

150mm PANEL			
# OF TUBES	1	2	
MEAN WATER TEMP. (°C)	71.1	116	139
	73.9	124	149
	76.7	132	158
	79.4	140	168
	82.2	148	178
	85.5	156	187
	87.8	164	197

300mm PANEL				
# OF TUBES	2	3	4	
MEAN WATER TEMP. (°C)	71.1	183	201	220
	73.9	197	217	236
	76.7	210	231	252
	79.4	224	246	269
	82.2	237	261	284
	85.5	251	276	301
	87.8	264	290	317

450mm PANEL					
# OF TUBES	3	4	5	6	
MEAN WATER TEMP. (°C)	71.1	253	270	286	304
	73.9	271	289	306	325
	76.7	290	309	329	348
	79.4	308	329	349	370
	82.2	327	349	371	392
	85.5	345	368	391	414
	87.8	364	388	413	437

600mm PANEL						
# OF TUBES	4	5	6	7	8	
MEAN WATER TEMP. (°C)	71.1	349	367	385	402	419
	73.9	373	392	411	429	448
	76.7	397	417	437	457	476
	79.4	421	442	463	484	505
	82.2	445	467	490	512	534
	85.5	469	492	516	539	563
	87.8	493	518	542	567	592

750mm PANEL							
# OF TUBES	5	6	7	8	9	10	
MEAN WATER TEMP. (°C)	71.1	419	436	452	469	486	503
	73.9	448	466	484	502	520	538
	76.7	476	495	514	533	552	571
	79.4	505	525	545	566	586	606
	82.2	534	555	577	598	619	641
	85.5	563	586	608	631	653	676
	87.8	591	615	638	662	686	709

900mm PANEL								
# OF TUBES	6	7	8	9	10	11	12	
MEAN WATER TEMP. (°C)	71.1	478	494	510	526	542	558	574
	73.9	511	528	545	562	579	596	613
	76.7	543	561	579	597	615	634	652
	79.4	576	595	614	634	653	672	691
	82.2	609	629	650	670	690	711	731
	85.5	642	663	685	706	728	749	770
	87.8	675	698	720	743	765	788	810

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%.

NOTE: Outputs from 750mm 5 tubes equivalent to 600mm 8 tubes

NOTE: Outputs from 900mm 8 tubes roughly equivalent to 750mm 10 tubes



Twa Panel
Systems, Inc.

Manufacturing the **FRENGER**® product line

Metric Outputs


LINEAR PANEL

LINEAR PANEL METRIC OUTPUTS

# OF TUBES	1	2	2	2	4	3	4	4	5	6	
NOMINAL PANEL WIDTHS * (mm)	150	200	250	300	400	450	500	600	750	900	
M E A N W A T E R T E M P E R A T U R E (°C)	48.9	52	61	70	75	90	105	144	157	188	215
	51.7	60	70	82	89	107	123	163	181	217	248
	54.4	68	82	95	102	124	142	181	205	246	281
	57.2	76	90	107	116	141	160	199	229	274	314
	60.0	84	100	120	129	159	179	218	253	303	347
	62.8	92	110	132	143	175	197	236	277	332	379
	65.6	100	119	145	156	194	216	254	301	361	412
	68.3	108	129	157	170	211	234	271	325	390	445
	71.1	116	139	170	183	229	253	289	349	419	478
	73.9	124	148	182	197	245	271	308	373	448	511
	76.7	132	158	195	210	264	290	327	397	476	543
	79.4	140	168	207	224	281	308	346	421	505	576
	82.2	148	179	220	237	300	327	365	445	534	609
	85.5	156	189	232	251	316	345	388	469	563	642
	87.8	164	199	245	264	335	364	411	493	591	675
	90.6	172	208	257	278	351	382	435	517	620	708
93.3	180	217	270	291	369	401	453	541	649	741	
96.1	188	227	282	305	386	419	471	565	678	774	
98.9	196	238	295	318	404	438	489	589	707	807	
101.7	204	248	307	332	422	456	507	613	735	840	

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%.

ANY PANEL WIDTH CAN BE CONSTRUCTED BY COMBINING 100mm AND 150mm EXTRUSIONS AND INTERPOLATING THE APPROPRIATE OUTPUTS.

PANEL OUTPUTS (METRIC)		
 Twa Panel Systems, Inc.	FRENGER.	L-5



**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		150mm PANEL		300mm PANEL			450mm PANEL			
# OF TUBES		1	2	2	3	4	3	4	5	6
MEAN WATER TEMPERATURE (°C)	35.0	12	15	8	9	10	13	14	15	15
	37.8	20	25	22	24	26	32	34	36	38
	40.6	29	34	36	39	43	50	54	57	60
	43.3	36	44	49	54	58	68	73	77	82
	46.1	44	53	62	68	75	87	93	98	104
	48.9	52	63	76	83	91	105	112	119	126
	51.7	60	72	89	98	107	124	132	140	148
	54.4	68	82	102	113	123	142	152	161	171
	57.2	76	91	116	128	139	161	171	182	193
	60.0	84	101	129	142	155	179	191	203	215
	62.8	92	111	143	157	171	197	211	224	237
	65.6	100	120	156	172	188	216	230	245	259
	68.3	108	130	170	187	204	237	252	268	284
	71.1	116	140	183	202	220	253	270	287	303
	73.9	124	149	197	217	237	271	289	307	325
	76.7	132	158	210	231	252	290	310	329	348
79.4	140	168	224	246	269	308	328	349	369	
82.2	148	178	237	260	284	327	349	370	392	
85.0	156	187	251	276	301	345	368	391	414	
87.8	164	197	264	291	317	364	389	413	437	

NOMINAL SIZE		150mm PANEL		300mm PANEL			450mm PANEL			
# OF TUBES		1	2	2	3	4	3	4	5	6
MEAN 50/50 ETHYLENE TEMPERATURE (°C)	35.0	10	13	7	8	9	11	12	13	13
	37.8	17	22	19	21	22	28	29	31	33
	40.6	25	29	31	34	37	43	47	49	52
	43.3	32	38	42	46	51	59	63	67	71
	46.1	39	46	54	59	65	75	80	85	90
	48.9	46	55	66	72	79	92	98	104	110
	51.7	53	63	78	86	93	108	115	122	130
	54.4	60	72	90	99	108	124	133	141	149
	57.2	67	80	102	112	122	141	150	160	169
	60.0	74	89	114	125	137	158	168	179	189
	62.8	81	98	126	139	151	174	186	197	209
	65.6	89	106	138	152	166	191	204	216	229
	68.3	96	115	150	165	181	210	224	238	251
	71.1	103	124	163	179	196	225	240	255	270
	73.9	111	133	176	193	211	242	258	274	290
	76.7	118	141	187	206	225	259	277	294	311
79.4	126	151	201	221	241	275	294	312	330	
82.2	133	160	212	234	255	294	313	333	352	
85.0	140	168	226	248	271	311	331	352	373	
87.8	148	178	239	262	286	329	351	373	394	

