 SG -B-1
	(1) 1---- MH B #12 TAG #134	REHEAT COIL - 2' X 4' ALSO DUCT SIDE COIL A1		
4	KETTLE	IN<BK> = 9< -3> PSIG		(1) 1/2 SG -B-O
	(1) --1/2 -- - TAG #135	KETTLE - GROEN MODEL D30SP 30 GAL CAP. 24"DIA X 21"DEEP GENERAL COOKING USE		
5	KETTLE	IN<BK> = 9< -3> PSIG		(1) 1/2 SG -B-O
	(1) --1/2 -- - TAG #136	KETTLE - GROEN 40 GAL CAP. 26"DIA X 22"DEEP TO BOIL WATER ONLY		
6	DISHWASHER	IN<BK> = 9< -3> PSIG		(1) 3/4 SG -B-1
	(1) --3/4 -- - TAG #137	HEX - HOBART MODEL FT-20 SERIAL #128609 6"DIA X 26"L		

ENGINEERING [illegible]
CHICAGO, ILLINOIS

04/09/82

BILL OF MATERIALS

PROPOSAL #10204
REVISION LETTER 'A'
PAGE 01 OF PAGE 01

GLENBROOK NORTH HIGH SCHOOL

ITEM	QTY	SIZE	DESCRIPTION	PRICE @	TTL AMOUNT
1.	(13)	1/2 INCH	SG -B-05	$ 69.90	$ 908.70
2.	(9)	1/2 INCH	SG -B-06	69.90	629.10
3.	(3)	1/2 INCH	SG -B-08	69.90	209.70
4.	(17)	3/4 INCH	SG -B-06	79.90	1,358.30
5.	(2)	3/4 INCH	SG -B-08	79.90	159.80
6.	(2)	3/4 INCH	SG -B-09	79.90	159.80
7.	(2)	3/4 INCH	SG -B-10	79.90	159.80
8.	(3)	1.0 INCH	SG -B-07	97.10	291.30
9.	(25)	1/2 INCH	STRAINERS 40-MESH SS SCREEN	11.50	287.50
10.	(23)	3/4 INCH	STRAINERS 40-MESH SS SCREEN	11.50	264.50
11.	(3)	1.0 INCH	STRAINERS 40-MESH SS SCREEN	22.20	66.60
			TOTAL MATERIALS -	$	4,495.10

QUANTITIES BASED ON REQUEST FOR QUOTATION OF A STEAMGARD# SYSTEM FOR THE LISTED EQUIPMENT AND ASSOCIATED STEAM DISTRIBUTION LINES. THE ACTUAL NUMBER OF EQUIPMENT AND LINES MAY CHANGE 'BILL OF MATERIALS.' MATERIALS WILL BE SHIPPED AND BILLED TO TAKE INTO CONSIDERATION THESE CHANGES IN ACCORDANCE WITH THE PRICE LIST IN EFFECT AT TIME OF ORDER.

STEAMGARD IS A REGISTERED TRADEMARK OF ERI

[illegible] MECHANICS, INC.
CHICAGO, ILLINOIS

04/09/82

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - R. BARANSKI
APPLICATIONS ENGR - M. TROY

PROPOSAL #10204
REVISION LETTER 'A'
SHEET 04 OF SHEET 04

GLENBROOK NORTH HIGH SCHOOL

49	GYMNASTICS RM D562	IN<BK> = 9< -3> PSIG		(1) 1/2 SG -B-C
	(1) --1/2 -- -	TAG # 90	CONVECTOR - FIN/TUBE 4" X 4" X 27 LF	
50	GYMNASTICS RM D562	IN<BK> = 9< -3> PSIG		(1) 1/2 SG -B-C
	(1) --1/2 -- -	TAG # 91	CONVECTOR - FIN/TUBE 4" X 4" X 27 LF	
51	ENTRANCE ACROSS D536	IN<BK> = 9< -3> PSIG		(1) 1/2 SG -B-C
	(1) --1/2 -- -	TAG # 92	CONVECTOR - FIN TUBE 5" X 1'2" X 44"	

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

04/09/82

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - R. BARANSKI
APPLICATIONS ENGR - M. TROY

PROPOSAL #10204
REVISION LETTER 'A'
SHEET 03 OF SHEET 04

GLENBROOK NORTH HIGH SCHOOL

33 CONVECTOR — IN<BK> = 9< -3> PSIG — (1) 1/2 SG -B-O
(1) --1/2 -- - TAG #125 — CONVECTOR - 4" X 4" X 20 LF NOTE - NO SOLONOID

34 OUTSIDE YOUTH OFFICE — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -B-O
(1) --3/4 -- - TAG #126 — UNIT VENT - 10" X 34" COIL HERMAN NELSON

35 BY DOOR 102 SM — IN<BK> = 9< -3> PSIG — (1) 1/2 SG -B-O
(1) --1/2 -- - TAG #127 — UNIT VENT - MODINE 1-1/2" X 10 X 34 COIL

36 BY DOOR 108SM — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -B-O
(1) --3/4 -- - TAG #128 — CONVECTOR - 4" X 4" X 40 LF

37 BY ROOM 82P — IN<BK> = 9< -3> PSIG — (1) 1/2 SG -B-O
(1) --1/2 -- - TAG #129 — CONVECTOR - 4" X 4" X 40 LF

38 CAFETERIA ROOM C 420 — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -B-1
(1) --3/4 -- - TAG #130 — CONVECTOR - 4" X 4" X 72 LF TOTAL DOUBLE TIER ASSEMBLY

39 CAFETERIA ROOM C 420 — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -B-1
(1) --3/4 -- - TAG #131 — CONVECTOR - 4" X 4" X 72 LF TOTAL DOUBLE TIER ASSEMBLY

40 CORRIDOR/TRAIN. RM — IN<BK> = 9< -3> PSIG — (1) 1/2 SG -B-O
(1) --1/2 -- - TAG # B1 — CONVECTOR - FIN/TUBE 4" X 4" X 5 LF NOT NORMALLY ON.

41 BOY'S LOCKER ROOM — IN<BK> = 9< -3> PSIG — (1) 1.0 SG -B-O
(1) 1---- -- - TAG # B2 — AHU - 4'6" X 6" COIL VERTICAL AIR FLOW 100% RECIRC HERMAN NELSON

42 LOCKER RM FOR TRAING — IN<BK> = 9< -3> PSIG — (1) 1.0 SG -B-O
(1) 1-1/4 -- - TAG # B3 — UNIT VENT - HAF AT CEILING 100% RECIRC COIL APPROX 6" X 6 LF

43 LOCKER RM FOR TRAING — IN<BK> = 9< -3> PSIG — (1) 1.0 SG -B-C
(1) 1-1/4 -- - TAG # B4 — UNIT VENT - HAF AT CEILING 100% RECIRC COIL APPROX 6" X 6 LF

44 CORRIDOR MEN'S TR RM — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -B-C
(1) --3/4 -- - TAG # B5 — UNIT VENT - 9" X 26" COIL MODINE

45 CORRIDOR DOOR 62 W — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -B-C
(1) --3/4 -- - TAG # B6 — UNIT VENT - 10" X 38" COIL MODINE

46 GYM ENTRANCE BY D532 — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -B-C
NO TRAP.....(NONE) TAG # B7 — UNIT VENT - COIL 5" X 1-1/2" X 44" MODINE

47 GYMNASTICS RM D562 — IN<BK> = 9< -3> PSIG — (1) 1/2 SG -B-C
(1) --1/2 -- - TAG # B8 — CONVECTOR - FIN/TUBE 4" X 4" X 27 LF

48 GYMNASTICS RM D562 — IN<BK> = 9< -3> PSIG — (1) 1/2 SG -B-C
(1) --1/2 -- - TAG # B9 — CONVECTOR - FIN/TUBE 4" X 4" X 27 LF

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - R. BARANSKI
APPLICATIONS ENGR - M. TROY

PROPOSAL #10204
REVISION LETTER 'A'
SHEET 02 OF SHEET 04

GLENBROOK NORTH HIGH SCHOOL

17	ROOM A 220	IN<BK> = 9< -3> PSIG		(1) 1/2 SG -B-O
	(1) --1/2 -- -	TAG #109	CONVECTOR - 4" X 4" X 16 LF	
18	NT	IN<BK> = 9< -3> PSIG		(1) 3/4 SG -B-O
	(1) --3/4 -- -	TAG #110	UNIT VENT - SIZE 75	
19	ROOM A 222	IN<BK> = 9< -3> PSIG		(1) 1/2 SG -B-O
	(1) --1/2 -- -	TAG #111	CONVECTOR - 4" X 4" X 16 LF	
20	NT	IN<BK> = 9< -3> PSIG		(1) 3/4 SG -B-O
	(1) --3/4 -- -	TAG #112	UNIT VENT - SIZE 75	
21	ROOM A 226	IN<BK> = 9< -3> PSIG		(1) 1/2 SG -B-C
	(1) --1/2 -- -	TAG #113	CONVECTOR - 4" X 4" X 16 LF	
22	NT	IN<BK> = 9< -3> PSIG		(1) 3/4 SG -B-C
	(1) --3/4 -- -	TAG #114	UNIT VENT - SIZE 75	
23	ROOM A 230	IN<BK> = 9< -3> PSIG		(1) 1/2 SG -B-C
	(1) --1/2 -- -	TAG #115	CONVECTOR - 4" X 4" X 16 LF	
24	NT	IN<BK> = 9< -3> PSIG		(1) 3/4 SG -B-C
	(1) --1/2 -- -	TAG #116	UNIT VENT - SIZE 75	
25	ROOM A 234	IN<BK> = 9< -3> PSIG		(1) 1/2 SG -B-C
	(1) --1/2 -- -	TAG #117	CONVECTOR - 4" X 4" X 16 LF	
26	NT	IN<BK> = 9< -3> PSIG		(1) 3/4 SG -B-C
	(1) --3/4 -- -	TAG #118	UNIT VENT - SIZE 75	
27	HALLWAY TO GYM 1 FL	IN<BK> = 9< -3> PSIG		(1) 1/2 SG -B-C
	(1) --1/2 -- -	TAG #119	CONVECTOR - 4" X 4" X 20 LF	
28	HALLWAY TO GYM	IN<BK> = 9< -3> PSIG		(1) 1/2 SG -B-C
	(1) --1/2 -- -	TAG #120	CONVECTOR - 4" X 4" X 20 LF	
29	HALLWAY TO GYM	IN<BK> = 9< -3> PSIG		(1) 1/2 SG -B-C
	(1) --1/2 -- -	TAG #121	CONVECTOR - 4" X 4" X 40 LF	
30	HALLWAY TO GYM	IN<BK> = 9< -3> PSIG		(1) 1/2 SG -B-C
	(1) --1/2 -- -	TAG #122	CONVECTOR - 4" X 4" X 36 LF	
31	HALLWAY TO GYM	IN<BK> = 9< -3> PSIG		(1) 1/2 SG -B-C
	(1) --1/2 -- -	TAG #123	CONVECTOR - 4" X 4" X 18 LF	
32	OUTSIDE HEALTH OFC	IN<BK> = 9< -3> PSIG		(1) 3/4 SG -B-C
	(1) --3/4 -- -	TAG #124	UNIT VENT - 10" X 30" COIL	

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

04/09/82

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - R. BARANSKI
APPLICATIONS ENGR - M. TROY

PROPOSAL #10204
REVISION LETTER 'A'
SHEET 01 OF SHEET 04

GLENBROOK NORTH HIGH SCHOOL

1	BY ENTRANCE 2N/3N (1) --3/4 -- - TAG # 93	IN<BK> = 9< -3> PSIG UNIT VENT - 10" X 40" COIL HERMAN NELSON	(1) 3/4 SG -B-O	
2	ABOVE LOCKER #H1 (1) --3/4 -- - TAG # 94	IN<BK> = 9< -3> PSIG CONVECTOR - 4" X 4" X 40 LF	(1) 3/4 SG -B-O	
3	ENGLISH CORR 2ND FL (1) --3/4 -- - TAG # 95	IN<BK> = 9< -3> PSIG CONVECTOR - 4" X 4" X 60 LF ALONG OUTSIDE WINDOW	(1) 3/4 SG -B-O	
4	ENGLISH CORR 2ND FL (1) --3/4 -- - TAG # 96	IN<BK> = 9< -3> PSIG CONVECTOR - 4" X 4" X 60 LF ALONG OUTSIDE WINDOW	(1) 3/4 SG -B-C	
5	ENGLISH RM 266 (1) --1/2 -- - TAG # 97	IN<BK> = 9< -3> PSIG CONVECTOR - 4" X 4" X 16 LF ALONG OUTSIDE WINDOW	(1) 1/2 SG -B-C	
6	ENGLISH ROOM 266 (1) --3/4 -- - TAG # 98	IN<BK> = 9< -3> PSIG UNIT VENT - TRANE #75 10" X 32" COIL	(1) 3/4 SG -B-C	
7	ROOM A 264 (1) --1/2 -- - TAG # 99	IN<BK> = 9< -3> PSIG CONVECTOR - FIN/TUBE 4" X 4" X 16 LF ROOM CONVECTORS 16" DOWN INSIDE WINDOW BOOKCA	(1) 1/2 SG -B-C	
8	ROOM A 262 (1) --3/4 -- - TAG #100	IN<BK> = 9< -3> PSIG UNIT VENT - TRANE SIZE 75	(1) 3/4 SG -B-C	
9	ROOM A 260 (1) --1/2 -- - TAG #101	IN<BK> = 9< -3> PSIG CONVECTOR - 4" X 4" X 16 LF	(1) 1/2 SG -B-C	
10	ROOM A-260 (1) --3/4 -- - TAG #102	IN<BK> = 9< -3> PSIG UNIT VENT - SIZE 75	(1) 3/4 SG -B-C	
11	ROOM A 212 (1) --1/2 -- - TAG #103	IN<BK> = 9< -3> PSIG CONVECTOR - 4" X 4" X 16 LF	(1) 1/2 SG -B-	
12	ROOM A 212 (1) --3/4 -- - TAG #104	IN<BK> = 9< -3> PSIG UNIT VENT - SIZE 75	(1) 3/4 SG -B-	
13	ROOM A 214 (1) --1/2 -- - TAG #105	IN<BK> = 9< -3> PSIG CONVECTOR - 4" X 4" X 16 LF	(1) 1/2 SG -B-	
14	NT (1) --3/4 -- - TAG #106	IN<BK> = 9< -3> PSIG UNIT VENT - SIZE 75	(1) 3/4 SG -B-	
15	ROOM A 216 (1) --1/2 -- - TAG #107	IN<BK> = 9< -3> PSIG CONVECTOR - 4" X 4" X 16 LF	(1) 1/2 SG -B-	
16	NT (1) --3/4 -- - TAG #108	IN<BK> = 9< -3> PSIG UNIT VENT - SIZE 75	(1) 3/4 SG -B-	

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

07/13/81

BILL OF MATERIALS

PROPOSAL #10005
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PAGE 01 OF PAGE 01

GLENBROOK NORTH HIGH SCHOOL

ITEM	QTY	SIZE	DESCRIPTION	PRICE @	TTL AMOUNT
1.	(2)	3/4 INCH	SG -A-03 MODEL 8A.....	$ 78.40	$ 156.80
2.	(4)	3/4 INCH	SG -A-04 MODEL 13A.....	78.40	313.60
3.	(5)	3/4 INCH	SG -A-05 MODEL 6B.....	78.40	392.00
4.	(3)	3/4 INCH	SG -A-06 MODEL 11A.....	78.40	235.20
5.	(4)	3/4 INCH	SG -A-07 MODEL 7B.....	78.40	313.60
6.	(4)	3/4 INCH	SG -A-08 MODEL 15A.....	78.40	313.60
7.	(3)	3/4 INCH	SG -A-09 MODEL 7C.....	78.40	235.20
8.	(2)	3/4 INCH	SG -A-12 MODEL 10D.....	78.40	156.80
9.	(1)	1.0 INCH	SG -A-05 MODEL 6B.....	86.70	86.70
10.	(1)	1.0 INCH	SG -A-09 MODEL 7C.....	86.70	86.70
11.	(1)	1.0 INCH	SG -A-11 MODEL 13C.....	86.70	86.70
12.	(3)	1.0 INCH	SG -A-14 MODEL 17A.....	86.70	260.10
13.	(8)	1.0 INCH	SG -A-15 MODEL 23A.....	86.70	693.60
14.	(1)	1.0 INCH	SG -A-16 MODEL 8D.....	86.70	86.70
15.	(2)	1.0 INCH	SG -A-17 MODEL 8E.....	86.70	173.40
16.	(1)	1.0 INCH	SGL-A-23 MODEL 15F.....	99.75	99.75
17.	(27)	3/4 INCH	STRAINERS 40-MESH SS SCREEN	11.50	310.50
18.	(18)	1.0 INCH	STRAINERS 40-MESH SS SCREEN	22.20	399.60

TOTAL MATERIALS - $ 4,400.55

QUANTITIES BASED ON REQUEST FOR QUOTATION OF A STEAMGARD# SYSTEM FOR THE LISTED EQUIPMENT AND ASSOCIATED STEAM DISTRIBUTION LINES. THE ACTUAL NUMBER OF EQUIPMENT AND LINES MAY CHANGE 'BILL OF MATERIALS.' MATERIALS WILL BE SHIPPED AND BILLED TO TAKE INTO CONSIDERATION THESE CHANGES IN ACCORDANCE WITH THE PRICE LIST IN EFFECT AT TIME OF ORDER.

STEAMGARD IS A REGISTERED TRADEMARK OF ERI

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

07/13/81

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - V. RICE
APPLICATIONS ENGR - M. TROY

PROPOSAL #10005
REVISION LETTER 'A'
SHEET 05 OF SHEET 05

GLENBROOK NORTH HIGH SCHOOL

>> ADDITION TO REVISION "A" - (08/05/81) <<

43 POOL TUNNEL — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -A-07 (7B
(1) --3/4 -- - TAG # 5 — DRIP - 10" IPS X 20 LF 1" GF

44 POOL TUNNEL — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -A-12 (10D
(1) --3/4 -- - TAG # 10 — DRIP - 10" IPS X 500 LF 1" GF

45 EAST POOL CORRIDOR — IN<BK> = 9< -3> PSIG — (NOT APPLICABLE) (
(1) --3/4 -- - TAG # 45 — CONVECTOR - FIN/TUBE 4" X 4" X 24 LF "INSTALLED (1) 3/4" SG-A-09 (7C)"

46 E. POOL CORRIDOR NT — IN<BK> = 9< -3> PSIG — (NOT APPLICABLE) (
(1) --1/2 -- - TAG # 46 — CONVECTOR - FIN/TUBE 4" X 4" X 12 LF "INSTALLED (1) 1/2" SG-A-09 (7C)"

47 E. POOL CORRIDOR NT — IN<BK> = 9< -3> PSIG — (NOT APPLICABLE) (
(1) --3/4 -- - TAG # 47 — CONVECTOR - FIN/TUBE 4" X 4" X 16 LF "INSTALLED (1) 3/4" SG-A-09 (7C)"

48 E. POOL CORRIDOR NT — IN<BK> = 9< -3> PSIG — (NOT APPLICABLE) (
(1) --3/4 -- - TAG # 48 — CONVECTOR - FIN/TUBE 4" X 4" X 20 LF "INSTALLED (1) 3/4" SG-A-09 (7C)"

49 POOL TUNNEL — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -A-07 (7B
(1) --3/4 -- - — DRIP - 10" X 10 LF ORIG. TAG 5B BEFORE PRS

50 POOL TUNNEL — IN<BK> = 9< -3> PSIG — (NOT APPLICABLE) (
(1) --3/4 -- - — DRIP - 10" X 20 LF ORIG. TAG 5C AFTER PRS "INSTALLED (1) 3/4" SG-A-07 (7B)"

51 POOL TUNNEL — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -A-12 (10D
(1) --3/4 -- - — DRIP - 10" X 500 LF

ENGINEERING RESOURCES, INC.

CHICAGO, ILLINOIS

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SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - V. RICE
APPLICATIONS ENGR - M. TROY

PROPOSAL #10005
REVISION LETTER 'A'

GLENBROOK NORTH HIGH SCHOOL

>> GYM FAN ROOMS <<

29	FAN RM "E" - SOUTH (1) 1-1/2 -- F	IN<BK> = 9< -3> PSIG TAG # 1 AHU - COIL 36" X 108" PREHEAT	(1) 1.0 SG -A-17	(8
30	FAN RM "E" - SOUTH (1) --3/4 -- B	IN<BK> = 9< -3> PSIG TAG # 2 DRIP - 3" X 30 LF 1" GF	(1) 3/4 SG -A-04	(13
31	FAN RM "E" - SOUTH (1) --3/4 -- B	IN<BK> = 9< -3> PSIG TAG # 3 AHU - COIL 13" X 26"	(1) 3/4 SG -A-08	(15
32	FAN RM "E" - SOUTH (1) 1-1/2 -- F	IN<BK> = 9< -3> PSIG TAG # 4 AHU - COIL 30" X 72"	(1) 1.0 SG -A-15	(23
33	FAN RM "E" - SOUTH (1) 1-1/2 -- F	IN<BK> = 9< -3> PSIG TAG # 5 AHU - COIL 30" X 72"	(1) 1.0 SG -A-15	(23
34	FAN RM "E" - SOUTH (1) --3/4 -- -	IN<BK> = 9< -3> PSIG TAG # 6 DRIP - 3" X 6 LF 1" GF	(1) 3/4 SG -A-03	(8
35	FAN RM "E" - SOUTH (1) --3/4 -- -	IN<BK> = 9< -3> PSIG TAG # 7 AHU - COIL 16" X 18"	(1) 3/4 SG -A-08	(15
36	FAN RM "E" - NORTH (1) 1-1/2 -- -	IN<BK> = 9< -3> PSIG TAG # 1 AHU - COIL 36" X 108" PREHEAT	(1) 1.0 SG -A-17	(8
37	FAN RM "E" - NORTH (1) --3/4 -- -	IN<BK> = 9< -3> PSIG TAG # 2 DRIP - 3" X 30 LF 1" GF	(1) 3/4 SG -A-04	(13
38	FAN RM "E" - NORTH (1) --3/4 -- -	IN<BK> = 9< -3> PSIG TAG # 3 AHU - COIL 13" X 26"	(1) 3/4 SG -A-08	(15
39	FAN RM "E" - NORTH (1) --3/4 -- -	IN<BK> = 9< -3> PSIG TAG # 4 AHU - COIL 30" X 72"	(1) 1.0 SG -A-15	(23
40	FAN RM "E" - NORTH (1) 1-1/2 -- F	IN<BK> = 9< -3> PSIG TAG # 5 AHU - COIL 30" X 72"	(1) 1.0 SG -A-15	(23
41	FAN RM "E" - NORTH (1) --3/4 -- -	IN<BK> = 9< -3> PSIG TAG # 6 DRIP - 3" X 6 LF 1" GF	(1) 3/4 SG -A-03	(8
42	FAN RM "E" - NORTH (1) --3/4 -- -	IN<BK> = 9< -3> PSIG TAG # 7 AHU - COIL 16" X 18"	(1) 3/4 SG -A-08	(15

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

07/13/81

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - V. RICE
APPLICATIONS ENGR - M. TROY

PROPOSAL #10005
REVISION LETTER 'A'
SHEET 03 OF SHEET 05

GLENBROOK NORTH HIGH SCHOOL

>> MAIN GYM FAN ROOMS <<

19	GYM FAN RM NORTH	IN<BK> = 9< -3> PSIG	(1) 1.0 SG -A-05	7-87 (6B
	(1) 1---- -- F TAG # 1	DRIP - 5" X 60 LF 1" GF		
20	GYM FAN RM NORTH	IN<BK> = 9< -3> PSIG	(1) 1.0 SG -A-15	7-87 (23A
	(1) 1-1/2 -- F TAG # 2	AHU - COIL 26" X 72" PREHEAT (1) ROW X (2) COILS COIL #1		
21	GYM FAN RM NORTH	IN<BK> = 9< -3> PSIG	(1) 1.0 SG -A-15	7-8 (23A
	(1) 1-1/2 -- F	AHU - COIL 26" X 72" PREHEAT (1) ROW X (2) COILS COIL #2		
22	GYM FAN RM SOUTH	IN<BK> = 9< -3> PSIG	(1) 1.0 SG -A-14	7-8 (17A
	(1) 1---- -- F TAG # 4	AHU - COIL 28" X 53" PREHEAT		
23	GYM FAN RM SOUTH	IN<BK> = 9< -3> PSIG	(1) 3/4 SG -A-06	7-8 (11A
	(1) --3/4 -- - TAG # 5	DRIP - 6" X 160 LF 1" GF		
24	GYM FAN RM SOUTH	IN<BK> = 9< -3> PSIG	(1) 1.0 SG -A-15	7-87 (23A
	(1) 1-1/2 -- - TAG # 6	AHU - COIL 26" X 78" PREHEAT (1) ROW X (2) COILS COIL #1		
25	GYM FAN RM SOUTH	IN<BK> = 9< -3> PSIG	(1) 1.0 SG -A-15	7-8 (23A
	(1) 1-1/2 -- -	AHU - COIL 26" X 78" PREHEAT (1) ROW X (2) COILS COIL #2		
26	GYM FAN RM SOUTH	IN<BK> = 9< -3> PSIG	(1) 1.0 SG -A-14	7-8 (17A
	(1) 1-1/2 -- - TAG # 7	AHU - COIL 26" X 66"		
27	GYM FAN RM SOUTH	IN<BK> = 9< -3> PSIG	(1) 1.0 SG -A-14	9-87 (17A
	(1) 1-1/2 -- - TAG # 8	AHU - COIL 26" X 66"		
28	GYM FAN RM SOUTH	IN<BK> = 9< -3> PSIG	(1) 1.0 SG -A-11	9-8 (13C
	(1) 1-1/2 -- - TAG # 9	AHU - COIL 20" X 41"		

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

07/13/81

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - V. RICE
APPLICATIONS ENGR - M. TROY

PROPOSAL #10005
REVISION LETTER 'A'
SHEET 02 OF SHEET 05

GLENBROOK NORTH HIGH SCHOOL

>> MECHANICAL ROOMS FOR POOL <<

11	POOL PUMP ROOM		IN<BK> = 9< -3> PSIG	(1) 1.0 SGL-A-23	(15F
	(1) 2---- MH F		CONVERTOR - SHELL 14" D X 33" L RECIRC 75 DEG F OUT PUMP 350 GPM		
12	POOL FAN ROOM		IN<BK> = 9< -3> PSIG	(1) 1.0 SG -A-16	(8D
	(1) 2---- -- F	TAG # 15	AHU - COIL 36" X 90" X 3" DEEP PREHEAT		
13	POOL FAN ROOM		IN<BK> = 9< -3> PSIG	(1) 1.0 SG -A-09	(7C
	(1) 1-1/2 -- B	TAG # 17	AHU - COIL 20" X 41" X 3/4" COPPER TUBING (SERPENTINE)		
14	POOL FAN ROOM		IN<BK> = 9< -3> PSIG	(1) 3/4 SG -A-09	(7C
	(1) --3/4 -- B	TAG # 17	AHU - COIL 20" X 48" X 3/4" COPPER TUBING (SERPENTINE)		
15	POOL FAN ROOM		IN<BK> = 9< -3> PSIG	(1) 3/4 SG -A-09	(7C
	(1) --3/4 -- B	TAG # 18	AHU - COIL 20" X 48" X 3/4" COPPER TUBING (SERPENTINE)		
16	POOL FAN ROOM		IN<BK> = 9< -3> PSIG	(1) 3/4 SG -A-04	(13A
	(1) --3/4 -- B	TAG # 19	DRIP - 3" X 16 LF 1" GF		
17	POOL FAN ROOM		IN<BK> = 9< -3> PSIG	(1) 3/4 SG -A-05	(6B
	(1) --3/4 -- B	TAG # 20	DRIP - 6" X 50 LF 1" GF		
18	POOL FAN ROOM		IN<BK> = 9< -3> PSIG	(1) 3/4 SG -A-09	(7C
	(1) --3/4 -- B	TAG # 21	AHU - COIL 20" X 48" X 3/4" COPPER TUBING (SERPENTINE)		

ORIGINAL SURVEY —

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

07/13/81

(2) PARTIAL ORDERS

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER . - V. RICE
APPLICATIONS ENGR - M. TROY

PROPOSAL #10005
REVISION LETTER 'A'
SHEET 01 OF SHEET 05

GLENBROOK NORTH HIGH SCHOOL

>> POOL TUNNEL <<

1	POOL TUNNEL (1) --3/4 MH F #17	TAG # 1	IN<BK> = 9< -3> PSIG DRIP - 2" X 112 LF 1" MAGNESIA	(1) 3/4 SG -A-05 # ALL DRIPS SIZED FOR CONTINUOUS OPERATION	(6E
2	POOL TUNNEL (1) --3/4 MH F #17	TAG # 2	IN<BK> = 9< -3> PSIG DRIP - 8" X 104 LF 1" GF	(1) 3/4 SG -A-06	(11F
3	POOL TUNNEL (1) --3/4 MH F #17	TAG # 3	IN<BK> = 9< -3> PSIG DRIP - 3" X 12 LF + 6" X 4 LF 1" GF	(1) 3/4 SG -A-04	(13F
4	POOL TUNNEL (1) --3/4 MH F #17	TAG # 4	IN<BK> = 9< -3> PSIG DRIP - 6" X 30 LF + RISER 1" GF	(1) 3/4 SG -A-05	(6E
5	POOL TUNNEL (1) --3/4 MH F #17	TAG # 5	IN<BK> = 9< -3> PSIG DRIP - 10" X 250 LF (MAIN) 1" GF "INSTALLED (1) 3/4" SG-A-12 (10D)"	(NOT APPLICABLE)	9-8 (
6	POOL TUNNEL (1) --3/4 MH F #17	TAG # 6	IN<BK> = 9< -3> PSIG DRIP - 6" X 105 LF (MAIN) 1" GF	(1) 3/4 SG -A-06	(11F
7	POOL TUNNEL (1) --3/4 MH F #17	TAG # 7	IN<BK> = 9< -3> PSIG DRIP - 6" X 176 LF (MAIN) 1" GF	(1) 3/4 SG -A-07	10-8 (7E
8	POOL TUNNEL (1) --3/4 MH F #17	TAG # 8	IN<BK> = 9< -3> PSIG DRIP - 3" X 50 LF 1" GF	(1) 3/4 SG -A-05	10-9 (6E
9	POOL TUNNEL (1) --3/4 MH F #17	TAG # 9	IN<BK> = 9< -3> PSIG DRIP - 6" X 200 LF (MAIN) 1" GF	(1) 3/4 SG -A-07	6-8? (7E
10	POOL TUNNEL (1) --3/4 MH F #17	TAG # 10	IN<BK> = 9< -3> PSIG DRIP - 4" X 16 LF + RISER 1" GF	(1) 3/4 SG -A-05	6-8- (6E

O = Orded 6-82

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS 05/10/82

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - V. RICE
APPLICATIONS ENGR - M. TROY

PROPOSAL #10005
REVISION LETTER 'B'
SHEET 05 OF SHEET 05

GLENBROOK NORTH HIGH SCHOOL

>> ADDITION TO REVISION "A" - (08/05/81) <<

43 POOL TUNNEL IN<BK> = 9< -3> PSIG (1) 3/4 SG -A-07 (7B)
(1) --3/4 -- - TAG # 5 DRIP - 10" IPS X 20 LF 1" GF

44 POOL TUNNEL IN<BK> = 9< -3> PSIG ~~(NOT APPLICABLE)~~ 9-81 (10D)
(1) --3/4 -- - TAG # 44 DRIP - 8" IPS X 250 LF 1" GF OLD TAG #10 "INSTALLED (1) 3/4" SG-A-12"

10-82
45 NOT SPECIFIED POOL HALLWAY IN<BK> = 9< -3> PSIG (1) 3/4 SG -A-09 (7C)
(1) --3/4 -- - CONVECTOR - FIN/TUBE 4" X 4" X 24 LF

10-82
46 NOT SPECIFIED IN<BK> = 9< -3> PSIG (1) 1/2 SG -A-09 (7C)
(1) --1/2 -- - CONVECTOR - FIN/TUBE 4" X 4" X 12 LF

47 E. POOL CORRIDOR IN<BK> = 9< -3> PSIG ~~(NOT APPLICABLE)~~ 9-81 (7C)
(1) --3/4 -- - TAG # 47 CONVECTOR - FIN/TUBE 4" X 4" X 40 LF INSTALLED (1) 3/4" SG-A-09

48 E. POOL CORRIDOR IN<BK> = 9< -3> PSIG ~~(NOT APPLICABLE)~~ 9-81 (7C)
(1) --3/4 -- - TAG # 48 CONVECTOR - FIN/TUBE 4" X 4" X 20 LF INSTALLED (1) 3/4" SG-A-09

10-82
49 POOL TUNNEL IN<BK> = 9< -3> PSIG (1) 3/4 SG -A-07 (7B)
(1) --3/4 -- - TAG # 49 DRIP - 8" X 10 LF ORIGINAL TAG 5B BEFORE PRS

50 POOL TUNNEL IN<BK> = 9< -3> PSIG ~~(NOT APPLICABLE)~~ 9-81 (7B)
(1) --3/4 -- - TAG # 50 DRIP - 8" X 20 LF ORIG. TAG 5C AFTER PRS "INSTALLED (1) 3/4" SG-A-07

51 POOL TUNNEL IN<BK> = 9< -3> PSIG ~~(NOT APPLICABLE)~~ 9-81 (10D)
(1) --3/4 -- - TAG # 51 DRIP - 8" X 500 LF OLT TAG #10A "INSTALLED (1) 3/4" SG-A-12"

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

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SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - V. RICE
APPLICATIONS ENGR - M. TROY