NOMINAL SIZE		150mm PANEL		300mm PANEL			450mm PANEL			
# OF TUBES		1	2	2	3	4	3	4	5	6
MEAN 50/50 PROPYLENE TEMPERATURE (°C)	35.0	11	14	7	8	9	12	13	14	14
	37.8	18	23	20	22	24	29	31	33	35
	40.6	27	31	33	36	39	46	49	52	55
	43.3	33	40	45	49	53	63	67	71	75
	46.1	41	49	57	63	68	80	85	90	96
	48.9	48	58	70	76	83	97	103	110	116
	51.7	56	67	82	90	99	114	122	129	137
	54.4	63	76	95	104	114	131	140	149	158
	57.2	71	85	107	118	129	149	159	169	178
	60.0	78	94	120	132	144	166	177	188	199
	62.8	86	103	133	146	159	183	196	208	220
	65.6	93	112	146	160	175	201	215	228	241
	68.3	101	121	158	174	190	221	235	250	265
	71.1	109	131	171	188	206	236	252	268	284
	73.9	116	139	184	203	221	254	271	288	305
	76.7	124	148	197	216	236	272	291	309	327
79.4	132	159	211	232	253	290	309	328	347	
82.2	140	168	223	245	268	308	329	349	370	
85.0	147	177	237	261	285	326	348	370	391	
87.8	156	187	250	275	300	345	368	391	414	

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**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		500mm PANEL			600mm PANEL				
# OF TUBES		4	5	6	4	5	6	7	8
MEAN WATER TEMPERATURE (°C)	35.0	53	56	60	38	40	42	44	46
	37.8	71	76	81	62	65	68	72	75
	40.6	90	96	102	86	91	95	99	104
	43.3	108	115	122	110	115	121	126	132
	46.1	126	134	143	134	140	147	154	161
	48.9	144	154	163	158	166	174	181	189
	51.7	163	173	184	182	191	200	209	218
	54.4	181	193	205	206	216	226	237	247
	57.2	199	212	226	230	241	253	264	276
	60.0	218	233	247	254	266	279	292	304
	62.8	236	251	267	278	291	305	319	333
	65.6	254	271	288	301	316	331	346	361
	68.3	271	289	307	325	342	358	374	391
	71.1	289	309	328	349	366	384	401	419
	73.9	308	328	349	374	393	411	430	449
	76.7	327	349	370	397	417	437	457	477
	79.4	346	369	392	421	442	463	484	505
82.2	365	390	414	445	467	490	512	534	
85.0	388	414	440	469	493	516	540	563	
87.8	411	438	465	493	518	543	567	592	

NOMINAL SIZE		500mm PANEL			600mm PANEL				
# OF TUBES		4	5	6	4	5	6	7	8
MEAN 50/50 ETHYLENE TEMPERATURE (°C)	35.0	45	48	51	33	34	36	38	39
	37.8	61	65	70	53	56	58	62	65
	40.6	78	83	88	74	79	82	86	90
	43.3	93	100	106	95	100	105	110	114
	46.1	109	117	124	116	122	128	134	140
	48.9	126	134	142	137	144	151	158	165
	51.7	142	151	161	159	167	174	182	190
	54.4	158	169	180	180	189	198	207	216
	57.2	175	186	198	202	212	222	232	242
	60.0	192	205	218	223	234	245	257	268
	62.8	208	222	235	245	257	269	281	294
	65.6	224	239	254	266	279	293	306	319
	68.3	240	256	272	288	303	317	332	346
	71.1	257	275	292	310	326	341	357	372
	73.9	274	293	311	333	350	367	383	400
	76.7	292	311	331	355	372	390	408	426
	79.4	310	331	351	377	396	415	433	452
82.2	328	350	372	400	420	440	460	480	
85.0	350	373	396	422	443	465	486	507	
87.8	370	395	420	445	467	489	512	534	

NOMINAL SIZE		500mm PANEL			600mm PANEL				
# OF TUBES		4	5	6	4	5	6	7	8
MEAN 50/50 PROPYLENE TEMPERATURE (°C)	35.0	48	51	55	35	36	38	40	42
	37.8	65	69	74	57	59	62	66	68
	40.6	82	88	93	79	83	87	90	95
	43.3	99	105	112	101	106	111	116	121
	46.1	116	123	131	123	129	135	141	147
	48.9	133	142	150	145	152	160	167	174
	51.7	150	160	170	168	176	184	193	201
	54.4	167	178	189	190	200	209	219	228
	57.2	184	197	209	213	223	234	245	255
	60.0	203	216	230	235	247	259	271	282
	62.8	219	234	248	258	271	284	296	309
	65.6	236	252	268	280	294	308	322	336
	68.3	253	270	287	304	319	334	349	364
	71.1	271	289	307	326	343	359	375	392
	73.9	288	307	326	350	368	385	403	420
	76.7	307	327	348	372	391	410	428	447
	79.4	326	348	369	396	416	436	456	476
82.2	345	368	390	420	441	462	483	504	
85.0	367	392	416	443	466	488	510	532	
87.8	388	414	440	467	490	513	537	560	

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%



**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		750mm PANEL					
# OF TUBES		5	6	7	8	9	10
MEAN WATER TEMPERATURE (°C)	35.0	45	47	49	50	52	54
	37.8	74	77	80	83	86	89
	40.6	103	107	112	116	120	124
	43.3	131	137	142	147	152	158
	46.1	160	166	173	179	186	192
	48.9	189	196	204	212	219	227
	51.7	218	226	235	244	252	261
	54.4	246	256	266	276	286	296
	57.2	275	286	297	308	319	330
	60.0	304	316	328	340	353	365
	62.8	333	346	359	373	386	399
	65.6	361	375	389	404	418	433
	68.3	390	406	421	437	453	468
	71.1	419	436	453	470	486	503
	73.9	448	466	484	502	520	538
	76.7	476	495	514	533	552	571
79.4	505	525	545	565	586	606	
82.2	534	555	576	598	619	640	
85.0	563	586	609	631	654	676	
87.8	591	615	639	662	686	710	