PROPOSAL #10005
REVISION LETTER "B"
SHEET 04 OF SHEET 05

GLENBROOK NORTH HIGH SCHOOL

>> GYM FAN ROOMS <<

29	FAN RM 528 - SOUTH (1) 1-1/2 -- F	TAG # 32	IN<BK> = 9< -3> PSIG AHU - COIL 36" X 108" PREHEAT C-N1 DUCT OUT 28 X 66	(1) 1.0 SG -A-17 (8E) 9-82
30	FAN RM 528 - SOUTH (1) --3/4 -- B	TAG # 33	IN<BK> = 9< -3> PSIG DRIP - 3" X 40 LF 1" GF END OF LINE TO ROOM	(1) 3/4 SG -A-04 (13A) 9-82
31	FAN RM 528 - SOUTH (1) --3/4 -- B	TAG # 34	IN<BK> = 9< -3> PSIG AHU - COIL 13" X 36" PREHEAT C-N MARLO F2.3 (DUCT 10 X 28)	(1) 3/4 SG -A-08 (15A) 9-82
32	FAN RM 528 - SOUTH (1) 1-1/2 -- F	TAG # 35	IN<BK> = 9< -3> PSIG AHU - COIL 30" X 60" REHEAT FROM C-N1	(1) 1.0 SG -A-15 (23A) 9-82
33	FAN RM 528 - SOUTH (1) 1-1/2 -- F	TAG # 36	IN<BK> = 9< -3> PSIG AHU - COIL 30" X 60" REHEAT FROM C-N1	(1) 1.0 SG -A-15 (23A) 9-82
34	FAN RM 528 - SOUTH (1) --3/4 -- -	TAG # 37	IN<BK> = 9< -3> PSIG DRIP - 3" X 6 LF 1" GF AFTER PRV	(1) 3/4 SG -A-03 (8A) 9-82
35	FAN RM 528 - SOUTH (1) --3/4 -- -	TAG # 38	IN<BK> = 9< -3> PSIG AHU - COIL 16" X 18" REHEAT FROM C-N (TAG #34)	(1) 3/4 SG -A-08 (15A) 9-82
36	FAN RM 538 - NORTH (1) 1-1/2 -- -	TAG # 39	IN<BK> = 9< -3> PSIG AHU - COIL 36" X 108" PREHEAT COIL C-N OUTLET DUCT 28 X 66	(1) 1.0 SG -A-17 (8E) 9-82
37	FAN RM 538 - NORTH (1) --3/4 -- -	TAG # 40	IN<BK> = 9< -3> PSIG DRIP - 3" X 30 LF 1" GF END OF LINE TO ROOM	(1) 3/4 SG -A-04 (13A) 9-82
38	FAN RM 538 - NORTH (1) --3/4 -- -	TAG # 41	IN<BK> = 9< -3> PSIG AHU - COIL 13" X 36" PREHEAT COIL C-R OUTLET DUCT 12 X 24	(1) 3/4 SG -A-08 (15A) 9-82
39	FAN RM 538 - NORTH (1) --3/4 -- -	TAG # 42	IN<BK> = 9< -3> PSIG AHU - COIL 30" X 60" REHEAT OF COIL C-N	(1) 3/4 SG -A-15 (23A) 10-82
40	FAN RM 538 - NORTH (1) 1-1/2 -- F		IN<BK> = 9< -3> PSIG AHU - COIL 30" X 60" REHEAT OF COIL C-N	(1) ~~1.0~~ 3/4 SG -A-15 (23A) 10-82
41	FAN RM 538 - NORTH (1) --3/4 -- -		IN<BK> = 9< -3> PSIG DRIP - 3" X 6 LF 1" GF AFTER PRV BEFORE COIL	(1) 3/4 SG -A-03 (8A) 10-82
42	FAN RM 538 - NORTH (1) --3/4 -- -		IN<BK> = 9< -3> PSIG AHU - COIL 16" X 18" REHEAT FROM COIL C-R	(1) 3/4 SG -A-08 (15A) 10-82

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

05/10/82

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - V. RICE
APPLICATIONS ENGR - M. TROY

PROPOSAL #10005
REVISION LETTER 'B'
SHEET 03 OF SHEET 05

GLENBROOK NORTH HIGH SCHOOL

>> MAIN GYM FAN ROOMS <<

19 GYM FAN RM NORTH — IN<BK> = 9< -3> PSIG — (1) 1.0 SG -A-05 (6B) 7-82
(1) 1---- -- F — TAG # 19 — DRIP - 5" X 60 LF 1" GF END OF LINE

20 GYM FAN RM NORTH — IN<BK> = 9< -3> PSIG — (1) 1.0 SG -A-15 (23A) 7-82
(1) 1-1/2 -- F — TAG # 20 — AHU - COIL 26" X 72" PREHEAT (1) ROW X (2) COILS COIL #1

21 GYM FAN RM NORTH — IN<BK> = 9< -3> PSIG — (1) 1.0 SG -A-15 (23A) 7-82
(1) 1-1/4 -- - — TAG # 21 — AHU - COIL 26" X 72" REHEAT

22 GYM FAN RM NORTH — IN<BK> = 9< -3> PSIG — (1) 1.0 SG -A-14 (17A) 7-82
(1) 1---- -- F — TAG # 22 — AHU - COIL 28" X 53" REHEAT

23 GYM FAN RM SOUTH — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -A-06 (11A) 7-82
(1) --3/4 -- - — TAG # 25 — DRIP - 6" X 160 LF 1" GF END OF LINE

24 GYM FAN RM SOUTH — IN<BK> = 9< -3> PSIG — (1) 1.0 SG -A-15 (23A) 7-82
(1) 1-1/2 -- - — TAG # 26 — AHU - COIL EACH 26" X 78" PREHEAT (1) ROW X (2) COILS

25 GYM FAN RM SOUTH — IN<BK> = 9< -3> PSIG — (1) 1.0 SG -A-15 (23A) 7-82
(1) 1---- -- - — TAG # 27 — AHU - COIL 14" X 48" REHEAT DUCT OUT 12 X 24

26 GYM FAN RM SOUTH — IN<BK> = 9< -3> PSIG — (1) 1.0 SG -A-14 (17A) 7-82
(1) 1---- -- - — TAG # 28 — AHU - COIL 20" X 36" REHEAT A-3

27 GYM FAN RM SOUTH — IN<BK> = 9< -3> PSIG — (1) 1.0 SG -A-14 (17A) 9-82
(1) 1-1/2 -- - — TAG # 29 — AHU - COIL 26" X 66" REHEAT A-2

28 GYM FAN RM SOUTH — IN<BK> = 9< -3> PSIG — (1) 1.0 SG -A-11 (13C) 9-82
(1) 1-1/2 -- - — TAG # 30 — AHU - COIL 26" X 72" REHEAT A-3

O = Ordered 1-82

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

05/10/82

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - V. RICE
APPLICATIONS ENGR - M. TROY

PROPOSAL #10005
REVISION LETTER 'B'
SHEET 02 OF SHEET 05

GLENBROOK NORTH HIGH SCHOOL

>> MECHANICAL ROOMS FOR POOL <<

11 POOL PUMP ROOM — IN<BK> = 9< -3> PSIG (NOT APPLICABLE) (9-81 15F)
(1) 2---- MH F — TAG # 11 — CONVERTOR - SHELL 14"D X 33"L RECIRC 75 F OUT PUMP 350 GPM OLD TAG #23 INSTALLED #23

12 POOL FAN ROOM — IN<BK> = 9< -3> PSIG (NOT APPLICABLE) (9-81 8D)
(1) 2---- -- F — TAG # 12 — AHU - COIL 36" X 90" X 3" DEEP PREHEAT OLD TAG #15 INSTALLED (1) 1.0" SG-A-16

13 POOL FAN ROOM — IN<BK> = 9< -3> PSIG (NOT APPLICABLE) (9-81 7C)
(1) 1-1/2 -- B — TAG # 13 — AHU - COIL 20"X42"X3/4" COPPER TUB. (SERP) OLD TAG #17 "INSTALLED (1) 1.0" SG-A-9

14 POOL FAN ROOM — IN<BK> = 9< -3> PSIG (NOT APPLICABLE) (9-81 7C)
(1) --3/4 -- B — TAG # 14 — AHU - COIL 20" X 48" X 3/4" COPPER TUBING (SERPENTINE) OLD TAG #17 INSTALLED 3/4" #09

15 POOL FAN ROOM — IN<BK> = 9< -3> PSIG (NOT APPLICABLE) (9-81 7C)
(1) --3/4 -- B — TAG # 15 — AHU - COIL 20"X48"X3/4" COPPER TUB. (SERP) OLD TAG #18 INSTALLED (1) 3/4" SG-A-09

16 POOL FAN ROOM — IN<BK> = 9< -3> PSIG (NOT APPLICABLE) (9-81 13A)
(1) --3/4 -- B — TAG # 16 — DRIP - 3"X16 LF 1"GF OLD TAG #19 "INSTALLED (1) 3/4" SG-A-04"

17 POOL FAN ROOM — IN<BK> = 9< -3> PSIG (NOT APPLICABLE) (9-81 6B)
(1) --3/4 -- B — TAG # 17 — DRIP - 6" X 50 LF 1" GF OLD TAG #20 "INSTALLED (1) 3/4" SG-A-05

18 POOL FAN ROOM — IN<BK> = 9< -3> PSIG (NOT APPLICABLE) (9-81 7C)
(1) --3/4 -- B — TAG # 18 — AHU - COIL 12"X30"X3/4"COPPER TUB. (SERP) OLD TAG #21 "INSTALLED (1) 3/4" SG-A-09"

Ordered 5-82.

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

05/10/82

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - V. RICE
APPLICATIONS ENGR - M. TROY

PROPOSAL #10005
REVISION LETTER "B"
SHEET 01 OF SHEET 05

GLENBROOK NORTH HIGH SCHOOL

>> POOL TUNNEL <<

1	POOL TUNNEL (1) --3/4 MH F #17	TAG # 1	IN<BK> = 9< -3> PSIG DRIP - 2"X112 LF; 1"GF ALL DRIPES SIZED FOR CONT OPER. END OF LINE "INSTALLED 3/4"	(NOT APPLICABLE)	(6B) 9-81
2	POOL TUNNEL (1) --3/4 MH F #17	TAG # 2	IN<BK> = 9< -3> PSIG DRIP - 8" X 104 LF 1" GF "INSTALLED (1) 3/4" SG-A-06"	(NOT APPLICABLE)	(11A) 9-81
3	POOL TUNNEL (1) --3/4 MH F #17	TAG # 3	IN<BK> = 9< -3> PSIG DRIP - 3" X 12 LF + 6" X 4 LF 1" GF "INSTALLED (1) 3/4" SG-A-04"	(NOT APPLICABLE)	(10A) 9-81
4	POOL TUNNEL (1) --3/4 MH F #17	TAG # 4	IN<BK> = 9< -3> PSIG DRIP - 6" X 30 LF + RISER 1" GF "INSTALLED (1) 3/4" SG-A-05"	(NOT APPLICABLE)	(6B) 9-81
5	FAN ROOM S-1 (1) 2---- -- -	TAG # 5	IN<BK> = 9< -3> PSIG HEX - B&G SU207-4	(1) 1.0 SG -A-00	(2S)
6	FAN ROOM S-1 (1) --3/4 -- -	TAG # 6	IN<BK> = 9< -3> PSIG DRIP - 6" X 30 LF	(1) 3/4 SG -A-00	(2S)
7	POOL TUNNEL (1) --3/4 MH F #17	TAG # 7	IN<BK> = 9< -3> PSIG DRIP - 6" X 176 LF (MAIN) 1" GF END OF LINE	(1) 3/4 SG -A-07	(7B) 10-82
8	POOL TUNNEL (1) --3/4 MH F #17	TAG # 8	IN<BK> = 9< -3> PSIG DRIP - 3" X 75 LF 1" GF	(1) 3/4 SG -A-05	(6B) 10-82
9	POOL TUNNEL (1) --3/4 MH F #17	TAG # 9	IN<BK> = 9< -3> PSIG DRIP - 6" X 200 LF (MAIN) 1" GF	(1) 3/4 SG -A-07	(7B) 6-82
10	POOL TUNNEL (1) --3/4 MH F #17	TAG # 10	IN<BK> = 9< -3> PSIG DRIP - 1" X 40 LF	(1) 3/4 SG -A-05	(6B) 6-82

Extra 106

1

Change to 15
Item #40

ENGINEERING RESOURCES, INC.
International Tower Building
8550 W. Bryn Mawr Ave.
Chicago, Illinois 60631
(312) 693-5500
Telex: 25-6259

December 1, 1982

Mr. Floyd Archer
Plant Operator
Glenbrook North High School
2300 Shermer Road
Northbrook, IL 60062

Dear Mr. Archer:

Thank you for your continued interest in the STEAMGARD™ System.

Enclosed are the Trap Surveys and Applications Schedules for each individual area we surveyed. Also enclosed is a revision of Proposal Number 10204 which now includes the Right Angle Radiator STEAMGARDS.

Please feel free to contact me should you require any additional information.

We look forward to working with you.

Sincerely,

Ron Baranski
Sales Representative

RB:sf
encl.

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

11/30/82

BILL OF MATERIALS

PROPOSAL #10437
REVISION LETTER 'A'

GLENBROOK NORTH HIGH SCHOOL

ITEM	QTY	SIZE	DESCRIPTION	PRICE @	TTL AMOUNT
1.	(1)	1/2 INCH	SG -R-05	$ 69.80	$ 69.80
2.	(5)	1/2 INCH	SG -R-07	$ 69.80	$ 349.00
3.	(3)	3/4 INCH	SG -B-05	$ 98.75	$ 296.25
4.	(1)	3/4 INCH	SG -B-06	$ 98.75	$ 98.75
5.	(1)	3/4 INCH	SG -B-07	$ 98.75	$ 98.75
6.	(1)	1.0 INCH	SG -B-06	$118.60	$ 118.60
7.	(1)	1.0 INCH	SGL-B-23	$152.50	$ 152.50
8.	(5)	3/4 INCH	STRAINERS 40-MESH SS SCREEN	$ 18.00	$ 90.00
9.	(2)	1.0 INCH	STRAINERS 40-MESH SS SCREEN	29.50	59.00

TOTAL MATERIALS - $ 1,332.65

QUANTITIES BASED ON REQUEST FOR QUOTATION OF A STEAMGARD‡ SYSTEM FOR THE LISTED EQUIPMENT AND ASSOCIATED STEAM DISTRIBUTION LINES. THE ACTUAL NUMBER OF EQUIPMENT AND LINES MAY CHANGE 'BILL OF MATERIALS.' MATERIALS WILL BE SHIPPED AND BILLED TO TAKE INTO CONSIDERATION THESE CHANGES IN ACCORDANCE WITH THE PRICE LIST IN EFFECT AT TIME OF ORDER.

‡ STEAMGARD IS A REGISTERED TRADEMARK OF ERI

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS 11/30/82

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - R. BARANSKI
APPLICATIONS ENGR - M. TROY

PROPOSAL #10437
REVISION LETTER 'A'
SHEET 02 OF SHEET 02

GLENBROOK NORTH HIGH SCHOOL

>> AREA E <<

5	MUSIC HALL		IN<BK> = 9< -3> PSIG		(5) 1/2 SG -R-07
	(1) --1/2 -- D		CONVECTOR - 4 X 4 X 25 LF (5 UNITS) (PRV)		
6	BOY'S ROOM		IN<BK> = 9< -3> PSIG		(1) 1/2 SG -R-05
	(1) --1/2 -- D		CONVECTOR - 4 X 4 X 3 LF (PRV)		
7	E-606		IN<BK> = 9< -3> PSIG	(NOT APPLICABLE)	
	(1) --1/2 -- D		CONVECTOR - 4 X 4 X 21 LF (PRV)		
8	E-608		IN<BK> = 9< -3> PSIG	(NOT APPLICABLE)	
	(1) --1/2 -- D		CONVECTOR - 4 X 4 X 21 LF (PRV)		
9	E-618		IN<BK> = 9< -3> PSIG		(1) 3/4 SG -B-05
	(1) --3/4 -- -	TAG #201	DRIP - 4" X 40 LF FEED TO ROOM/HEX		
10	FOR SU-8		IN<BK> = 9< -3> PSIG		(1) 1.0 SGL-B-23
	(1) 1-1/2 -- -	TAG #202	HEX - 10"DIA X 91"LG (P-K) COILS AT MAX 150 F	AHU 13835 CFM	
11	BY STAIRS		IN<BK> = 9< -3> PSIG		(1) 3/4 SG -B-04
	(1) --3/4 -- -	TAG #203	HORIZ UH - 12 X 12 H. NELSON #SU1221A		

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

11/30/82

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - R. BARANSKI
APPLICATIONS ENGR - M. TROY

PROPOSAL #10437
REVISION LETTER 'A'
SHEET 01 OF SHEET 02

GLENBROOK NORTH HIGH SCHOOL

>> AREA E - TUNNEL <<

1 UNDER BOY'S LOCKER — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -B-07
(1) --3/4 -- - TAG #197 DRIP - 4" X 60 LF + 3" X 80 LF

2 UNDER MUSIC — IN<BK> = 9< -3> PSIG — (1) 1.0 SG -B-06
(1) 1---- -- - TAG #198 DRIP - 3" X 80 LF END OF FEED

3 MUSIC FEED — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -B-05
(1) --3/4 -- - TAG #199 DRIP - 1-1/2 X 40 LF EST VERT. FEED AFTER SOL (SOL)

4 END OF MUSIC HALL — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -B-05
(1) --3/4 -- - TAG #200 DRIP - 1-1/4 X 20 LF BARE SEE BAD TRAP #6 AFTER SOL. NEAR CPA FAN ROOM (SOL)

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

11/30/82

BILL OF MATERIALS

PROPOSAL #10436
REVISION LETTER 'A'
PAGE 01 OF PAGE 01

GLENBROOK NORTH HIGH SCHOOL

ITEM	QTY	SIZE	DESCRIPTION	PRICE @	TTL AMOUNT
1.	(7)	1/2 INCH	SG -R-05	$ 69.80	$ 488.60
2.	(3)	1/2 INCH	SG -R-06	$ 69.80	$ 209.40
3.	(7)	1/2 INCH	SG -R-07	$ 69.80	$ 488.60
4.	(1)	1/2 INCH	SG -R-08	$ 69.80	$ 69.80
5.	(1)	1/2 INCH	SG -R-09	$ 69.80	$ 69.80
6.	(4)	3/4 INCH	SG -R-07	$ 78.40	$ 313.60
7.	(3)	3/4 INCH	SG -R-08	$ 78.40	$ 235.20
8.	(3)	3/4 INCH	SG -B-05	$ 98.75	$ 296.25
9.	(2)	3/4 INCH	SG -B-06	$ 98.75	$ 197.50
10.	(3)	3/4 INCH	SG -B-07	$ 98.75	$ 296.25
11.	(3)	3/4 INCH	SG -B-08	$ 98.75	$ 296.25
12.	(2)	1.0 INCH	SG -B-08	$118.60	$ 237.20
13.	(11)	3/4 INCH	STRAINERS 40-MESH SS SCREEN	$ 18.00	$ 198.00
14.	(2)	1.0 INCH	STRAINERS 40-MESH SS SCREEN	29.50	59.00

TOTAL MATERIALS - $ 3,455.45

QUANTITIES BASED ON REQUEST FOR QUOTATION OF A STEAMGARD* SYSTEM FOR THE LISTED EQUIPMENT AND ASSOCIATED STEAM DISTRIBUTION LINES. THE ACTUAL NUMBER OF EQUIPMENT AND LINES MAY CHANGE 'BILL OF MATERIALS.' MATERIALS WILL BE SHIPPED AND BILLED TO TAKE INTO CONSIDERATION THESE CHANGES IN ACCORDANCE WITH THE PRICE LIST IN EFFECT AT TIME OF ORDER.

* STEAMGARD IS A REGISTERED TRADEMARK OF ERI

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

11/30/82

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - R. BARANSKI
APPLICATIONS ENGR - M. TROY

PROPOSAL #10436
REVISION LETTER 'A'
SHEET 03 OF SHEET 03

GLENBROOK NORTH HIGH SCHOOL

24 COORDS OFFICE (1) --1/2 -- D	IN<BK> = 9< -3> PSIG DRIP - 1-1/2 X 50 LF BARE EST. END OF FEED FROM UPSTAIRS FAN ROOM	(1) 1/2 SG -R-05
25 BOY'S PE (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 15 LF MANUAL SHUT OFF	(1) 1/2 SG -R-05
26 ASST. ATH DIR OFFICE (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 18 LF MANUAL SHUT OFF	(1) 1/2 SG -R-04
27 GIRL'S SHELF (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 27 LF HIGH SEE TAG 88-91. ADD (3) UNITS (PRV)	(3) 1/2 SG -R-07
28 BOY'S SHELF (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 27 LF HIGH/WALL/WINDOW SEE TAG 88-91 ADD (3) UNITS (PRV)	(3) 1/2 SG -R-07
29 SHELF STORE ROOMS (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 10 LF MANUAL VALVE (2) UNITS	(2) 1/2 SG -R-05
30 D-550 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 20 LF FOR BOY'S GYMNASTIC OFFICE (PRV)	(1) 1/2 SG -R-04
31 D-550 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 20 LF (PRV)	(1) 1/2 SG -R-04
32 NORTH LAUNDRY DOOR (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - 1-1/2 X 8 X 3 LF 100% RECIRC. 500 CFM (SOL)	(1) 3/4 SG -R-07
33 OUTSIDE HALL DOOR 5N (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - 1-1/2 X 10 X 4 LF 100% RECIRC. 760 CFM (SOL)	(1) 3/4 SG -R-08

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINDIS

11/30/82

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - R. BARANSKI
APPLICATIONS ENGR - M. TROY

PROPOSAL #10436
REVISION LETTER 'A'
SHEET 02 OF SHEET 03

GLENBROOK NORTH HIGH SCHOOL

>> AREA D <<

8	CONCESSION STAND (1) --3/4 -- -	IN<BK> = 9< -3> PSIG DRIP - 2" X 60 LF EST	(1) 3/4 SG -B-0E
9	HALL STUD. ACT CLST (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - 100% RECIRC COIL APPROX 1-1/2 X 10 X 48 + DRIP 2" X 30 LF 500 CFM (SOL)	(1) 3/4 SG -R-07
10	HALL STUD. ACT CLST (1) --1/2 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - 1-1/2 X 8 X 44 APPROX 100% RECIRC 500 CFM OPPOSIT ABOVE UNIT (SOL)	(1) 1/2 SG -R-07
11	COACHES LOCKER ROOM (1) 1-1/4 -- -	IN<BK> = 9< -3> PSIG UNIT VENT - VAF COIL 6" X 4'6" 100% RECIRC. 500 CFM AT CEILING (SOL)	(1) 3/4 SG -R-07
12	SHOWER STALL/C.LKR (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 16 LF ON WALL/HIGH (PRV)	(1) 1/2 SG -R-0E
13	NEAR C. LKR. ENTR. (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - 1-1/2 X 8 X 4 LF COIL EST. 100% RECIRC 500 CFM MODINE (SOL)	(1) 3/4 SG -R-0E
14	P.E. LOCKER ROOM (1) 1---- -- -	IN<BK> = 9< -3> PSIG UNIT VENT - VAF 1000 CFM 100% O.A. H. NELSON AT CEILING (2) UNITS (SOL)	(2) 1.0 SG -B-0E
15	BOY'S EQUIPMENT ROOM (1) --3/4 -- - TAG #204	IN<BK> = 9< -3> PSIG UNIT VENT - VAF 500 CFM 100% RECIRC AT CEILING COIL EST 1-1/2 X 8 X 3 LF (SOL)	(1) 3/4 SG -B-07
16	SOUTH LOBBY STAIRWAY (1) --3/4 -- -	IN<BK> = 9< -3> PSIG UNIT VENT - 1-1/2 X 8 X 3 LF 100% RECIRC. 500 CFM MODINE BY D-556. (SOL)	(1) 3/4 SG -R-07
17	CATWALK OVER M GYM (1) --3/4 -- -	IN<BK> = 9< -3> PSIG HORIZ UH - 24 X 24 MODINE H455L	(1) 3/4 SG -B-0E
18	CATWALK OVER M GYM (1) --1/2 -- D	IN<BK> = 9< -3> PSIG DRIP - 2" X 50 LF END OF LINE TO UNIT HEATER	(1) 1/2 SG -R-0E
19	BEAM OVER LOBBY CTWK (1) --1/2 -- D	IN<BK> = 9< -3> PSIG DRIP - 2" X 30 LF FEED TO ABOVE UNIT HEATER	(1) 1/2 SG -R-0E
20	N OF LOBBY CATWALK (1) --3/4 -- -	IN<BK> = 9< -3> PSIG HORIZ UH - 24 X 24 MODINE	(1) 3/4 SG -B-0E
21	D-556 DANCE ROOM (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 36 LF (PRV)	(1) 1/2 SG -R-0E
22	D-556 (1) --3/4 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 36 LF (PRV)	(1) 3/4 SG -R-0E
23	ATH PE SEC (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 40 LF MANUAL ON/OFF 3 OFFICES FED.	(1) 1/2 SG -R-09

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

11/30/82

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - R. BARANSKI
APPLICATIONS ENGR - M. TROY

PROPOSAL #10436
REVISION LETTER 'A'
SHEET 01 OF SHEET 03

GLENBROOK NORTH HIGH SCHOOL

>> AREA D - TUNNEL <<

1	NW UNDER SUPPLY (1) --3/4 -- -	TAG #190	IN<BK> = 9< -3> PSIG DRIP - 3" X 30 LF VERTICAL FEED TO KITCHEN AHU	(1) 3/4 SG -B-05
2	UNDER CAF. C-424 (1) --3/4 -- -	TAG #191	IN<BK> = 9< -3> PSIG DRIP - 3" X 125 LF + 2" X 100 LF END OF LINE BAD TRAP	(1) 3/4 SG -B-08
3	UNDER LAUNDRY (1) --3/4 HN F	TAG #192	IN<BK> = 9< -3> PSIG DRIP - 4" X 130 LF EST.	(1) 3/4 SG -B-07
4	UNDER LAUNDRY (1) --3/4 -- -	TAG #193	IN<BK> = 9< -3> PSIG DRIP - 2" X 130 LF EST. BAD TRAP	(1) 3/4 SG -B-06
5	UNDER GIRL'S LOCKER (1) --3/4 -- -	TAG #194	IN<BK> = 9< -3> PSIG DRIP - 2-1/2 X 30 LF VERTICAL FEED TO UNIT HEATER	(1) 3/4 SG -B-05
6	UNDER GIRL'S LOCKER (1) --3/4 -- -	TAG #195	IN<BK> = 9< -3> PSIG DRIP - 3" X 10 LF + 2" X 100 LF CHECK BAD TRAP UPSTAIRS END OF FEED BAD TRAP	(1) 3/4 SG -B-07
7	PE HALL (1) --3/4 -- -	TAG #196	IN<BK> = 9< -3> PSIG DRIP - 4" X 60 LF BY TAG #78 VERTICAL FEED	(1) 3/4 SG -B-06

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

11/30/82

BILL OF MATERIALS

PROPOSAL #10435
REVISION LETTER 'A'

GLENBROOK NORTH HIGH SCHOOL

ITEM	QTY	SIZE	DESCRIPTION	PRICE $	TTL AMOUNT
1.	(1)	3/4 INCH	SG -R-07	$ 78.40	$ 78.40
2.	(1)	3/4 INCH	SG -B-00	$ 98.75	$ 98.75
3.	(3)	3/4 INCH	SG -B-05	$ 98.75	$ 296.25
4.	(1)	3/4 INCH	SG -B-06	$ 98.75	$ 98.75
5.	(2)	3/4 INCH	SG -B-07	$ 98.75	$ 197.50
6.	(1)	1.0 INCH	SG -B-08	$118.60	$ 118.60
7.	(7)	3/4 INCH	STRAINERS 40-MESH SS SCREEN	$ 18.00	$ 126.00
8.	(1)	1.0 INCH	STRAINER 40-MESH SS SCREEN	29.50	29.50

TOTAL MATERIALS - $ 1,043.75

QUANTITIES BASED ON REQUEST FOR QUOTATION OF A STEAMGARD* SYSTEM FOR THE LISTED EQUIPMENT AND ASSOCIATED STEAM DISTRIBUTION LINES. THE ACTUAL NUMBER OF EQUIPMENT AND LINES MAY CHANGE 'BILL OF MATERIALS.' MATERIALS WILL BE SHIPPED AND BILLED TO TAKE INTO CONSIDERATION THESE CHANGES IN ACCORDANCE WITH THE PRICE LIST IN EFFECT AT TIME OF ORDER.

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CHICAGO, ILLINOIS

11/30/82

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - R. BARANSKI
APPLICATIONS ENGR - M. TROY

PROPOSAL #10435
REVISION LETTER 'A'
SHEET 02 OF SHEET 02

GLENBROOK NORTH HIGH SCHOOL

>> AREA C <<

7 BY C-424 IN HALL (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - 1-1/2 X 8 X 3 LF 500 CFM (SOL)	(1) 3/4 SG -R-07
8 LAUNDRY ROOM (1) --3/4 -- -	IN<BK> = 9< -3> PSIG HEATER - UNIT NOT SEEN	(1) 3/4 SG -B-0(
9 C-422 (1) 1---- -- D	IN<BK> = 9< -3> PSIG AHU - H NELSON ASSUME 50% O.A. 1250 CFM (PRV)	(1) 1.0 SG -B-0E

ENGINEERING RESOURCES, INC.
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SHEET 01 OF SHEET 02

GLENBROOK NORTH HIGH SCHOOL

>> AREA C - TUNNEL <<

1	ART TUNNEL (1) --3/4 -- - TAG #172	IN<BK> = 9< -3> PSIG DRIP - 1-1/2" X 70 LF APPROX TO VERTICAL FEED END OF FEED.	(1) 3/4 SG -B-0
2	TUNNEL UNDER CLAY (1) --3/4 -- - TAG #173	IN<BK> = 9< -3> PSIG DRIP - 3" X 100 LF + 1-1/2 X 50 LF VERT FEEDS END OF LINE BAD TRAP	(1) 3/4 SG -B-0
3	N END OF E TUNNEL (1) --3/4 -- - TAG #174	IN<BK> = 9< -3> PSIG DRIP - 2"X100LF + 3"X40LF + 4"X80LF + 1-1/2"X50LF VERT FDS. END OF MAIN FEED TO ART.	(1) 3/4 SG -B-0
4	UNDER ROOM C-410 (1) --3/4 -- - TAG #175	IN<BK> = 9< -3> PSIG DRIP - 2" X 80 LF EST. END OF LINE BAD TRAP	(1) 3/4 SG -B-0
5	FEED TO DOOR 12-N (1) --3/4 -- - TAG #176	IN<BK> = 9< -3> PSIG DRIP - 2" X 20 LF END OF LINE	(1) 3/4 SG -B-0
6	SCIENCE (1) --3/4 -- - TAG #177	IN<BK> = 9< -3> PSIG DRIP - 2"X30 LF + 6"X130LF FEED FROM CHOCK GENERATOR TAG#70 END OF MAIN TO AREA BD TRAP	(1) 3/4 SG -B-0

ENGINEERING RESOURCES, INC.
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BILL OF MATERIALS

PROPOSAL #10434
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GLENBROOK NORTH HIGH SCHOOL

ITEM	QTY	SIZE	DESCRIPTION	PRICE @	TTL AMOUNT
1.	(12)	1/2 INCH	SG -R-05	$ 69.80	$ 837.60
2.	(6)	1/2 INCH	SG -R-06	$ 69.80	$ 418.80
3.	(3)	1/2 INCH	SG -R-07	$ 69.80	$ 209.40
4.	(1)	3/4 INCH	SG -R-05	$ 78.40	$ 78.40
5.	(2)	3/4 INCH	SG -R-06	$ 78.40	$ 156.80
6.	(3)	3/4 INCH	SG -R-07	$ 78.40	$ 235.20
7.	(9)	3/4 INCH	SG -R-08	$ 78.40	$ 705.60
8.	(12)	3/4 INCH	SG -R-09	$ 78.40	$ 940.80
9.	(1)	1/2 INCH	SG -B-05	$ 88.15	$ 88.15
10.	(2)	3/4 INCH	SG -B-00	$ 98.75	$ 197.50
11.	(1)	3/4 INCH	SG -B-05	$ 98.75	$ 98.75
12.	(3)	3/4 INCH	SG -B-06	$ 98.75	$ 296.25
13.	(3)	3/4 INCH	SG -B-08	$ 98.75	$ 296.25
14.	(2)	3/4 INCH	SG -B-09	$ 98.75	$ 197.50
15.	(1)	3/4 INCH	SG -B-10	$ 98.75	$ 98.75
16.	(1)	3/4 INCH	SG -B-11	$ 98.75	$ 98.75
17.	(1)	3/4 INCH	SG -B-15	$ 98.75	$ 98.75
18.	(3)	1.0 INCH	SG -B-00	$118.60	$ 355.80
19.	(1)	1.0 INCH	SG -B-05	$118.60	$ 118.60
20.	(1)	1/2 INCH	STRAINER 40-MESH SS SCREEN	$ 18.00	$ 18.00
21.	(14)	3/4 INCH	STRAINERS 40-MESH SS SCREEN	18.00	252.00
22.	(4)	1.0 INCH	STRAINERS 40-MESH SS SCREEN	29.50	118.00

TOTAL MATERIALS - $ 5,915.65

QUANTITIES BASED ON REQUEST FOR QUOTATION OF A STEAMGARD* SYSTEM FOR THE LISTED EQUIPMENT AND ASSOCIATED STEAM DISTRIBUTION LINES. THE ACTUAL NUMBER OF EQUIPMENT AND LINES MAY CHANGE 'BILL OF MATERIALS.' MATERIALS WILL BE SHIPPED AND BILLED TO TAKE INTO CONSIDERATION THESE CHANGES IN ACCORDANCE WITH THE PRICE LIST IN EFFECT AT TIME OF ORDER.