NOMINAL SIZE		750mm PANEL					
# OF TUBES		5	6	7	8	9	10
MEAN 50/50 ETHYLENE TEMPERATURE (°C)	35.0	39	40	42	43	45	46
	37.8	64	66	69	71	74	77
	40.6	89	92	97	100	104	107
	43.3	114	118	123	128	132	137
	46.1	139	145	150	156	161	167
	48.9	164	171	178	184	191	197
	51.7	190	198	205	213	220	228
	54.4	216	224	233	242	250	259
	57.2	242	251	261	271	280	290
	60.0	267	278	289	300	310	321
	62.8	293	305	317	329	340	352
	65.6	319	331	344	357	370	382
	68.3	346	360	373	387	401	415
	71.1	373	388	403	417	432	447
	73.9	399	415	431	447	463	479
	76.7	425	442	459	476	493	510
79.4	452	470	488	506	524	542	
82.2	479	498	518	537	556	575	
85.0	507	527	548	568	588	609	
87.8	533	555	576	597	619	640	

NOMINAL SIZE		750mm PANEL					
# OF TUBES		5	6	7	8	9	10
MEAN 50/50 PROPYLENE TEMPERATURE (°C)	35.0	41	43	45	45	47	49
	37.8	67	70	73	76	78	81
	40.6	94	98	102	106	110	113
	43.3	120	125	130	135	140	144
	46.1	147	153	159	165	170	176
	48.9	174	181	188	195	202	208
	51.7	201	209	217	225	233	241
	54.4	228	237	246	255	264	273
	57.2	255	265	275	285	296	306
	60.0	282	293	305	316	327	338
	62.8	309	321	334	346	358	371
	65.6	336	349	363	376	389	403
	68.3	364	379	393	408	422	437
	71.1	392	408	423	439	455	470
	73.9	419	436	453	470	486	503
	76.7	446	464	482	500	518	536
79.4	475	494	513	532	551	570	
82.2	503	523	543	564	584	604	
85.0	532	554	575	596	618	639	
87.8	559	582	604	627	649	671	

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**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		900mm PANEL						
# OF TUBES		6	7	8	9	10	11	12
MEAN WATER TEMPERATURE (°C)	35.0	50	52	53	55	57	58	60
	37.8	83	86	89	92	94	97	100
	40.6	117	120	124	128	132	136	140
	43.3	149	154	159	164	168	173	178
	46.1	182	188	194	200	206	212	218
	48.9	214	221	229	236	243	250	257
	51.7	247	255	264	272	280	289	297
	54.4	280	289	299	308	317	327	336
	57.2	313	323	334	344	355	365	376
	60.0	346	357	369	381	392	404	415
	62.8	379	391	404	417	429	442	455
	65.6	412	425	439	453	466	480	494
	68.3	445	460	475	490	504	520	534
	71.1	477	493	509	525	541	557	573
	73.9	511	527	545	562	578	596	613
	76.7	543	561	580	598	616	634	652
	79.4	576	595	615	634	653	672	691
82.2	609	629	649	670	690	710	730	
85.0	642	663	685	707	728	750	771	
87.8	675	697	720	742	765	788	810	

NOMINAL SIZE		900mm PANEL						
# OF TUBES		6	7	8	9	10	11	12
MEAN 50/50 ETHYLENE TEMPERATURE (°C)	35.0	43	45	45	47	49	50	51
	37.8	71	74	77	79	81	83	86
	40.6	101	104	107	111	114	118	121
	43.3	129	133	138	142	146	150	155
	46.1	158	163	168	174	179	184	189
	48.9	187	193	199	205	212	218	224
	51.7	216	223	230	237	245	252	259
	54.4	245	254	262	270	278	286	295
	57.2	275	284	293	302	311	321	330
	60.0	304	314	325	335	345	355	365
	62.8	334	345	357	368	379	390	401
	65.6	364	376	388	400	412	425	437
	68.3	394	407	421	434	447	460	473
	71.1	424	438	453	467	481	495	509
	73.9	455	470	485	500	515	531	546
	76.7	485	501	518	534	550	566	582
	79.4	515	532	550	567	584	602	619
82.2	547	565	583	601	619	638	656	
85.0	578	597	617	636	655	675	694	
87.8	609	629	650	670	690	711	731	

NOMINAL SIZE		900mm PANEL						
# OF TUBES		6	7	8	9	10	11	12
MEAN 50/50 PROPYLENE TEMPERATURE (°C)	35.0	45	47	48	50	52	53	55
	37.8	76	78	81	84	86	88	91
	40.6	107	110	113	117	121	124	128
	43.3	136	141	145	150	154	159	163
	46.1	167	172	178	183	189	194	200
	48.9	197	204	210	217	224	230	237
	51.7	228	236	243	251	258	266	274
	54.4	259	267	276	285	293	302	311
	57.2	290	299	309	319	328	338	348
	60.0	321	332	343	353	364	375	385
	62.8	352	364	376	387	399	411	422
	65.6	383	396	409	422	434	447	460
	68.3	415	429	443	457	471	485	498
	71.1	446	461	476	491	506	521	536
	73.9	478	494	510	526	541	558	573
	76.7	510	526	544	561	577	595	611
	79.4	542	560	578	596	614	632	650
82.2	574	593	612	631	650	670	689	
85.0	607	627	648	668	688	708	728	
87.8	639	660	681	702	723	745	766	

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**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		150mm PANEL		300mm PANEL			450mm PANEL			
# OF TUBES		1	2	2	3	4	3	4	5	6
MEAN WATER TEMPERATURE (°C)	35.0	12	15	8	9	10	13	14	15	15
	37.8	20	25	22	24	26	32	34	36	38
	40.6	29	34	36	39	43	50	54	57	60
	43.3	36	44	49	54	58	68	73	77	82
	46.1	44	53	62	68	75	87	93	98	104
	48.9	52	63	76	83	91	105	112	119	126
	51.7	60	72	89	98	107	124	132	140	148
	54.4	68	82	102	113	123	142	152	161	171
	57.2	76	91	116	128	139	161	171	182	193
	60.0	84	101	129	142	155	179	191	203	215
	62.8	92	111	143	157	171	197	211	224	237
	65.6	100	120	156	172	188	216	230	245	259
	68.3	108	130	170	187	204	237	252	268	284
	71.1	116	140	183	202	220	253	270	287	303
	73.9	124	149	197	217	237	271	289	307	325
	76.7	132	158	210	231	252	290	310	329	348
79.4	140	168	224	246	269	308	328	349	369	
82.2	148	178	237	260	284	327	349	370	392	
85.0	156	187	251	276	301	345	368	391	414	
87.8	164	197	264	291	317	364	389	413	437	