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11/30/82

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - R. BARANSKI
APPLICATIONS ENGR - M. TROY

PROPOSAL #10434
REVISION LETTER 'A'
SHEET 05 OF SHEET 05

GLENBROOK NORTH HIGH SCHOOL

51	B-332 CLASSROOM (1) --3/4 -- -	IN<BK> = 9< -3> PSIG AHU (#S-1) - SPECS REQUIRED CHECK STEAM TO TRAP TO VACUUM PIPING (PRV)	(1) 3/4 SG -B-O(
52	B-332 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 15 LF (PRV)	(1) 1/2 SG -R-O{
53	B-332 (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - TRANE #75 33% O.A. 750 CFM (SOL)	(1) 3/4 SG -R-O{
54	B-328 DRAFTING (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - TRANE #75 33% O.A. 1000 CFM (2) UNITS (SOL)	(2) 3/4 SG -R-O{
55	B-328 NORTH (1) --3/4 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 40 LF (PRV)	(1) 3/4 SG -R-O9
56	B-328 WEST (1) --3/4 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 30 LF (PRV)	(1) 3/4 SG -R-O{
57	B-328 DRAFTING (1) 1---- -- -	IN<BK> = 9< -3> PSIG AHU - S-3 SPECS REQUIRED (PRV)	(1) 1.0 SG -B-O(

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PROPOSAL #10434
REVISION LETTER 'A'
SHEET 04 OF SHEET 05

GLENBROOK NORTH HIGH SCHOOL

>> AREA B - INDUSTRIAL ARTS <<

35 B-346 SMALL ENG. — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -R-07
(1) --3/4 -- D — UNIT VENT - MODINE COIL 1-1/2 X 8 X 32 ASSUME 670 CFM 100% RECIRC. (SOL)

36 METAL SHOP CLASSROOM — IN<BK> = 9< -3> PSIG — (1) 1/2 SG -R-05
(1) --1/2 -- D — CONVECTOR - 4 X 4 X 15 LF (PRV)

37 METAL SHOP CLASSROOM — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -R-07
(1) --3/4 -- D — UNIT VENT - TRANE #75 100% O.A. 2" X 12" X 30" 500 CFM (SOL)

38 METAL SHOP B-344 — IN<BK> = 9< -3> PSIG — (1) 1.0 SG -B-05
(1) 1-1/4 -- - TAG #187 — DRIP - 3" X 20 LF AFTER PRV (PRV)

39 ROOM B-344 — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -B-15
(1) --3/4 -- - TAG #188 — AHU - 7500 CFM TRANE COIL APPROX 2 LF X 8 LF APPROX 60% O.A. (PRV)

40 ROOM B-344 — IN<BK> = 9< -3> PSIG — (1) 1.0 SG -B-0C
(1) 1---- -- - TAG #189 — AHU - +1-1/2 X 20 LF DRIP AAF #S2 COIL 24 X 40 SPECS REQUIRED (PRV)

41 HALL BY B-346 — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -R-07
(1) --3/4 -- D — UNIT VENT - NELSON COIL - 1-1/2 X 8 X 37 (LEAKING) ASSUME 1545 CFM I.A. (SOL)

42 B-340 AU TO SHOP — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -B-1C
(1) --3/4 -- - — HORIZ UH - MODINE HS720 24 X 24 COIL COOL AREA (2) UNITS

43 B-340 STORAGE — IN<BK> = 9< -3> PSIG — (1) 1/2 SG -R-05
(1) --1/2 -- D — CONVECTOR - 4 X 4 X 8 LF (PRV)

44 B-340 OFFICE — IN<BK> = 9< -3> PSIG — (1) 1/2 SG -R-06
(1) --1/2 -- D — CONVECTOR - 4 X 4 X 20 LF AT WINDOW/CEILING (PRV)

45 WOOD SHOP — IN<BK> = 9< -3> PSIG — (1) 1/2 SG -R-06
(1) --1/2 -- D — CONVECTOR - 4 X 4 X 20 LF AT WINDOW/CEILING (PRV)

46 WOOD SHOP — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -B-06
(1) --3/4 -- - — HORIZ UH - TRANE 15 X 17

47 B-336 PAINT STORAGE — IN<BK> = 9< -3> PSIG — (1) 1/2 SG -B-05
(1) --1/2 -- - — CONVECTOR - 4 X 4 X 15 LF STYLE CS VULCAN (PRV)

48 B-336 — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -R-09
(1) --3/4 -- D — CONVECTOR - 4 X 4 X 40 LF STYLE CS. (PRV)

49 B-336 — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -B-0C
(1) --3/4 -- - — DRIP - 4" X 200 LF APPROX END OF MAIN FEED FEED TO AHU GOOD TRAP

50 B-336 — IN<BK> = 9< -3> PSIG — (1) 1.0 SG -B-0C
(1) 1---- -- - — AHU - COIL APPROX 2 LF X 6 LF 1/3 2/3 CONTROL SPECS REQUIRED APPROX 60% O.A. (PRV)

ENGINEERING RESOURCES, INC.
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SURVEY / APPLICATIONS SCHEDULE

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PROPOSAL #10434
REVISION LETTER 'A'
SHEET 03 OF SHEET 05

GLENBROOK NORTH HIGH SCHOOL

>> AREA B - TUNNEL <<

27 BENEATH B-346 — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -B-0
(1) --3/4 -- - TAG #178 — DRIP - 2" X 20 LF + 4" X 30 LF END OF LINE

28 BENEATH LOCKERS — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -B-0
(1) --3/4 -- - TAG #179 — DRIP - 4" X 15 LF + 6" X 250 LF END OF MAIN BAD TRAP

29 BENEATH LOCKERS — IN<BK> = 9< -3> PSIG — (1) 1/2 SG -R-0
(1) --1/2 -- D TAG #180 — DRIP - 2" X 15 LF VERT. FEED TO LOCKERS BAD TRAP

30 BENEATH END OF HALL — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -B-0
(1) --3/4 -- - TAG #181 — DRIP - 2" X 180 LF END OF LINE BAD TRAP

31 BENEATH SCIENCE — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -B-0
(1) --3/4 -- - TAG #182 — DRIP - 2" X 180 LF BAD TRAP

32 BENEATH LOCKER — IN<BK> = 9< -3> PSIG — (1) 1/2 SG -R-0
(1) --1/2 -- D TAG #184 — DRIP - 2" X 15 LF VERT FEED TO LOCKER BAD TRAP

33 BENEATH WOODSHOP — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -B-0
(1) --3/4 -- - TAG #185 — DRIP - 6" X 300 LF EST. BAD TRAP

34 BENEATH B-346 — IN<BK> = 9< -3> PSIG — (1) 3/4 SG -R-0
(1) --3/4 -- D — DRIP - 2" X 40 LF

ENGINEERING RESOURCES, INC.
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PROPOSAL #10434
REVISION LETTER 'A'
SHEET 02 OF SHEET 05

GLENBROOK NORTH HIGH SCHOOL

17	B-350 WORKROOM (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 10 LF STYLE CS VULCAN	(1) 1/2 SG -R--05
18	B-354 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 12 LF + 1-1/2 X 10 LF BARE (PRV)	(1) 1/2 SG -R--05
19	B-354 (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - TRANE 125 33% O.A.. 1250 CFM (SOL)	(2) 3/4 SG -R--05
20	B-356 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 10 LF (PRV)	(1) 1/2 SG -R--05
21	B-356 (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - TRANE 125 33% O.A. ASSUMED (SOL)	(3) 3/4 SG -R--05
22	B-356 WORKSHOP (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 10 LF STYLE CS VULCAN	(1) 1/2 SG -R--05
23	B-358 CHEMISTRY (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 16 LF (PRV)	(1) 1/2 SG -R--04
24	B-358 (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - COIL 2 X 12 X 46 TRANE A-125 SN U796 33% O.A. ASSUME 1250 CFM (SOL)	(4) 3/4 SG -R--05
25	SCIENCE HALL (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 30 LF OVER LOCKERS (3) UNITS (PRV)	(3) 1/2 SG -R--07
26	B-358 TUNNEL (1) --3/4 -- D TAG #183	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 20 LF TRAP IN TUNNEL BELOW (PRV)	(1) 3/4 SG -R--04

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SHEET 01 OF SHEET 05

GLENBROOK NORTH HIGH SCHOOL

>> AREA B - OLD SCIENCE <<

1	PRE-SCHOOL STORAGE (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 5 LF NOT USED	(NOT APPLICABLE)
2	MEN'S ROOM (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 5 LF NOT WANTED. SHUT-OFF THE VALVE	(NOT APPLICABLE)
3	B-330 CHEM WORKSHOP (1) --3/4 -- -	IN<BK> = 9< -3> PSIG AHU - COIL 32 X 30 APPROX 33% O.A. ABOVE FALSE CEILING (PRV)	(1) 3/4 SG -B-11
4	B-330 (1) --3/4 -- -	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 21 LF (PRV)	(1) 3/4 SG -R-06
5	B-330 (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - (FAN) TRANE #75 2" X 10" X 31" COIL 750 CFM 33% O.A. (SOL)	(1) 3/4 SG -R-06
6	STOR B-330/332 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 6 LF LEAK. (PRV)	(1) 1/2 SG -R-05
7	B-334 E (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 21 LF (PRV)	(1) 1/2 SG -R-06
8	B-334 E (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - TRANE 33% O.A. 750 CFM (SOL)	(2) 3/4 SG -R-06
9	B-336 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 21 LF (PRV)	(1) 1/2 SG -R-06
10	B-336 (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - TRANE #75 750 CFM 33% O.A. (SOL)	(3) 3/4 SG -B-08
11	ACROSS FROM B-342 (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - MODINE COIL 1-1/2 X 8 X 33 ASSUME 900 CFM BY DOOR B65 C (SOL)	(1) 3/4 SG -R-08
12	GREENHOUSE OFFICE (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - 1-1/2 X 8 X 32 100% I.A. 600 CFM VERT FEED TO ROOM (SOL)	(1) 3/4 SG -R-08
13	GREENHOUSE OFFICE (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 3 LF AT CEILING HAND VALVE	(1) 1/2 SG -R-05
14	GREENHOUSE B-342 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 13 LF + 1-1/2 X 30 LF BARE PIPE AT COLD FLOOR HAND VALVE (PRV)	(1) 1/2 SG -R-05
15	B-350 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 20 LF + 1-1/2 X 10 LF BARE PIPE (PRV)	(1) 1/2 SG -R-06
16	B-350 (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - TRANE 125 33% O.A. ASSUME 1250 CFM (SOL)	(1) 3/4 SG -R-09

ENGINEERING RESOURCES, INC.
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BILL OF MATERIALS

PROPOSAL #10433
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GLENBROOK NORTH HIGH SCHOOL

ITEM	QTY	SIZE	DESCRIPTION	PRICE @	TTL AMOUNT
1.	(3)	3/4 INCH	SB -B-00	$ 98.75	$ 296.25
2.	(6)	3/4 INCH	SB -B-05	98.75	592.50
3.	(9)	3/4 INCH	STRAINERS 40-MESH SS SCREEN	$ 18.00	$ 162.00
			TOTAL MATERIALS -		$ 1,050.75

QUANTITIES BASED ON REQUEST FOR QUOTATION OF A STEAMGARD* SYSTEM FOR THE LISTED EQUIPMENT AND ASSOCIATED STEAM DISTRIBUTION LINES. THE ACTUAL NUMBER OF EQUIPMENT AND LINES MAY CHANGE 'BILL OF MATERIALS.' MATERIALS WILL BE SHIPPED AND BILLED TO TAKE INTO CONSIDERATION THESE CHANGES IN ACCORDANCE WITH THE PRICE LIST IN EFFECT AT TIME OF ORDER.

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APPLICATIONS ENGR - M. TROY

PROPOSAL #10433
REVISION LETTER 'A'
SHEET 01 OF SHEET 01

GLENBROOK NORTH HIGH SCHOOL

>> AREA H GENERAL - BASEMENT <<

1	ELEC MAINT SHOP	IN<BK> = 9< -3> PSIG		(1) 3/4 SG -B-05
	(1) --3/4 -- - TAG #160	DRIP - 3" X 40 LF FEED TO TUNNEL		
2	BENEATH OVERHEAD DR	IN<BK> = 9< -3> PSIG		(1) 3/4 SG -B-05
	(1) --3/4 -- - TAG #161	DRIP - 2-1/2 X 150 LF END OF LINE BY VALVE #10		
3	TUNNEL CORNER	IN<BK> = 9< -3> PSIG		(1) 3/4 SG -B-05
	(1) --3/4 -- - TAG #162	DRIP - 2-1/2 X 150 LF END OF LINE FROM CARP. SHOP		
4	TO AREA G	IN<BK> = 9< -3> PSIG		(1) 3/4 SG -B-0C
	(1) --3/4 -- - TAG #163	AHU - SEE G AREA GUIDANCE TAG #125 NEAR VALVES #11/12	(PRV)	
5	CARPENTER SHOP	IN<BK> = 9< -3> PSIG		(1) 3/4 SG -B-05
	(1) --3/4 -- - TAG #164	DRIP - 3" X 100 LF EST. FEED TO TAG #160/AREA H		
6	CARPENTER SHOP	IN<BK> = 9< -3> PSIG		(1) 3/4 SG -B-05
	(1) --3/4 -- - TAG #165	DRIP - 3" X 30 LF + 2" X 110 LF		
7	CARPENTER SHOP	IN<BK> = 9< -3> PSIG		(NOT APPLICABLE)
	(1) --1/2 -- -	CONVECTOR - FINS 6" X 6" X 8 LF TO BE REMOVED	NOT REQUIRED	
8	ELECTRIC SHOP	IN<BK> = 9< -3> PSIG		(1) 3/4 SG -B-05
	(1) --3/4 -- - TAG #166	DRIP - 2-1/2 X 40 LF FEED TO AHU		
9	EQUIPMENT 136	IN<BK> = 9< -3> PSIG		(1) 3/4 SG -B-0C
	(1) --3/4 -- - TAG #167	AHU - PREHEAT DUCT 24 X 42 ASSUME 50% O.A.	FEEDS H AREA/OLD GUIDANCE	(PRV)
10	EQUIPMENT 136	IN<BK> = 9< -3> PSIG		(1) 3/4 SG -B-0C
	(1) --3/4 -- - TAG #168	AHU - REHEAT COIL EST AS DUCT SIZE ALSO	(PRV)	

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

11/30/82

BILL OF MATERIALS

PROPOSAL #10432
REVISION LETTER 'A'

GLENBROOK NORTH HIGH SCHOOL

ITEM	QTY	SIZE	DESCRIPTION		PRICE @		TTL AMOUNT
1.	(18)	1/2 INCH	SG -R-05	.....	$ 69.80	$	1,256.40
2.	(1)	1/2 INCH	SG -R-08	.....	$ 69.80	$	69.80
3.	(1)	3/4 INCH	SG -R-06	.....	$ 78.40	$	78.40
4.	(2)	3/4 INCH	SG -R-07	.....	$ 78.40	$	156.80
5.	(2)	3/4 INCH	SG -R-08	.....	$ 78.40	$	156.80
6.	(1)	3/4 INCH	SG -B-00	.....	$ 98.75	$	98.75
7.	(1)	3/4 INCH	STRAINER	40-MESH SS SCREEN	$ 18.00	$	18.00
				TOTAL MATERIALS -		$	1,834.95

QUANTITIES BASED ON REQUEST FOR QUOTATION OF A STEAMGARD‡ SYSTEM FOR THE LISTED EQUIPMENT AND ASSOCIATED STEAM DISTRIBUTION LINES. THE ACTUAL NUMBER OF EQUIPMENT AND LINES MAY CHANGE 'BILL OF MATERIALS.' MATERIALS WILL BE SHIPPED AND BILLED TO TAKE INTO CONSIDERATION THESE CHANGES IN ACCORDANCE WITH THE PRICE LIST IN EFFECT AT TIME OF ORDER.

‡ STEAMGARD IS A REGISTERED TRADEMARK OF ERI

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

11/30/82

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - R. BARANSKI
APPLICATIONS ENGR - M. TROY

PROPOSAL #10432
REVISION LETTER 'A'
SHEET 02 OF SHEET 02

GLENBROOK NORTH HIGH SCHOOL

>> AREA G - FIRST FLOOR <<

13 HEWITT OFFICE (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 8 LF (SOL)	(1) 1/2 SG -R-05
14 HEWITT OFFICE (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 12 LF (SOL)	(1) 1/2 SG -R-05
15 PUBLIC ADDRESS (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 5 LF (SOL)	(1) 1/2 SG -R-05
16 COMPUTER OFFICE (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 5 LF (SOL)	(1) 1/2 SG -R-05
17 MAIL ROOM (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 6 LF (SOL)	(1) 1/2 SG -R-05
18 M.O. SWITCHBOARD (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 8 LF (SOL)	(1) 1/2 SG -R-05
19 SECURITY OFFICE (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 11 LF (SOL)	(1) 1/2 SG -R-05
20 ASSOC. PRINCIPAL (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 10 LF (SOL)	(1) 1/2 SG -R-05
21 ASSOC. PRINCIPAL (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - (FAN) 1000 CFM 100% O.A. 3" X 10" X 31" TRANE #75 (SOL)	(1) 3/4 SG -R-06
22 PRINCIPAL (1) --1/2 -- -	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 8 LF (SOL)	(1) 1/2 SG -R-05
23 CONFERENCE RUN (1) --3/4 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 18 LF (SOL)	(1) 3/4 SG -R-06
24 CONFERENCE (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - TRANE 75 COIL 3 X 10 X 31" 1000 CFM 100% O.A. 2 ROW (SOL)	(1) 3/4 SG -R-06

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS 11/30/82

SURVEY / APPLICATIONS SCHEDULE

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PROPOSAL #10432
REVISION LETTER 'A'
SHEET 01 OF SHEET 02

GLENBROOK NORTH HIGH SCHOOL

>> AREA G <<

1	STUDENT ACT OFFICE (1) --1/2 MH D	IN<BK> = 9< -3> PSIG CONVECTOR - 4" X 4" X 60"LG FINS (SOL)	(1) 1/2 SG -R-05
2	HALL BY G-18 (1) --3/4 MH D	IN<BK> = 9< -3> PSIG UNIT VENT - (FAN) 3 X 8 X 22 1000 CFM EST. (SOL)	(1) 3/4 SG -R-07
3	GUIDANCE OFFICES (4) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - FIN 4 X 4 X 72" BY WINDOW (4) UNITS (SOL)	(4) 1/2 SG -R-05
4	H-AREA TUNNEL (1) --3/4 MH D 2-4 TAG #125	IN<BK> = 9< -3> PSIG (NOT APPLICABLE) CONVECTOR - 4 X 4 X 20 LF SEE PROPOSAL #10204 (SOL)	
5	GUIDANCE OFFICE (1) --3/4 -- - TAG #170	IN<BK> = 9< -3> PSIG AHU - COIL 12" X 42" X 2"W 100%O.A. AHU-C IN CEILING SPECS REQUIRED (PRV)	(1) 3/4 SG -B-0(
6	GUIDANCE G-2 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4" X 4" X 12 LF (SOL)	(1) 1/2 SG -R-05
7	NURSES (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 12 LF (SOL)	(1) 1/2 SG -R-05
8	NURSES BED-S (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 15 LF (SOL)	(1) 1/2 SG -R-05
9	NURSES BED-N (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 5 LF (SOL)	(1) 1/2 SG -R-05
10	HALL/HEALTH OFFICE (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - (FAN) 2 X 8 X 30" 1000 CFM EST. BY FIRE ALARM #29 (SOL)	(1) 3/4 SG -R-07
11	ABOVE CARPEN SHOP (1) --1/2 -- D TAG #171	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 30 LF EST. UNDER SEAT IN HALL (SOL)	(1) 1/2 SG -R-08
12	UNDER ST ACT STRWY (1) --3/4 MH D	IN<BK> = 9< -3> PSIG (NOT APPLICABLE) AHU - COIL 12" X 3 LF 100% RECIRC. NO REQUIRED - TO BE SHUT OFF. (NO SOL)	

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

11/30/82

BILL OF MATERIALS

PROPOSAL #10431
REVISION LETTER 'A'

GLENBROOK NORTH HIGH SCHOOL

ITEM	QTY	SIZE	DESCRIPTION	PRICE @	TTL AMOUNT
1.	(15)	1/2 INCH	SG -R-05	$ 69.80	$ 1,047.00
2.	(1)	1/2 INCH	SG -R-06	$ 69.80	$ 69.80
3.	(1)	1/2 INCH	SG -R-07	$ 69.80	$ 69.80
4.	(17)	3/4 INCH	SG -R-07	$ 78.40	$ 1,332.80
5.	(2)	3/4 INCH	SG -R-08	$ 78.40	$ 156.80

TOTAL MATERIALS - $ 2,676.20

QUANTITIES BASED ON REQUEST FOR QUOTATION OF A STEAMGARD* SYSTEM FOR THE LISTED EQUIPMENT AND ASSOCIATED STEAM DISTRIBUTION LINES. THE ACTUAL NUMBER OF EQUIPMENT AND LINES MAY CHANGE 'BILL OF MATERIALS.' MATERIALS WILL BE SHIPPED AND BILLED TO TAKE INTO CONSIDERATION THESE CHANGES IN ACCORDANCE WITH THE PRICE LIST IN EFFECT AT TIME OF ORDER.

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ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

11/30/82

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - R. BARANSKI
APPLICATIONS ENGR - M. TROY

PROPOSAL #10431
REVISION LETTER 'A'
SHEET 02 OF SHEET 02

GLENBROOK NORTH HIGH SCHOOL

17 ROOM F-712 (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - FAN HN 750 CFM 191 EDR -10F ADESGN 2 PSI RATING START 35%OA THESE (SOL)	(1) 3/4 SG -R-07
18 STORAGE F-708 (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - (FAN) 33%O.A. 750 CFM EST. TOTAL HTG EDR 191 HN-RJCG342I-3 (SOL)	(1) 3/4 SG -R-07
19 F-708 (2) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 6 LF (2) UNITS (SOL)	(2) 1/2 SG -R-05
20 F-708 (2) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - FAN HN 750 CFM 191 EDR -10F ADESGN 2 PSI RATING START 35%OA THESE (SOL)	(2) 3/4 SG -R-07
21 F-708 TYPING OFF (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 6 LF (SOL)	(1) 1/2 SG -R-05
22 F-708 TYPING OFF (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - FAN HN 750 CFM 191 EDR -10F ADESGN 2 PSI RATING START 35%OA THESE (SOL)	(1) 3/4 SG -R-07
23 F-700 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 6 LF (SOL)	(1) 1/2 SG -R-05
24 F-700 (2) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - FAN HN 750 CFM 191 EDR -10F ADESGN 2 PSI RATING START 35%OA THESE (SOL)	(2) 3/4 SG -R-07
25 F-704 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 6 LF (SOL)	(1) 1/2 SG -R-05
26 F-704 (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - FAN HN 750 CFM 191 EDR -10F ADESGN 2 PSI RATING START 35%OA THESE (SOL)	(1) 3/4 SG -R-07
27 F-704 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 6 LF (SOL)	(1) 1/2 SG -R-05
28 F-704 (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - FAN HN 750 CFM 191 EDR -10F ADESGN 2 PSI RATING START 35%OA THESE (SOL)	(1) 3/4 SG -R-07

ENGINEERING RESOURCES, INC.
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SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - R. BARANSKI
APPLICATIONS ENGR - M. TROY

PROPOSAL #10431
REVISION LETTER 'A'
SHEET 01 OF SHEET 02

GLENBROOK NORTH HIGH SCHOOL

>> AREA F <<

1	DOOR 152-GM (1) --1/2 -- D	IN<BK> = 9< -3> PSIG (1) 1/2 SG -R-07 UNIT VENT - (FAN) COIL 1-1/2 X 8 X 48 1300 CFM EST. FACE DIM 20 X 57. (SOL)
2	BOY'S WASHROOM (1) --1/2 -- D	IN<BK> = 9< -3> PSIG (1) 1/2 SG -R-06 UNIT VENT - (FAN) 1-1/2 X 8 36 TRANE FULL LOUVER COVER 28 X 42. (SOL)
3	ENTRANCE - 425 (1) --3/4 -- D	IN<BK> = 9< -3> PSIG (1) 3/4 SG -R-06 UNIT VENT - (FAN) 2 X 10 X 48 WDZF-2431 452 EDR 1383 CFM H NELSON CASE 60X34 (SOL)
4	LADIES (1) --1/2 -- D	IN<BK> = 9< -3> PSIG (1) 1/2 SG -R-05 CONVECTOR - 4 X 4 X 10 LF (SOL)
5	CPA ENTRANCE (1) --3/4 -- D	IN<BK> = 9< -3> PSIG (1) 3/4 SG -R-06 UNIT VENT - (FAN) 1-1/2 X 8 X 5 LF HN ABOUT 450 EDR FIRE ALARM 59. (SOL)
6	ROOM F-722 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG (1) 1/2 SG -R-05 CONVECTOR - 4 X 4 X 6 LF (SOL)
7	ROOM F-722 (1) --3/4 -- D	IN<BK> = 9< -3> PSIG (1) 3/4 SG -R-07 UNIT VENT - FAN HN 750 CFM 191 EDR -10F ADESGN 2 PSI RATING START 35%OA THESE (SOL)
8	ROOM F-718 (2) --1/2 -- D	IN<BK> = 9< -3> PSIG (2) 1/2 SG -R-05 CONVECTOR - 4 X 4 X 6 LF (2) UNITS (SOL)
9	ROOM F-718 (2) --3/4 -- D	IN<BK> = 9< -3> PSIG (2) 3/4 SG -R-07 UNIT VENT - FAN HN 750 CFM 191 EDR -10F ADESGN 2 PSI RATING START 35%OA THESE (SOL)
10	ROOM F-720 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG (1) 1/2 SG -R-05 CONVECTOR - 4 X 4 X 6 LF (SOL)
11	ROOM F-720 (2) --3/4 -- D	IN<BK> = 9< -3> PSIG (2) 3/4 SG -R-07 UNIT VENT - FAN HN 750 CFM 191 EDR -10F ADESGN 2 PSI RATING START 35%OA THESE (SOL)
12	ROOM F-716 (2) --1/2 -- D	IN<BK> = 9< -3> PSIG (2) 1/2 SG -R-05 CONVECTOR - 4 X 4 X 6 LF (2) UNITS (SOL)
13	ROOM F-716 (1) --3/4 -- D	IN<BK> = 9< -3> PSIG (1) 3/4 SG -R-07 UNIT VENT - FAN HN 750 CFM 191 EDR -10F ADESGN 2 PSI RATING START 35%OA THESE (SOL)
14	ROOM F-714 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG (1) 1/2 SG -R-05 CONVECTOR - 4 X 4 X 6 LF (SOL)
15	ROOM F-714 (2) --3/4 -- D	IN<BK> = 9< -3> PSIG (2) 3/4 SG -R-07 UNIT VENT - FAN HN 750 CFM 191 EDR -10F ADESGN 2 PSI RATING START 35%OA THESE (SOL)
16	ROOM F-712 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG (1) 1/2 SG -R-05 CONVECTOR - 4 X 4 X 6 LF (SOL)

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

11/30/82

BILL OF MATERIALS

PROPOSAL #10430
REVISION LETTER 'A'

GLENBROOK NORTH HIGH SCHOOL

ITEM	QTY	SIZE	DESCRIPTION		PRICE @		TTL AMOUNT
1.	(5)	1/2 INCH	SG -R-05	.....	$ 69.80	$	349.00
2.	(3)	1/2 INCH	SG -R-06	.....	$ 69.80	$	209.40
3.	(1)	1/2 INCH	SG -R-07	.....	$ 69.80	$	69.80
4.	(1)	1/2 INCH	SG -R-08	.....	$ 69.80	$	69.80
5.	(4)	3/4 INCH	SG -R-06	.....	$ 78.40	$	313.60
6.	(3)	3/4 INCH	SG -R-07	.....	$ 78.40	$	235.20
7.	(3)	3/4 INCH	SG -R-08	.....	$ 78.40	$	235.20
8.	(1)	3/4 INCH	SG -R-09	.....	$ 78.40	$	78.40
9.	(1)	3/4 INCH	SG -B-00	.....	$ 98.75	$	98.75
10.	(1)	3/4 INCH	STRAINER	40-MESH SS SCREEN	$ 18.00	$	18.00

TOTAL MATERIALS - $ 1,677.15

QUANTITIES BASED ON REQUEST FOR QUOTATION OF A STEAMGARD* SYSTEM FOR THE LISTED EQUIPMENT AND ASSOCIATED STEAM DISTRIBUTION LINES. THE ACTUAL NUMBER OF EQUIPMENT AND LINES MAY CHANGE 'BILL OF MATERIALS.' MATERIALS WILL BE SHIPPED AND BILLED TO TAKE INTO CONSIDERATION THESE CHANGES IN ACCORDANCE WITH THE PRICE LIST IN EFFECT AT TIME OF ORDER.

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ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

11/30/82

SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - R. BARANSKI
APPLICATIONS ENGR - M. TROY

PROPOSAL #10430
REVISION LETTER 'A'
SHEET 02 OF SHEET 02

GLENBROOK NORTH HIGH SCHOOL

17	CLAY ROOM C-406 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 20 LF (SOL)	(1) 1/2 SG -R-04
18	CLAY ROOM C-406 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 9 LF (SOL)	(1) 1/2 SG -R-05
19	CLAY ROOM C-406 (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - (FAN) TRANE A125 1560 CFM 100% O.A. (SOL)	(1) 3/4 SG -R-06
20	CLAY RODM C-406 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 26 LF (SOL)	(1) 1/2 SG -R-07

ENGINEERING RESOURCES, INC.
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SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - R. BARANSKI
APPLICATIONS ENGR - M. TROY

PROPOSAL #10430
REVISION LETTER 'A'
SHEET 01 OF SHEET 02

GLENBROOK NORTH HIGH SCHOOL

>> AREA C <<

1	HALL SHOWCASE (2) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - (FAN) 1-1/2" X 8 X 42"LG SEE ALSO TAG #128 (2) UNITS (SOL)	(2) 3/4 SG -R-06
2	C-416 (1) --3/4 -- -	IN<BK> = 9< -3> PSIG AHU - SPECS REQUIRED. KITCHEN OF HOME ECONOMICS (PRV)	(1) 3/4 SG -B-00
3	C-416 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - (NO FAN) 4 X 4 X 12 LF (SOL)	(1) 1/2 SG -R-05
4	C-410 DEMO ROOM (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - (FAN) 1560 CFM 100%O.A. TRANE SIZE 75 (SOL)	(1) 3/4 SG -R-09
5	C-408 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - (NO FAN) 4 X 4 X 18 LF COMES FROM C-410 (SOL)	(1) 1/2 SG -R-06
6	C-408 (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - (FAN) 10" X 30" X 3" 1000 CFM APPROX TRANE SIZE 75 (SOL)	(1) 3/4 SG -R-07
7	HALL DOOR 80-P (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - (FAN) 1-1/2 X 9 X 4 LF EST. 1000 CFM MODINE (SOL)	(1) 3/4 SG -R-06
8	DOOR 12-N (1) --1/2 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - (FAN) 4 X 8 X 29" 315 CFM TRANE 100-2. SN F007. (SOL)	(1) 1/2 SG -R-06
9	DOOR 79-P (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - (FAN) 3 X 8 X 3 LF COIL MODINE EST. 1500 CFM CLASS ROOM C-400 (SOL)	(1) 3/4 SG -R-07
10	C-400 (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - (FAN) 12" X 46" X 3" 1560 CFM 100%O.A. TRANE A125 SN U782. (SOL)	(1) 3/4 SG -R-08
11	C-402 (1) --3/4 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 25 LF FROM C-400 (SOL)	(1) 3/4 SG -R-07
12	C-402 (1) --3/4 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 18 LF (SOL)	(1) 3/4 SG -R-06
13	C-402 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - (FAN) TRANE A125 1560 CFM 100%O.A. (SOL)	(1) 1/2 SG -R-08
14	C-406 (1) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 6 LF (SOL)	(1) 1/2 SG -R-05
15	C-406 (2) --1/2 -- D	IN<BK> = 9< -3> PSIG CONVECTOR - 4 X 4 X 12 LF (2) UNITS (SOL)	(2) 1/2 SG -R-05
16	C-406 (1) --3/4 -- D	IN<BK> = 9< -3> PSIG UNIT VENT - TRANE A125 1560 CFM 100%O.A. (SOL)	(1) 3/4 SG -R-08

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

11/30/82

BILL OF MATERIALS

PROPOSAL #10429
REVISION LETTER 'A'
PAGE 01 OF PAGE 01

GLENBROOK NORTH HIGH SCHOOL

ITEM	QTY	SIZE	DESCRIPTION		PRICE @		TTL AMOUNT
1.	(4)	1/2 INCH	SG -R-05	.....	$ 69.80	$	279.20
2.	(1)	1/2 INCH	SG -R-08	.....	$ 69.80	$	69.80
3.	(1)	3/4 INCH	SG -B-09	.....	$ 98.75	$	98.75
4.	(1)	3/4 INCH	STRAINER	40-MESH SS SCREEN	$ 18.00	$	18.00
				TOTAL MATERIALS -		$	465.75

QUANTITIES BASED ON REQUEST FOR QUOTATION OF A STEAMGARD‡ SYSTEM FOR THE LISTED EQUIPMENT AND ASSOCIATED STEAM DISTRIBUTION LINES. THE ACTUAL NUMBER OF EQUIPMENT AND LINES MAY CHANGE 'BILL OF MATERIALS.' MATERIALS WILL BE SHIPPED AND BILLED TO TAKE INTO CONSIDERATION THESE CHANGES IN ACCORDANCE WITH THE PRICE LIST IN EFFECT AT TIME OF ORDER.

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SURVEY / APPLICATIONS SCHEDULE

SALES ENGINEER - R. BARANSKI
APPLICATIONS ENGR - M. TROY

PROPOSAL #10429
REVISION LETTER 'A'
SHEET 01 OF SHEET 01

GLENBROOK NORTH HIGH SCHOOL

>> AREA B <<

1	LITTLE THEATER (1) --3/4 -- - TAG #169	IN<BK> = 9< -3> PSIG DRIP - 2-1/2" X 250 LF EST. UNINSULATED FEED TO C-424 STUDY HALL.	(1) 3/4 SG -B-09
2	HALL BY ROOM B-322 (1) --1/2 MH D	IN<BK> = 9< -3> PSIG UNIT VENT - (FAN) COIL 3" X 9" X 50"LG 1500 CFM EST. (SOL)	(1) 1/2 SG -R-08
3	BY WINDOW (2) --1/2 MH D	IN<BK> = 9< -3> PSIG CONVECTOR - 4" X 4" X 66" (NO FAN) NO SOLENOID. (2) WINDOW UNITS	(2) 1/2 SG -R-05
4	FACULTY CAFETERIA (1) --1/2 MH D	IN<BK> = 9< -3> PSIG CONVECTOR - (NO FAN) 4" X 4" X 66" (2) WINDOW UNITS (SOL)	(2) 1/2 SG -R-05

ENGINEERING RESOURCES, INC.
CHICAGO, ILLINOIS

11/30/82

BILL OF MATERIALS

PROPOSAL #10428
REVISION LETTER 'A'

GLENBROOK NORTH HIGH SCHOOL

ITEM	QTY	SIZE	DESCRIPTION	PRICE @	TTL AMOUNT
1.	(1)	3/4 INCH	SG -B-04	$ 98.75	$ 98.75
2.	(4)	3/4 INCH	SG -B-05	98.75	395.00
3.	(2)	3/4 INCH	SG -B-06	98.75	197.50
4.	(1)	1.0 INCH	SG -B-08	118.60	118.60
5.	(1)	1.0 INCH	SG -B-09	118.60	118.60
6.	(7)	3/4 INCH	STRAINERS 40-MESH SS SCREEN	$ 18.00	$ 126.00
7.	(2)	1.0 INCH	STRAINERS 40-MESH SS SCREEN	29.50	59.00

TOTAL MATERIALS - $ 1,113.45

QUANTITIES BASED ON REQUEST FOR QUOTATION OF A STEAMGARD* SYSTEM FOR THE LISTED EQUIPMENT AND ASSOCIATED STEAM DISTRIBUTION LINES. THE ACTUAL NUMBER OF EQUIPMENT AND LINES MAY CHANGE 'BILL OF MATERIALS.' MATERIALS WILL BE SHIPPED AND BILLED TO TAKE INTO CONSIDERATION THESE CHANGES IN ACCORDANCE WITH THE PRICE LIST IN EFFECT AT TIME OF ORDER.