NOMINAL SIZE		150mm PANEL		300mm PANEL			450mm PANEL			
# OF TUBES		1	2	2	3	4	3	4	5	6
MEAN (40% VOLUME) ETHYLENE TEMPERATURE (°C)	35.0	11	13	7	8	9	12	13	13	13
	37.8	18	22	20	22	23	29	30	32	34
	40.6	26	31	32	35	39	45	48	51	54
	43.3	33	39	44	48	53	62	66	70	74
	46.1	40	48	56	62	67	78	83	89	94
	48.9	47	57	68	75	82	95	101	108	114
	51.7	55	66	81	89	97	112	120	127	134
	54.4	62	74	93	102	112	129	138	146	155
	57.2	69	83	106	116	127	146	156	166	175
	60.0	77	92	118	130	142	163	174	185	196
	62.8	84	101	131	144	157	181	193	205	217
	65.6	92	110	143	157	172	198	211	224	237
	68.3	99	119	156	171	187	217	231	246	260
	71.1	107	128	168	185	202	232	248	263	279
	73.9	114	137	182	200	218	250	266	283	300
	76.7	122	146	193	213	232	268	286	304	322
79.4	130	156	207	228	249	285	304	323	342	
82.2	137	165	219	241	263	303	323	343	364	
85.0	145	174	233	256	280	321	342	363	385	
87.8	153	183	246	270	295	339	362	384	407	

NOMINAL SIZE		150mm PANEL		300mm PANEL			450mm PANEL			
# OF TUBES		1	2	2	3	4	3	4	5	6
MEAN (40% VOLUME) PROPYLENE TEMPERATURE (°C)	35.0	11	14	8	8	9	12	13	14	14
	37.8	19	24	21	23	25	30	32	34	36
	40.6	27	32	34	37	41	47	51	54	57
	43.3	34	41	46	51	55	65	69	73	78
	46.1	42	51	59	65	71	82	88	93	99
	48.9	50	60	72	79	86	100	107	113	120
	51.7	57	69	85	93	102	118	126	134	141
	54.4	65	78	98	108	117	136	145	154	163
	57.2	73	87	111	122	133	154	164	174	184
	60.0	81	97	124	136	149	172	183	194	206
	62.8	88	106	137	151	164	189	202	215	227
	65.6	96	116	150	165	180	208	221	235	249
	68.3	104	125	163	180	196	228	243	258	273
	71.1	112	135	177	194	212	244	260	276	293
	73.9	120	144	190	209	228	262	279	297	314
	76.7	127	153	202	223	243	281	299	318	337
79.4	136	163	217	239	260	298	318	338	357	
82.2	144	172	229	252	275	317	338	359	381	
85.0	151	181	244	268	292	335	358	380	402	
87.8	160	192	257	283	308	354	378	401	425	

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%



**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		500mm PANEL			600mm PANEL				
# OF TUBES		4	5	6	4	5	6	7	8
MEAN WATER TEMPERATURE (°C)	35.0	53	56	60	38	40	42	44	46
	37.8	71	76	81	62	65	68	72	75
	40.6	90	96	102	86	91	95	99	104
	43.3	108	115	122	110	115	121	126	132
	46.1	126	134	143	134	140	147	154	161
	48.9	144	154	163	158	166	174	181	189
	51.7	163	173	184	182	191	200	209	218
	54.4	181	193	205	206	216	226	237	247
	57.2	199	212	226	230	241	253	264	276
	60.0	218	233	247	254	266	279	292	304
	62.8	236	251	267	278	291	305	319	333
	65.6	254	271	288	301	316	331	346	361
	68.3	271	289	307	325	342	358	374	391
	71.1	289	309	328	349	366	384	401	419
	73.9	308	328	349	374	393	411	430	449
	76.7	327	349	370	397	417	437	457	477
	79.4	346	369	392	421	442	463	484	505
82.2	365	390	414	445	467	490	512	534	
85.0	388	414	440	469	493	516	540	563	
87.8	411	438	465	493	518	543	567	592	

NOMINAL SIZE		500mm PANEL			600mm PANEL				
# OF TUBES		4	5	6	4	5	6	7	8
MEAN (40% VOLUME) ETHYLENE TEMPERATURE (°C)	35.0	47	50	54	34	36	38	39	41
	37.8	64	68	73	56	58	61	65	67
	40.6	81	86	92	77	82	85	89	93
	43.3	97	103	110	99	104	109	114	119
	46.1	114	121	129	121	127	133	139	145
	48.9	130	139	148	143	150	157	164	171
	51.7	147	157	167	165	173	181	189	198
	54.4	164	175	186	187	196	206	215	224
	57.2	181	193	205	209	219	230	240	251
	60.0	199	212	226	231	243	254	266	278
	62.8	215	230	244	254	266	279	292	304
	65.6	232	248	263	275	289	303	317	330
	68.3	249	265	282	298	313	328	343	358
	71.1	266	284	301	321	337	353	369	385
	73.9	283	302	321	344	362	379	396	413
	76.7	302	322	342	367	385	403	422	440
	79.4	320	342	363	390	409	429	448	467
82.2	339	361	384	413	433	454	475	495	
85.0	361	385	409	436	458	479	501	523	
87.8	382	407	433	459	482	505	528	550	

NOMINAL SIZE		500mm PANEL			600mm PANEL				
# OF TUBES		4	5	6	4	5	6	7	8
MEAN (40% VOLUME) PROPYLENE TEMPERATURE (°C)	35.0	50	53	57	36	38	40	41	43
	37.8	67	72	76	59	61	64	68	71
	40.6	85	91	96	81	86	90	94	98
	43.3	102	109	116	104	109	115	120	125
	46.1	120	128	136	127	133	140	146	153
	48.9	137	147	156	150	158	165	173	180
	51.7	155	165	176	173	182	190	199	208
	54.4	173	184	196	196	206	216	226	235
	57.2	190	203	216	220	230	241	252	263
	60.0	209	223	237	243	255	267	279	292
	62.8	226	241	256	266	279	293	306	319
	65.6	244	260	276	289	304	318	333	347
	68.3	261	278	296	313	329	344	360	376
	71.1	279	298	316	336	353	370	387	404
	73.9	297	317	336	361	379	397	415	433
	76.7	316	337	358	384	403	422	441	460
	79.4	335	358	380	408	428	448	469	489
82.2	354	378	402	432	453	475	497	518	
85.0	377	402	427	456	478	501	524	547	
87.8	399	426	452	479	503	527	551	575	

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%



**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		750mm PANEL					
# OF TUBES		5	6	7	8	9	10
MEAN WATER TEMPERATURE (°C)	35.0	45	47	49	50	52	54
	37.8	74	77	80	83	86	89
	40.6	103	107	112	116	120	124
	43.3	131	137	142	147	152	158
	46.1	160	166	173	179	186	192
	48.9	189	196	204	212	219	227
	51.7	218	226	235	244	252	261
	54.4	246	256	266	276	286	296
	57.2	275	286	297	308	319	330
	60.0	304	316	328	340	353	365
	62.8	333	346	359	373	386	399
	65.6	361	375	389	404	418	433
	68.3	390	406	421	437	453	468
	71.1	419	436	453	470	486	503
	73.9	448	466	484	502	520	538
	76.7	476	495	514	533	552	571
79.4	505	525	545	565	586	606	
82.2	534	555	576	598	619	640	
85.0	563	586	609	631	654	676	
87.8	591	615	639	662	686	710	

NOMINAL SIZE		750mm PANEL					
# OF TUBES		5	6	7	8	9	10
MEAN (40% VOLUME) ETHYLENE TEMPERATURE (°C)	35.0	40	42	44	45	46	48
	37.8	66	69	72	74	77	80
	40.6	92	96	101	104	108	111
	43.3	118	123	128	133	137	142
	46.1	144	150	156	162	167	173
	48.9	171	178	184	191	198	205
	51.7	197	205	213	221	229	237
	54.4	224	233	242	251	260	269
	57.2	250	260	270	280	290	300
	60.0	277	288	299	310	321	333
	62.8	304	316	328	341	353	365
	65.6	330	343	356	370	383	396
	68.3	358	372	386	401	415	429
	71.1	385	401	416	431	447	462
	73.9	413	429	446	462	479	495
	76.7	439	457	474	492	510	527
79.4	467	486	504	523	542	560	
82.2	495	514	534	554	574	594	
85.0	523	544	565	586	607	628	
87.8	550	572	594	616	638	660	

NOMINAL SIZE		750mm PANEL					
# OF TUBES		5	6	7	8	9	10
MEAN (40% VOLUME) PROPYLENE TEMPERATURE (°C)	35.0	42	44	46	47	49	51
	37.8	70	73	76	78	81	84
	40.6	97	101	106	110	114	117
	43.3	124	129	134	139	144	149
	46.1	152	158	164	170	176	182
	48.9	180	187	194	201	209	216
	51.7	207	216	224	232	241	249
	54.4	235	244	254	263	273	282
	57.2	263	274	284	295	305	316
	60.0	291	303	314	326	338	349
	62.8	319	332	345	357	370	383
	65.6	347	360	374	388	402	416
	68.3	375	390	405	420	435	450
	71.1	404	420	436	453	469	485
	73.9	432	450	467	484	502	519
	76.7	460	478	497	515	533	552
79.4	489	508	528	547	567	586	
82.2	518	538	559	580	600	621	
85.0	547	569	591	613	635	657	
87.8	575	598	621	644	667	690	

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%



**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		900mm PANEL						
# OF TUBES		6	7	8	9	10	11	12
MEAN WATER TEMPERATURE (°C)	35.0	50	52	53	55	57	58	60
	37.8	83	86	89	92	94	97	100
	40.6	117	120	124	128	132	136	140
	43.3	149	154	159	164	168	173	178
	46.1	182	188	194	200	206	212	218
	48.9	214	221	229	236	243	250	257
	51.7	247	255	264	272	280	289	297
	54.4	280	289	299	308	317	327	336
	57.2	313	323	334	344	355	365	376
	60.0	346	357	369	381	392	404	415
	62.8	379	391	404	417	429	442	455
	65.6	412	425	439	453	466	480	494
	68.3	445	460	475	490	504	520	534
	71.1	477	493	509	525	541	557	573
	73.9	511	527	545	562	578	596	613
	76.7	543	561	580	598	616	634	652
	79.4	576	595	615	634	653	672	691
82.2	609	629	649	670	690	710	730	
85.0	642	663	685	707	728	750	771	
87.8	675	697	720	742	765	788	810	

NOMINAL SIZE		900mm PANEL						
# OF TUBES		6	7	8	9	10	11	12
MEAN (40% VOLUME) ETHYLENE TEMPERATURE (°C)	35.0	45	46	47	49	51	52	54
	37.8	74	77	80	82	84	87	90
	40.6	105	108	111	115	119	122	126
	43.3	134	138	143	147	152	156	161
	46.1	164	169	175	180	186	191	196
	48.9	194	200	207	213	220	226	233
	51.7	224	231	239	246	254	261	269
	54.4	255	263	272	280	289	297	306
	57.2	285	294	304	313	323	332	342
	60.0	316	326	337	347	357	368	379
	62.8	346	358	369	381	392	404	416
	65.6	377	389	402	414	427	440	452
	68.3	408	422	436	449	463	476	490
	71.1	439	453	468	483	497	512	527
	73.9	470	486	502	517	533	549	564
	76.7	501	518	535	552	568	585	602
	79.4	533	550	568	586	604	622	639
82.2	564	583	602	621	639	658	677	
85.0	597	616	637	656	676	696	716	
87.8	628	648	670	691	711	733	753	

NOMINAL SIZE		900mm PANEL						
# OF TUBES		6	7	8	9	10	11	12
MEAN (40% VOLUME) PROPYLENE TEMPERATURE (°C)	35.0	47	49	50	52	54	55	57
	37.8	78	81	84	87	89	92	94
	40.6	111	114	117	121	125	129	132
	43.3	141	146	150	155	160	164	169
	46.1	172	178	184	190	195	201	207
	48.9	204	211	218	225	231	238	245
	51.7	236	243	251	259	267	275	283
	54.4	267	276	285	294	303	312	321
	57.2	299	309	319	329	339	349	359
	60.0	331	342	354	365	376	387	398
	62.8	363	375	388	400	412	424	436
	65.6	396	409	422	435	448	462	475
	68.3	428	442	457	471	485	500	514
	71.1	460	475	491	506	522	537	552
	73.9	493	509	526	542	558	575	591
	76.7	525	542	560	577	595	612	630
	79.4	558	576	595	613	632	651	669
82.2	590	610	630	649	669	689	708	
85.0	624	644	665	686	707	728	748	
87.8	656	678	700	722	743	766	787	

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%



**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		150mm PANEL		300mm PANEL			450mm PANEL			
# OF TUBES		1	2	2	3	4	3	4	5	6
MEAN WATER TEMPERATURE (°C)	35.0	12	15	8	9	10	13	14	15	15
	37.8	20	25	22	24	26	32	34	36	38
	40.6	29	34	36	39	43	50	54	57	60
	43.3	36	44	49	54	58	68	73	77	82
	46.1	44	53	62	68	75	87	93	98	104
	48.9	52	63	76	83	91	105	112	119	126
	51.7	60	72	89	98	107	124	132	140	148
	54.4	68	82	102	113	123	142	152	161	171
	57.2	76	91	116	128	139	161	171	182	193
	60.0	84	101	129	142	155	179	191	203	215
	62.8	92	111	143	157	171	197	211	224	237
	65.6	100	120	156	172	188	216	230	245	259
	68.3	108	130	170	187	204	237	252	268	284
	71.1	116	140	183	202	220	253	270	287	303
	73.9	124	149	197	217	237	271	289	307	325
	76.7	132	158	210	231	252	290	310	329	348
79.4	140	168	224	246	269	308	328	349	369	
82.2	148	178	237	260	284	327	349	370	392	
85.0	156	187	251	276	301	345	368	391	414	
87.8	164	197	264	291	317	364	389	413	437	