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APPLICATIONS ENGR - M. TROY

PROPOSAL #10428
REVISION LETTER 'A'
SHEET 01 OF SHEET 01

GLENBROOK NORTH HIGH SCHOOL

>> FAN ROOM A & CRAWL SPACE AREA <<

1	CRAWL SPACE (1) --3/4 -- -	TAG #150	IN<BK> = 9< -3> PSIG DRIP - 2" X 100 LF + 3" X 150 LF END OF LINE SG-B-06 REQUIRES INSTALLATION OR 1" 19A	(1) 3/4 SG -B-06
2	CRAWL SPACE (1) --3/4 -- -	TAG #151	IN<BK> = 9< -3> PSIG DRIP - 2" X 15 LF END OF LINE NOT USED AHU	(1) 3/4 SG -B-04
3	CRAWL SPACE (1) 1---- -- -	TAG #152	IN<BK> = 9< -3> PSIG DRIP - 8" X 400 LF EST BAD TRAP END OF BOILER FEED TO AREA	(1) 1.0 SG -B-09 OR 1" 17A
4	CRAWL SPACE (1) --3/4 MN D 2-4	TAG #153	IN<BK> = 9< -3> PSIG (NOT APPLICABLE) AHU - TRANE UNIVENTILATOR SIZE 50. NOT USED. NO DRIP. RECOMMEND DRIP OR VALVE.	
5	CRAWL SPACE (1) --3/4 -- -	TAG #154	IN<BK> = 9< -3> PSIG DRIP - 2" X 60 LF FEED TO UPSTAIRS. TRAP PLUGGED.	(1) 3/4 SG -B-05
6	CRAWL SPACE (1) 1---- -- -	TAG #155	IN<BK> = 9< -3> PSIG DRIP - 6" X 200 LF + 4" X 80 LF END OF LINE NEAR TAG #150	(1) 1.0 SG -B-08
7	AFTER SHUT-OFF (1) --3/4 -- -	TAG #156	IN<BK> = 9< -3> PSIG DRIP - 6" X 75 LF + 4" X 125 LF TUNNEL	(1) 3/4 SG -B-05
8	OPPOSITE BELOW (1) --3/4 -- -	TAG #157	IN<BK> = 9< -3> PSIG DRIP - 3" X 150 LF + 2" X 50 LF END OF LINE TUNNEL	(1) 3/4 SG -B-05
9	SIDE TUNNEL TAKE-OFF (1) --3/4 -- -	TAG #158	IN<BK> = 9< -3> PSIG DRIP - 3" X 130 LF + 2" X 160 LF END OF LINE TUNNEL	(1) 3/4 SG -B-06
10	FAN ROOM A (1) --3/4 -- -	TAG #159	IN<BK> = 9< -3> PSIG DRIP - 3" X 30 LF FEED OUT OF ROOM	(1) 3/4 SG -B-05

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STEAM MISER™

CONDENSATE LOAD, W_A

STEP 1. FACTOR "D"

P_i PSIG	D	P_i PSIG	D
5	315	125	48
10	213	150	44
15	167	175	41
20	139	200	38
25	121	250	34
30	108	300	32
40	90	350	29
50	78	400	28
60	70	450	26
80	60	500	25
100	53		

STEP 2. FACTOR "B"

$\frac{P_b}{P_i}$ %	B
5	1.03
10	1.05
15	1.09
20	1.12
25	1.16
30	1.20
35	1.24
40	1.29

STEP 3. FACTOR "C"

SG	C	SG	C
1	- 8	14	221- 280
2	19- 13	15	281- 340
3	14- 16	16	341- 530
4	17- 21	17	531- 770
5	22- 30	18	771-1040
6	31- 43	19	1041-1360
7	44- 59	20	1361-1800
8	60- 77	21	1801-2400
9	78- 92	22	2401-3070
10	93-118	23	3071-4180
11	119-150	24	4181-5460
12	151-180	25	5461-7700
13	181-220		

PROCEDURE

STEP 1. Determine: INLET STEAM PRESSURE, P_i (PSIG) FIND "D"

STEP 2. Determine: BACK PRESSURE, P_b (PSIF) FIND "B"

STEP 3. Determine: ACTUAL CONDENSATE LOAD, W_A (UNDER WORST CONDITIONS) (LB/HR)

CALCULATE "C"

$$C = W_A \cdot \frac{D}{100} \cdot B$$

SELECT MODEL BASED ON "C"

ORIGINAL SYSTEMS
33956 N. Fairfield Road
Round Lake, Illinois 60073
RON BARANSKI
(312) 546-1210

EXAMPLE #1. INDIVIDUAL CASE

STEP 1. INLET STEAM PRESSURE, P_i = 15 PSIG D = 167

STEP 2. BACK PRESSURE, P_b = 1½ PSIG B = 1.05

STEP 3. CONDENSATE LOAD W_A = 200 LB/HR

CALCULATE $C = \frac{200}{100} \times 161 \times 1.05 = 338$

USE MODEL "SG 15"

EXAMPLE #2. USEFUL RANGE OF A GIVEN MODEL

STEP 1. INLET STEAM PRESSURE, P_i = 30 PSIG D = 108

STEP 2. BACK PRESSURE, P_b = 3 PSIG MAX B = 1.05

STEP 3. CONSIDER MODEL "SG 15"

$C = 281 - 340$

FIND W_A MAX & W_A MIN $W_A = 100 \times C / (D \times B)$

W_A MAX $= 100 \times 340 / (108 \times 1.05)$

$= 300$ LB/HR

W_A MIN $= 100 \times 281 / (108 \times 1.05)$

$= 248$ LB/HR

* W_A MIN may be less than 248 LB/HR to standardize similar applications on as few models as economically feasible.

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THERMAL OUTPUT, Q

STEP 1. FACTOR "D"

P_i PSIG	D	P_i PSIG	D
5	395	125	66
10	269	150	61
15	212	175	58
20	178	200	55
25	156	250	50
30	139	300	47
40	117	350	45
50	103	400	43
60	93	450	41
80	81	500	40
100	73		

STEP 2. FACTOR "B"

$\frac{P_b}{P_i}$ %	B
5	1.03
10	1.05
15	1.09
20	1.12
25	1.16
30	1.20
35	1.24
40	1.29

STEP 3. FACTOR "C"

SG	C	SG	C
1	- 10	14	261- 330
2	11- 16	15	331- 410
3	17- 19	16	411- 640
4	20- 26	17	641- 920
5	27- 36	18	921-1260
6	37- 52	19	1261-1640
7	53- 72	20	1641-2170
8	73- 93	21	2171-1880
9	94-110	22	2881-3690
10	111-140	23	3691-5030
11	141-180	24	5031-6570
12	181-210	25	6571-9260
13	211-260		

PROCEDURE

STEP 1. Determine: INLET STEAM PRESSURE, P_i (PSIG) FIND "D"

STEP 2. Determine: BACK PRESSURE, P_b (PSIG) FING "B"

STEP 3. Determine: REQ'D THERMAL OUTPUT, Q (BTU/HR) "UNDER WORST CONDITIONS"

CALCULATE "C"

$$C = Q \cdot \frac{D}{100000} \cdot B$$

SELECT MODEL BASED ON "C"

EXAMPLE:

STEP 1. INLET STEAM PRESSURE, P_i = 100 PSIG D = 73

STEP 2. BACK PRESSURE P_b = 0 PSIG B = 1.0

STEP 3. REQ'D THERMAL OUTPUT, Q = 240,000 BTU/HR

CALCULATE $C = \frac{240,000}{100,000} \times 73 \times 1.0 = 175$

USE MODEL "SG 11"

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MISER

DISTRIBUTION SYSTEMS - INSULATED LINES ONLY

STEP 1. FACTOR "S"

PIPE SIZE IPS	INSULATION THICKNESS, IN. TK=1	TK=2	TK=3
1	324	489	601
2	214	346	441
3	158	267	350
4	129	227	297
5	108	190	256
6	92	165	226
8	73	133	185
10	60	111	155
12	51	96	135
14	47	88	125
16	41	78	111
18	37	70	101
20	33	64	92
24	28	54	78

STEP 2. FACTOR "D"

P_i PSIG	MINIMUM AMBIENT TEMP °F 70 INDOOR	40	20	0	-10	-20 OUTDOOR
5	236	307	335	361	314	386
10	182	235	254	273	282	291
15	160	205	221	236	244	251
25	139	175	188	200	206	212
40	123	154	164	173	178	182
60	112	138	146	154	158	162
80	105	129	136	143	146	149
100	100	122	128	134	137	140
120	96	117	123	128	131	134
150	92	111	116	121	123	126
175	88	106	111	116	118	120
200	86	103	108	112	114	116
250	82	98	102	106	107	109
300	79	94	98	101	103	105
350	77	91	95	98	99	101
400	75	89	92	95	97	98
500	74	88	71	94	95	96

STEP 3. FACTOR "B"

$\frac{P_b}{P_i}$ %	B
5	1.03
10	1.05
15	1.09
20	1.12
25	1.16
30	1.20
35	1.24
40	1.29

STEP 4. FACTOR "C_M"

TYPE OF INSULATION MATERIAL	C_M
FIBER GLASS	1.00
RUBBER FOAM	1.00
CALCIUM SILICATE	1.45
RIGID CELLULAR GLASS	1.50
85% MAGNESIA	1.55
URETHANE FOAM	0.75

STEP 5. FACTOR "C"

SG	C
1	0-64
2	65-100
3	101-120
4	121-160
5	161-220
6	221-320
7	321-440
8	441-570
9	571-670

PROCEDURE

STEP 1. Determine: PIPE SIZE, IPS (INCHES)
INSULATION THICKNESS, TK (INCHES) — Find "S"

STEP 2. Determine: MIN. AMBIENT TEMPERATURE (°F)
INLET STEAM PRESSURE, P_i (PSIG) — Find "D"

STEP 3. Determine: BACK PRESSURE, P_b (PSIG) — Find "B"

STEP 4. Determine: TYPE OF INSULATION MATERIAL — Find "C_M"

STEP 5. Determine: PIPE LENGTH, L (FEET)
CALCULATE "C"
SELECT MODEL BASED ON "C"

$$C = L \cdot \frac{D}{S} \cdot B \cdot C_M$$

EXAMPLE #1. SINGLE DISTRIBUTION LINE

STEP 1.	PIPE SIZE INSULATION THICKNESS,	8" IPS TK = 2"	S = 133
STEP 2.	MIN. AMBIENT TEMP, INDOOR, INLET STEAM PRESSURE,	T_A = 70 ^{o}F P_i = 100 PSIG	D = 100
STEP 3.	BACK PRESSURE,	P_b = 0 PSIG	B = 1.0
STEP 4.	TYPE OF INSULATION MAT'L	FIBER GLASS	C_M = 1.0
STEP 5.	PIPE LENGTH,	L = 400 FT	
	CALCULATE	$C = 400 \times \frac{100}{133} \times 1.0 \times 1.0 = 301$	
	USE MODEL "SG 6"		

EXAMPLE #2. FIND RANGE OF "L" USING "SG 6"
SAME CONDITIONS AS EXAMPLE #1.

STEP 5. FOR "SG 6" $C = 221 - 320$

$L = C \cdot S / (D \cdot B \cdot C_M)$

MAX $L = 320 \times 133 / 100 = 426$ FT

MIN $L = 221 \times 133 / 100 = 294$ FT

USE "SG 6" FOR L = 290 - 430 FT

EXAMPLE #3. PIPE OF DIFFERENT SIZES		PIPE #1		PIPE #2	
STEP 1.	PIPE SIZE, INSULATION THICKNESS,	8" IPS 2"	S_1 = 133	4" IPS 2"	S_2 = 227
STEP 2.	MIN AMBIENT TEMP INLET STEAM PRESSURE,	70 ^{o}F 60 PSIG	D_1 = 112	0 ^{o}F 60 PSIG	D_2 = 154
STEP 3.	BACK PRESSURE,			0 PSIG	B = 1.0
STEP 4.	TYPE OF INSULATION MAT'L	CALCIUM SILICATE			
		C_{M1} = 1.45		C_{M2} = 1.45	
STEP 5.	PIPE LENGTHS	100 FT		300 FT	
	CALCULATE	$C_1 = 100 \times \frac{112}{133} \times 1.00 \times 1.45 = 112$			
		$C_2 = 300 \times \frac{154}{227} \times 1.00 \times 1.45 = 295$			
		$C = C_1 + C_2$			= 417
	USE MODEL "SG 7"				

MISER

Memo

Date November 14, 1980

To All Personnel

From Michael Troy MT

File

Subject Extension of Factor "C" for Steam Distribution Systems - Insulated line only.

SG	C
10	671- 870
11	871- 1090
12	1091- 1300
13	1301- 1600
14	1601- 2030
15	2031- 2500
16	2501- 3910
17	3911- 5630
18	5631- 7560
19	7561-10000

The above models are not generally applicable to steam lines due to their large sizes. Therefore, the distribution of this memo should be confined to customers known to have large pipes with substantial distances between drip legs.

Be sure to check your assumptions and calculation if you find that you need to employ the above extention table.

MT:sf

MISER

STEAM TRACING

ENGINEERING RESOURCES, INC.

STEP 1. FACTOR "S"

PIPE SIZE IPS	INSULATION THICKNESS, IN. TK=1	TK=2	TK=3
1	273	458	597
2	217	375	499
3	179	316	426
4	155	277	378
5	135	245	338
6	120	220	305
8	99	184	259
10	84	157	223
12	73	138	197
14	68	129	184
16	60	116	166
18	55	105	151
20	50	96	139
24	42	82	120

STEP 2. FACTOR "D"

P_i PSIG	PRODUCT PIPE TEMPERATURE - MIN. AMBIENT TEMP $\Delta T = T_p - T_A$ ^oF OUTDOOR APPLICATIONS* 60	80	100	120	140	160	180	200	225	250	275	300	P_i PSIG
5	168	223	277	331	383	434	482	530					5
10	121	160	199	237	274	310	347	381	420				10
15	100	132	164	195	226	257	286	314	348				15
25	78	103	129	153	178	202	224	248	275	300			25
40	62	82	102	122	142	160	179	196	219	239	259		40
60	50	67	83	99	152	131	146	161	179	196	212		60
80	43	58	72	86	99	113	126	138	154	169	183	197	80
100	38	51	63	76	88	100	112	123	137	150	163	175	100
120	35	46	57	68	80	90	101	111	124	136	148	158	120
150	31	41	51	61	70	80	90	98	110	121	131	141	150
175	28	37	47	56	65	74	82	91	101	112	121	130	175
200	26	35	44	52	61	69	77	85	95	105	114	123	200
250	24	32	40	48	56	64	71	79	88	96	105	113	250

STEP 3. FACTOR "B"

$\frac{P_b}{P_i}$ %	B
5	1.03
10	1.05
15	1.09
20	1.12
25	1.16
30	1.20
35	1.24
40	1.29

STEP 4. FACTOR "C_M"

TYPE OF INSULATION MATERIAL	C_M
FIBER GLASS	1.00
RUBBER FOAM	1.00
CALCIUM SILICATE	1.45
RIGID CELLULAR GLASS	1.50
85% MAGNESIA	1.55
URETHANE FOAM	0.75

STEP 5. FACTOR "C"

SG	C
1	0-64
2	65-100
3	101-120
4	121-160
5	161-220
6	221-320
7	321-440
8	441-570
9	571-670

PROCEDURE

STEP 1. Determine: PRODUCT PIPE SIZE, IPS (INCHES) — INSULATION THICKNESS, TK (INCHES) — Find "S"

STEP 2. Determine: TEMPERATURE DIFFERENCE, ΔT (^oF) — INLET STEAM PRESSURE, P_i (PSIG) — Find "D"

STEP 3. Determine: BACK PRESSURE, P_b (PSIG) — Find "B"

STEP 4. Determine: TYPE OF INSULATION MATERIAL — Find "C_M"

STEP 5. Determine: PRODUCT PIPE LENGTH, L (FEET)

CALCULATE "C"

*MULTIPLY C BY 0.9 FOR INDOOR

$$C = L \cdot \frac{D}{S} \cdot B \cdot C_M$$

SELECT MODEL BASED ON "C"

100 — 3A

EXAMPLE #1 SIZING FOR AN INDIVIDUAL PIPE

STEP 1.	PRODUCT PIPE SIZE, IPS	6"	S = 220
	INSULATION THICKNESS, TK	2"	
STEP 2.	TEMPERATURE DIFFERENCE, ΔT	$160^{O}F$	D = 100
	INLET STEAM PRESSURE, P_i	100 PSIG	
STEP 3.	BACK PRESSURE, P_b	5 PSIG	B = 1.03
STEP 4.	TYPE OF INSULATION MAT'L	GLASS FIBER	C_M = 1.00
STEP 5.	PRODUCT PIPE LENGTH, L	300 FT	
	OUTDOOR		

$$C = 300 \times \frac{100}{220} \times 1.03 \times 1.00 = 141$$

USE MODEL SG 4

EXAMPLE #2 SIZING FOR A GROUP OF PIPES

INLET STEAM PRESSURE, P_i	100 PSIG	B = 1.03
BACK PRESSURE, P_b	5 MAX	
INSULATION THICKNESS, TK	2"	
INSULATION MATERIAL	GLASS FIBER	
TEMPERATURE DIFFERENCE	$120^{O}F$ & $160^{O}F$	
PRODUCT PIPE SIZE, IPS	6", 8" & 10"	

$\Delta T = 120^{O}$ D = 76; $\Delta T = 160^{O}$ D = 100
IPS 6" S = 220; IPS 8" S = 184; IPS 10" S = 157

$$L_{MAX} = C_{MAX} / (\frac{D}{S} \cdot B \cdot C_M) \quad \& \quad L_{MIN} = C_{MIN} / (\frac{D}{S} \cdot B \cdot C_M)$$

SG 4 C = 121 TO 160

$\Delta T = 120^{O}$, IPS 6" $L_{MAX} = 160/(76/220 \times 1.03 \times 1.00) = 450$ FT
$L_{MIN} = 121/(76/220 \times 1.03 \times 1.00) = 340$ FT

SG 4

$\Delta T = 120^{O}$	IPS 6"	IPS 8"	IPS 10"
L_{MAX}	450*	376**	321
L_{MIN}	340**	284	243

$\Delta T = 160^{O}$	IPS 6"	IPS 8"	IPS 10"
L_{MAX}	342	286***	244
L_{MIN}	258	216	185

NOTE: *BY PROPORTIONING, ONLY 1 LENGTH MUST BE CALCULATED THE LONG WAY.