NOMINAL SIZE		150mm PANEL		300mm PANEL			450mm PANEL			
# OF TUBES		1	2	2	3	4	3	4	5	6
MEAN (35% VOLUME) ETHYLENE TEMPERATURE (°C)	35.0	11	14	7	8	9	12	13	14	14
	37.8	18	23	20	22	24	29	31	33	35
	40.6	26	31	33	36	39	46	49	52	55
	43.3	33	40	45	49	53	62	67	71	75
	46.1	41	49	57	63	68	80	85	90	95
	48.9	48	58	69	76	83	97	103	110	116
	51.7	56	67	82	90	98	114	122	129	137
	54.4	63	76	95	104	114	131	140	149	157
	57.2	70	85	107	118	129	148	158	168	178
	60.0	78	94	120	132	144	166	177	188	199
	62.8	85	103	132	146	159	183	195	207	220
	65.6	93	112	145	160	174	201	214	227	241
	68.3	101	121	158	174	190	220	235	250	264
	71.1	108	130	171	188	205	236	251	267	283
	73.9	116	139	184	203	221	253	270	287	304
	76.7	123	148	196	216	235	272	290	308	326
79.4	131	158	210	231	252	288	307	326	346	
82.2	139	166	222	244	266	306	327	347	368	
85.0	146	176	236	259	283	324	346	368	389	
87.8	155	186	249	274	299	343	366	389	412	

NOMINAL SIZE		150mm PANEL		300mm PANEL			450mm PANEL			
# OF TUBES		1	2	2	3	4	3	4	5	6
MEAN (35% VOLUME) PROPYLENE TEMPERATURE (°C)	35.0	11	14	8	9	10	12	13	14	14
	37.8	19	24	21	23	25	31	33	34	36
	40.6	28	33	34	37	41	48	52	55	57
	43.3	35	42	47	51	56	66	70	74	79
	46.1	43	51	60	66	72	83	89	95	100
	48.9	50	60	73	80	87	101	108	115	122
	51.7	58	70	86	95	103	119	127	135	143
	54.4	66	79	99	109	119	137	146	156	165
	57.2	74	88	112	123	135	155	166	176	186
	60.0	82	98	125	138	150	173	185	197	208
	62.8	90	107	139	153	166	192	205	217	230
	65.6	97	117	152	167	182	210	224	238	252
	68.3	105	126	165	182	198	230	246	261	276
	71.1	113	136	179	196	214	246	263	279	296
	73.9	121	145	192	212	231	265	282	300	318
	76.7	129	154	205	225	246	284	303	322	340
79.4	137	165	219	241	263	301	321	341	361	
82.2	145	174	232	255	278	320	342	363	384	
85.0	153	183	246	271	295	339	361	384	406	
87.8	161	194	260	286	312	358	382	406	429	

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%



**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		500mm PANEL			600mm PANEL				
# OF TUBES		4	5	6	4	5	6	7	8
MEAN WATER TEMPERATURE (°C)	35.0	53	56	60	38	40	42	44	46
	37.8	71	76	81	62	65	68	72	75
	40.6	90	96	102	86	91	95	99	104
	43.3	108	115	122	110	115	121	126	132
	46.1	126	134	143	134	140	147	154	161
	48.9	144	154	163	158	166	174	181	189
	51.7	163	173	184	182	191	200	209	218
	54.4	181	193	205	206	216	226	237	247
	57.2	199	212	226	230	241	253	264	276
	60.0	218	233	247	254	266	279	292	304
	62.8	236	251	267	278	291	305	319	333
	65.6	254	271	288	301	316	331	346	361
	68.3	271	289	307	325	342	358	374	391
	71.1	289	309	328	349	366	384	401	419
	73.9	308	328	349	374	393	411	430	449
	76.7	327	349	370	397	417	437	457	477
	79.4	346	369	392	421	442	463	484	505
82.2	365	390	414	445	467	490	512	534	
85.0	388	414	440	469	493	516	540	563	
87.8	411	438	465	493	518	543	567	592	

NOMINAL SIZE		500mm PANEL			600mm PANEL				
# OF TUBES		4	5	6	4	5	6	7	8
MEAN (35% VOLUME) ETHYLENE TEMPERATURE (°C)	35.0	48	51	55	35	36	38	40	42
	37.8	65	69	74	56	59	62	66	68
	40.6	82	88	93	79	83	87	90	95
	43.3	98	105	112	101	106	111	116	121
	46.1	115	123	131	123	129	135	141	147
	48.9	133	141	150	145	152	159	167	174
	51.7	150	160	170	167	176	184	192	201
	54.4	167	178	189	190	199	209	218	228
	57.2	184	196	208	212	223	233	244	255
	60.0	202	216	229	235	247	258	270	282
	62.8	218	233	247	257	270	283	296	309
	65.6	236	252	267	280	294	308	322	336
	68.3	252	269	286	303	318	333	348	364
	71.1	270	288	306	325	342	358	374	390
	73.9	287	307	326	349	367	384	402	419
	76.7	306	326	347	372	390	409	427	446
	79.4	324	346	367	394	414	434	453	473
82.2	342	365	388	417	438	459	480	501	
85.0	365	390	414	441	463	485	507	529	
87.8	387	413	438	465	488	511	534	558	

NOMINAL SIZE		500mm PANEL			600mm PANEL				
# OF TUBES		4	5	6	4	5	6	7	8
MEAN (35% VOLUME) PROPYLENE TEMPERATURE (°C)	35.0	51	53	57	36	38	40	42	44
	37.8	68	73	77	59	62	65	69	72
	40.6	86	92	98	82	87	91	95	100
	43.3	103	110	117	105	111	116	121	127
	46.1	121	129	137	129	135	142	148	154
	48.9	139	148	157	152	160	167	175	182
	51.7	157	167	178	175	184	193	202	210
	54.4	175	186	198	199	209	219	228	238
	57.2	192	205	218	222	233	244	255	266
	60.0	211	226	240	246	258	270	283	295
	62.8	229	244	259	269	283	296	310	323
	65.6	247	263	280	293	307	322	336	351
	68.3	264	282	299	317	332	348	364	380
	71.1	282	301	319	340	357	374	391	408
	73.9	300	320	340	365	383	402	420	438
	76.7	319	341	362	388	407	427	446	466
	79.4	339	361	384	412	432	453	474	494
82.2	358	382	406	436	458	480	502	524	
85.0	381	407	432	460	483	506	529	552	
87.8	403	430	457	484	509	533	557	581	

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%



**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		750mm PANEL					
# OF TUBES		5	6	7	8	9	10
MEAN WATER TEMPERATURE (°C)	35.0	45	47	49	50	52	54
	37.8	74	77	80	83	86	89
	40.6	103	107	112	116	120	124
	43.3	131	137	142	147	152	158
	46.1	160	166	173	179	186	192
	48.9	189	196	204	212	219	227
	51.7	218	226	235	244	252	261
	54.4	246	256	266	276	286	296
	57.2	275	286	297	308	319	330
	60.0	304	316	328	340	353	365
	62.8	333	346	359	373	386	399
	65.6	361	375	389	404	418	433
	68.3	390	406	421	437	453	468
	71.1	419	436	453	470	486	503
	73.9	448	466	484	502	520	538
	76.7	476	495	514	533	552	571
79.4	505	525	545	565	586	606	
82.2	534	555	576	598	619	640	
85.0	563	586	609	631	654	676	
87.8	591	615	639	662	686	710	

NOMINAL SIZE		750mm PANEL					
# OF TUBES		5	6	7	8	9	10
MEAN (35% VOLUME) ETHYLENE TEMPERATURE (°C)	35.0	41	43	45	45	47	49
	37.8	67	70	73	76	78	81
	40.6	94	98	102	106	110	113
	43.3	120	125	130	135	139	144
	46.1	147	153	159	164	170	176
	48.9	174	180	187	194	201	208
	51.7	200	208	216	224	232	240
	54.4	227	236	246	255	264	273
	57.2	254	264	275	285	295	305
	60.0	281	293	304	315	326	338
	62.8	308	321	333	345	358	370
	65.6	335	348	362	375	389	402
	68.3	363	378	392	407	421	436
	71.1	391	406	422	438	453	469
	73.9	418	435	452	469	485	502
	76.7	445	463	481	499	517	535
79.4	472	491	510	529	548	567	
82.2	500	520	540	560	580	600	
85.0	530	551	572	593	614	636	
87.8	557	579	602	624	646	668	

NOMINAL SIZE		750mm PANEL					
# OF TUBES		5	6	7	8	9	10
MEAN (35% VOLUME) PROPYLENE TEMPERATURE (°C)	35.0	43	45	47	48	50	52
	37.8	71	74	76	79	82	85
	40.6	99	103	107	111	115	119
	43.3	126	131	136	141	146	151
	46.1	154	160	166	172	179	185
	48.9	182	189	196	204	211	218
	51.7	210	218	227	235	244	252
	54.4	238	248	257	267	276	286
	57.2	266	277	287	298	309	319
	60.0	294	306	318	330	342	353
	62.8	323	336	349	362	375	388
	65.6	350	364	379	393	407	421
	68.3	380	395	410	425	440	456
	71.1	408	425	441	457	474	490
	73.9	437	455	472	490	507	525
	76.7	465	484	502	521	539	558
79.4	494	513	533	553	573	592	
82.2	523	544	565	586	607	628	
85.0	553	575	597	619	641	663	
87.8	581	604	627	650	674	697	

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%



**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		900mm PANEL						
# OF TUBES		6	7	8	9	10	11	12
MEAN WATER TEMPERATURE (°C)	35.0	50	52	53	55	57	58	60
	37.8	83	86	89	92	94	97	100
	40.6	117	120	124	128	132	136	140
	43.3	149	154	159	164	168	173	178
	46.1	182	188	194	200	206	212	218
	48.9	214	221	229	236	243	250	257
	51.7	247	255	264	272	280	289	297
	54.4	280	289	299	308	317	327	336
	57.2	313	323	334	344	355	365	376
	60.0	346	357	369	381	392	404	415
	62.8	379	391	404	417	429	442	455
	65.6	412	425	439	453	466	480	494
	68.3	445	460	475	490	504	520	534
	71.1	477	493	509	525	541	557	573
	73.9	511	527	545	562	578	596	613
	76.7	543	561	580	598	616	634	652
	79.4	576	595	615	634	653	672	691
82.2	609	629	649	670	690	710	730	
85.0	642	663	685	707	728	750	771	
87.8	675	697	720	742	765	788	810	

NOMINAL SIZE		900mm PANEL						
# OF TUBES		6	7	8	9	10	11	12
MEAN (35% VOLUME) ETHYLENE TEMPERATURE (°C)	35.0	45	47	48	50	52	53	55
	37.8	76	78	81	84	86	88	91
	40.6	107	110	113	117	121	124	128
	43.3	136	141	145	150	154	159	163
	46.1	166	172	178	183	189	194	200
	48.9	197	204	210	217	223	230	236
	51.7	228	235	243	251	258	266	273
	54.4	259	267	276	284	293	302	310
	57.2	289	299	309	318	328	338	347
	60.0	320	331	342	352	363	374	384
	62.8	351	363	375	386	398	410	421
	65.6	382	395	408	421	433	446	459
	68.3	414	428	442	456	470	484	497
	71.1	445	460	475	490	504	519	534
	73.9	477	493	509	525	540	557	572
	76.7	508	525	543	559	576	593	610
	79.4	539	557	575	593	611	629	647
82.2	570	589	609	627	646	666	684	
85.0	604	624	644	664	684	705	725	
87.8	636	657	678	699	720	742	763	

NOMINAL SIZE		900mm PANEL						
# OF TUBES		6	7	8	9	10	11	12
MEAN (35% VOLUME) PROPYLENE TEMPERATURE (°C)	35.0	48	50	51	53	54	55	57
	37.8	79	82	85	88	90	93	96
	40.6	112	115	119	123	126	130	134
	43.3	143	147	152	157	162	167	171
	46.1	175	180	186	192	198	204	210
	48.9	206	213	220	227	234	241	248
	51.7	239	247	255	263	270	279	286
	54.4	271	280	289	298	307	316	325
	57.2	303	313	323	333	343	353	363
	60.0	335	346	358	369	380	391	402
	62.8	368	380	392	405	417	429	441
	65.6	400	413	427	440	453	467	480
	68.3	433	447	462	476	491	505	520
	71.1	465	480	496	512	527	543	558
	73.9	498	515	532	548	565	582	598
	76.7	531	548	566	584	601	619	637
	79.4	563	582	601	620	638	657	676
82.2	596	616	636	656	676	696	716	
85.0	630	651	672	693	714	735	756	
87.8	663	685	707	729	751	774	795	