** $450 \times \frac{121}{160} = 340$ *** $450 \times \frac{184}{220} = 376$ **** $376 \times \frac{76}{100} = 286$

MISER

TABLE 1. UNIT PRESSURE DROP, Δp - PSIG/100 LINEAR FT

$\frac{C}{100}^2 P_i$	INLET STEAM PRESSURE, P_i PSIG													$\frac{C}{100}^2 P_i$
	5	10	15	25	40	60	80	100	120	150	175	200	250	
10	.04	.03	.03	.02	———			.01	.01	.01	———			10
50	.20	.16	.14	.11	.1	.1	.1	.04	.03	.03	.02	.02	.02	50
200	.81	.66	.55	.42	.3	.2	.2	.15	.13	.11	.10	.08	.07	200
500	2.03	1.64	1.38	1.05	.8	.6	.5	.39	.33	.27	.24	.21	.17	500
1000	———	3.28	2.76	2.10	1.6	1.2	.9	.77	.66	.55	.48	.42	.35	1000
2000			5.52	4.20	3.1	2.3	1.9	1.54	1.33	1.09	.95	.85	.69	2000
3000	———			6.30	4.7	3.5	2.8	2.31	1.99	1.64	1.43	1.27	1.04	3000
4000					6.2	4.6	3.7	3.08	2.65	2.18	1.91	1.69	1.38	4000
5000	———				7.8	5.8	4.6	3.85	3.32	2.73	2.38	2.11	1.73	5000
6000					9.3	7.0	5.6	4.62	3.98	3.28	2.86	2.54	2.07	6000
7000	———				10.9	8.1	6.5	5.39	4.64	3.82	3.34	2.96	2.42	7000
8000						9.3	7.4	6.16	5.31	4.37	3.81	3.38	2.76	8000
9000	———					10.4	8.3	6.93	5.97	4.91	4.29	3.81	3.11	9000
10000						11.6	9.3	7.70	6.63	5.46	4.77	4.23	3.45	10000
11000	———					12.8	10.2	8.47	7.29	6.01	5.24	4.65	3.80	11000
12000						13.9	11.1	9.24	7.96	6.55	5.72	5.07	4.15	12000

TABLE 2.

d INCH	C_d
0.15	0.000033
0.20	0.000186
0.25	0.000699
0.30	0.00206
0.35	0.00513
0.40	0.0113
0.45	0.0226
0.50	0.0420
0.55	0.0735
0.60	0.1226
0.65	0.196
0.70	0.302
0.75	0.451
0.80	0.657
0.85	0.934
0.90	1.302
0.95	1.781
1.00	2.397
1.05	3.177

TO determine TOTAL PRESSURE DROP, ΔP, PSIG

1. Calculate $[C/100]^2 P_i$
2. Find Δp from TABLE 1.
3. Find C_d for the actual inside diameter of tracer in INCHES from TABLE 2.
4. Determine LENGTH OF TRACER, L_t in FEET
5. Calculate TOTAL PRESSURE DROP,

$$\Delta P = \frac{L_t}{100} \cdot \frac{\Delta p}{C_d}$$

EXAMPLE

1. C = 141 & P_i = 100 $\quad \left(\frac{C}{100}\right)^2 P_i = 199$
2. $\Delta p = .15$
3. d = .65 INCH $\quad C_d = .1226$
4. L_t = 300 FT
5. $\Delta P = \frac{300}{100} \times 0.15/.1226 = 3.67$ PSIG

AN ALTERNATE METHOD OF SIZING - BASE OF PRESSURE DROP.

INLET STEAM PRESSURE, P_i	100 PSIG
BACK PRESSURE, B	20 PSIG
LENGTH OF TRACERS, L_T	100 - 200 FEET
INSIDE DIAMETER OF TRACER, d	0.40 INCH
MAXIMUM ALLOWABLE PRESSURE DROP	20 %

1) WORKING PRESSURE DIFFERENTIAL 80 PSIG

2) MAX ALLOWABLE PRESSURE DROP ΔP 16 PSIG

3) FROM TABLE 2 $C_d = .0113$

4) Rewriting equation (1), we have

$$\Delta p = \frac{\Delta}{L_t} \cdot C_d \cdot 100$$

$$\Delta p_1 = \frac{16}{100} \times .0113 \times 100 = .18$$

$$\Delta p_2 = \frac{16}{100} \times .0113 \times 100 = .09$$

5) FROM TABLE 1. The corresponding

$$(C/100)^2 P_i = 120 - 230 \quad (\text{for } \Delta p = .09 - .18)$$

or $C = 109 - 151$

USE MODEL "SG 4" For the ENTIRE GROUP

EXPLANATIONS:

Tracers are usually small pipes or tubings. For any given length it has a limited capacity of steam flow. Generally, a 20% drop of the working pressure is the maximum allowed for a reasonable design. The pressure drop is proportional to the square of the flow rate. Any additional flow will cause the pressure to drop very fast.

Steam flow is the direct result of steam consumption or condensate load. Therefore, this provides us a means of estimating the condensate load without knowing any more than the steam pressure and tracer geometry.

A shorter tracer has the ability to carry a proportionately larger steam flow. However, in actual applications, short tracers are used on short product pipes, or, where steam consumption is small.

In other words, the size of the tracer establishes well defined limits on steam consumption. Couple this with the fact that the small orifices usually required for tracing have inherently small steam losses, this method of sizing is reasonable and very useful.

ENGINEERING RESOURCES, INC.

MISER

AIR HEATING

STEP 1. FACTOR "D"

P_i PSIG	ΔT = ENTERING AIR TEMP - FINAL AIR TEMP, °F							
	30	40	50	60	70	80	90	100
5	53	70	88	105	123	140	158	175
10	37	50	62	75	87	100	112	124
15	31	41	51	61	71	81	92	102
20	27	35	44	53	62	71	80	88
25	24	32	40	48	56	63	71	79
30	22	29	36	43	51	58	65	72
40	19	25	31	38	44	50	57	63
50	17	23	28	34	40	45	51	56
60	16	21	26	31	36	41	47	52
80	14	18	23	27	32	36	41	45
100	12	16	20	24	28	32	36	40
125	11	15	18	22	25	29	33	36
150	10	13	17	20	23	27	30	33

STEP 2. FACTOR "B"

$\frac{P_b}{P_i}$ %	B
5	1.03
10	1.05
15	1.09
20	1.12
25	1.16
30	1.20
35	1.24
40	1.29

STEP 3. FACTOR "C"

SG	C	SG	C
3	0- 9	15	166- 200
4	10- 13	16	201- 320
5	14- 18	17	321- 460
6	19- 26	18	461- 630
7	27- 35	19	631- 820
8	36- 46	20	821-1080
9	47- 55	21	1081-1440
10	56- 71	22	1441-1840
11	72- 89	23	1841-2510
12	90-106	24	2511-3280
13	107-131	25	3281-4620
14	132-165		

PROCEDURE

STEP 1. Determine: INLET STEAM PRESSURE, P_i (PSIG); TEMPERATURE RISE, ΔT (^oF) — FIND "D"

STEP 2. Determine: BACK PRESSURE, P_b (PSIG) — FIND "B"

STEP 3. Determine: AIR FLOW, CFM (FT^3/MIN)

CALCULATE "C"

$$C = CFM \cdot \frac{D}{1000} \cdot B$$

SELECT MODEL BASED ON "C"

EXAMPLE:

STEP 1. INLET STEAM PRESSURE, P_i = 15 PSIG; TEMPERATURE RISE, ΔT = 60 ^oF — D = 61

STEP 2. BACK PRESSURE, P_b = 1½ PSIG — B = 1.05

STEP 3. AIR FLOW CFM = 15,000

CALCULATE $C = \frac{15,000}{1,000} \times 61 \times 1.05 = 961$

USE MODEL "SG 20"

MISER

ENGINEERING RESOURCES, INC.

DIRECT RADIATOR

STEP 1.
FACTOR "D"

P_i PSIG	D
2	49
3	40
4	35
5	32
6	29
7	27
8	26
9	24
10	23
12	22
15	20

STEP 2.
FACTOR "B"

$\frac{P_b}{P_i}$ %	B
5	1.03
10	1.05
15	1.09
20	1.12
25	1.16
30	1.20
35	1.24
40	1.29

STEP 3.
FACTOR "C"

SG	C
3	- 440
4	441- 590
5	591- 820
6	821-1200
7	1201-1600
8	1601-2000
9	2001-2500
10	2501-3200
11	3201-4000
12	4001-4800
13	4801-5900
14	5901-7400
15	7401-9200

PROCEDURE

STEP 1. Determine: INLET STEAM PRESSURE, P_i (PSIG) FIND "D"

STEP 2. Determine: BACK PRESSURE, P_b (PSIG) FIND "B"

STEP 3. Determine: SURFACE AREA OF RADIATOR, A* (FT^2)

CALCULATE "C"

$$C = D \cdot B \cdot A$$

SELECT MODEL BASED ON "C"

*Estimate the surface area, A_o, of a typical section of the radiator; then A is equal to A_o multiplied by the number of sections making up the radiator.

EXAMPLE #1. INDIVIDUAL RADIATOR

STEP 1. INLET STEAM PRESSURE, P_i = 8 PSIG D = 26

STEP 2. BACK PRESSURE, P_b = 1 PSIG B = 1.06

STEP 3. SURFACE AREA
10 SECTIONS, 2 FT^2 EACH

$A = 2 \times 10 = 20\ FT^2$

CALCULATE $C = 20 \times 26 \times 1.06 = 551$

USE MODES SG 4

EXAMPLE #2. GROUP OF RADIATORS

STEP 1. INLET STEAM PRESSURE, p_i = 8 PSIG D = 26

STEP 2. BACK PRESSURE, P_b = 6" WATER VACUUM B = 1.0

(Assuming B = 1.0 for small vacuum results in conservative design)

STEP 3. SURFACE AREA, A = 20 to 40 FT^2

CALCULATE C FOR A = 40

$C_1 = 40 \times 26 \times 1.0 = 1040$

*USE MODEL SG 6

CALCULATE C FOR A = 30

$C_2 = 30 \times 26 \times 1.0 = 780$

*USE MODEL SG 5

*USED SG 6 for large radiators & SG 5 for small radiator. Alternatively SG 6 may be used for all radiators.

MISER

HEAT EXCHANGER

ENGINEERING RESOURCES, INC.

STEP 1. FACTOR "D"

P_i PSIG	ΔT = ENTERING TEMP - FINAL TEMP °F												P_i PSIG
	10	20	30	40	60	80	100	120	140	160	180	200	
5	21	42	63	84	126	168	210	253	295	337	379	421	5
10	15	30	45	60	90	119	149	179	209	239	269	299	10
15	12	24	37	49	73	98	122	147	171	196	220	244	15
20	11	21	32	42	64	85	106	127	149	170	191	212	20
25	10	19	29	38	57	76	95	114	133	152	171	190	25
30	9	17	26	35	52	70	87	104	122	139	157	174	30
40	8	15	23	30	45	60	76	91	106	121	136	151	40
50	7	14	20	27	41	54	68	81	95	108	122	135	50
60	6	12	19	25	37	50	62	74	87	99	112	124	60
80	5	11	16	22	32	43	54	65	76	86	97	108	80
100	5	10	15	19	29	39	49	58	68	78	87	97	100
125	4	9	13	17	26	35	44	52	61	70	79	87	125
150	4	8	12	16	24	32	40	48	56	64	72	80	150

STEP 2. FACTOR "B"

$\frac{P_b}{P_i}$ %	B
5	1.03
10	1.05
15	1.09
20	1.12
25	1.16
30	1.20
35	1.24
40	1.29

STEP 4. FACTOR "C"

SG	C	SG	C
3	- 26	15	441- 550
4	27- 35	16	551- 850
5	36- 48	17	851- 1230
6	49- 70	18	1231- 1670
7	71- 96	19	1671- 2180
8	97-124	20	2181- 2890
9	125-150	21	2891- 3840
10	151-190	22	3841- 4920
11	191-240	23	4921- 6700
12	241-280	24	6701- 8750
13	281-350	25	8751-12340
14	351-440		

PROCEDURE

STEP 1. Determine: INLET STEAM PRESSURE, P_i (PSIG) — FIND "D"
TEMPERATURE RISE, ΔT (°F)

STEP 2. Determine: BACK PRESSURE, P_b (PSIG) — FIND "B"

STEP 3. Determine: SPECIFIC HEAT, CP (BTU/°F-LB) — FIND "CP"
SPECIFIC GRAVITY, SG — FIND "SG"

STEP 4. Determine: FLOW RATE, GPM (US GAL/MIN) — FIND "GPM"

CALCULATE "C"

$$C = GPM \cdot D \cdot B \cdot CP \cdot SG$$

SELECT MODEL BASED ON "C"

100 — 30A

EXAMPLE #1. HOT WATER CONVERTOR

STEP 1. INLET STEAM PRESSURE, P_i = 15 PSIG
TEMPERATURE RISE, ΔT = 95 ^{o}F D = 116

STEP 2. BACK PRESSURE P_b = 0 PSIG B = 1.0

STEP 3. SPECIFIC HEAT CP = 1.0 BTU/^{o}F-LB
SPECIFIC GRAVITY SG = 1.0

STEP 4. FLOW RATE GPM = 50 MAX.

CALCULATE C = 50 x 116 x 1.0 x 1.0 x 1.0

= 5800

USE MODEL "SG 23"

EXAMPLE #2. RECIRCULATION TANK

STEP 1. INLET STEAM PRESSURE, P_i = 100 PSIG
TEMPERATURE RISE, ΔT = 320 - 310 = 10 ^{o}F D = 5

STEP 2. BACK PRESSURE, P_b = 10 PSIG B = 1.05

STEP 3. VEGETABLE OIL
SPECIFIC HEAT, CP = .65 BTU/^{o}F-LB
SPECIFIC GRAVITY SG = .96

STEP 4. FLOW RATE GPM = 500

CALCULATE C = 500 x 5 x 1.05 x .65 x .96

= 1638

USE MODEL "SG 18"

ENGINEERING RESOURCES, INC

PROCESS DATA:

HEAT TRANSFER AREA	=	1000	SQ FT
BATCH SIZE	=	44000	LBS
SPECIFIC HEAT OF MATERIAL	=	.56	BTU/LB/DEG F
INITIAL TEMP OF BATCH	=	120	DEF F
FINAL TEMP OF BATCH	=	400	DEG F
STEAM TEMPERATURE	=	456	DEG F
LATENT HEAT OF STEAM	=	768	BTU/LB
HEAT TRANSFER COEFFICIENT	=	40	BTU/HR/DEG F/SQ FT

RESULTS:

TIME (MIN)	TEMP DEG F	HTX MBH	LOAD #/H
0	120	13440	17500
1.5	133	12907	16806
3.06	147	12373	16111
4.68	160	11840	15417
6.39	173	11307	14722
8.17	187	10773	14028
10.05	200	10240	13333
12.03	213	9707	12639
14.12	227	9173	11944
16.33	240	8640	11250
18.69	253	8107	10556
21.2	267	7573	9861
23.9	280	7040	9167
26.81	293	6507	8472
29.97	307	5973	7778
33.43	320	5440	7083
37.24	333	4907	6389
41.5	347	4373	5694
46.3	360	3840	5000
51.83	373	3307	4306
58.33	387	2773	3611
66.22	400	2240	2917