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%



**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		150mm PANEL		300mm PANEL			450mm PANEL			
# OF TUBES		1	2	2	3	4	3	4	5	6
MEAN WATER TEMPERATURE (°C)	35.0	12	15	8	9	10	13	14	15	15
	37.8	20	25	22	24	26	32	34	36	38
	40.6	29	34	36	39	43	50	54	57	60
	43.3	36	44	49	54	58	68	73	77	82
	46.1	44	53	62	68	75	87	93	98	104
	48.9	52	63	76	83	91	105	112	119	126
	51.7	60	72	89	98	107	124	132	140	148
	54.4	68	82	102	113	123	142	152	161	171
	57.2	76	91	116	128	139	161	171	182	193
	60.0	84	101	129	142	155	179	191	203	215
	62.8	92	111	143	157	171	197	211	224	237
	65.6	100	120	156	172	188	216	230	245	259
	68.3	108	130	170	187	204	237	252	268	284
	71.1	116	140	183	202	220	253	270	287	303
	73.9	124	149	197	217	237	271	289	307	325
	76.7	132	158	210	231	252	290	310	329	348
79.4	140	168	224	246	269	308	328	349	369	
82.2	148	178	237	260	284	327	349	370	392	
85.0	156	187	251	276	301	345	368	391	414	
87.8	164	197	264	291	317	364	389	413	437	

NOMINAL SIZE		150mm PANEL		300mm PANEL			450mm PANEL			
# OF TUBES		1	2	2	3	4	3	4	5	6
MEAN (30% VOLUME) ETHYLENE TEMPERATURE (°C)	35.0	10	13	7	8	9	11	12	13	13
	37.8	17	22	19	21	22	28	29	31	33
	40.6	25	29	31	34	37	43	47	49	52
	43.3	32	38	42	46	51	59	63	67	71
	46.1	39	46	54	59	65	75	80	85	90
	48.9	46	55	66	72	79	92	98	104	110
	51.7	53	63	78	86	93	108	115	122	130
	54.4	60	72	90	99	108	124	133	141	149
	57.2	67	80	102	112	122	141	150	160	169
	60.0	74	89	114	125	137	158	168	179	189
	62.8	81	98	126	139	151	174	186	197	209
	65.6	89	106	138	152	166	191	204	216	229
	68.3	96	115	150	165	181	210	224	238	251
	71.1	103	124	163	179	196	225	240	255	270
	73.9	111	133	176	193	211	242	258	274	290
	76.7	118	141	187	206	225	259	277	294	311
79.4	126	151	201	221	241	275	294	312	330	
82.2	133	160	212	234	255	294	313	333	352	
85.0	140	168	226	248	271	311	331	352	373	
87.8	148	178	239	262	286	329	351	373	394	

NOMINAL SIZE		150mm PANEL		300mm PANEL			450mm PANEL			
# OF TUBES		1	2	2	3	4	3	4	5	6
MEAN (30% VOLUME) PROPYLENE TEMPERATURE (°C)	35.0	11	14	7	8	9	12	13	14	14
	37.8	18	23	20	22	24	29	31	33	35
	40.6	27	31	33	36	39	46	49	52	55
	43.3	33	40	45	49	53	63	67	71	75
	46.1	41	49	57	63	68	80	85	90	96
	48.9	48	58	70	76	83	97	103	110	116
	51.7	56	67	82	90	99	114	122	129	137
	54.4	63	76	95	104	114	131	140	149	158
	57.2	71	85	107	118	129	149	159	169	178
	60.0	78	94	120	132	144	166	177	188	199
	62.8	86	103	133	146	159	183	196	208	220
	65.6	93	112	146	160	175	201	215	228	241
	68.3	101	121	158	174	190	221	235	250	265
	71.1	109	131	171	188	206	236	252	268	284
	73.9	116	139	184	203	221	254	271	288	305
	76.7	124	148	197	216	236	272	291	309	327
79.4	132	159	211	232	253	290	309	328	347	
82.2	140	168	223	245	268	308	329	349	370	
85.0	147	177	237	261	285	326	348	370	391	
87.8	156	187	250	275	300	345	368	391	414	

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%



**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		500mm PANEL			600mm PANEL				
# OF TUBES		4	5	6	4	5	6	7	8
MEAN WATER TEMPERATURE (°C)	35.0	53	56	60	38	40	42	44	46
	37.8	71	76	81	62	65	68	72	75
	40.6	90	96	102	86	91	95	99	104
	43.3	108	115	122	110	115	121	126	132
	46.1	126	134	143	134	140	147	154	161
	48.9	144	154	163	158	166	174	181	189
	51.7	163	173	184	182	191	200	209	218
	54.4	181	193	205	206	216	226	237	247
	57.2	199	212	226	230	241	253	264	276
	60.0	218	233	247	254	266	279	292	304
	62.8	236	251	267	278	291	305	319	333
	65.6	254	271	288	301	316	331	346	361
	68.3	271	289	307	325	342	358	374	391
	71.1	289	309	328	349	366	384	401	419
	73.9	308	328	349	374	393	411	430	449
	76.7	327	349	370	397	417	437	457	477
	79.4	346	369	392	421	442	463	484	505
82.2	365	390	414	445	467	490	512	534	
85.0	388	414	440	469	493	516	540	563	
87.8	411	438	465	493	518	543	567	592	

NOMINAL SIZE		500mm PANEL			600mm PANEL				
# OF TUBES		4	5	6	4	5	6	7	8
MEAN (30% VOLUME) ETHYLENE TEMPERATURE (°C)	35.0	45	48	51	33	34	36	38	39
	37.8	61	65	70	53	56	58	62	65
	40.6	78	83	88	74	79	82	86	90
	43.3	93	100	106	95	100	105	110	114
	46.1	109	117	124	116	122	128	134	140
	48.9	126	134	142	137	144	151	158	165
	51.7	142	151	161	159	167	174	182	190
	54.4	158	169	180	180	189	198	207	216
	57.2	175	186	198	202	212	222	232	242
	60.0	192	205	218	223	234	245	257	268
	62.8	208	222	235	245	257	269	281	294
	65.6	224	239	254	266	279	293	306	319
	68.3	240	256	272	288	303	317	332	346
	71.1	257	275	292	310	326	341	357	372
	73.9	274	293	311	333	350	367	383	400
	76.7	292	311	331	355	372	390	408	426
	79.4	310	331	351	377	396	415	433	452
82.2	328	350	372	400	420	440	460	480	
85.0	350	373	396	422	443	465	486	507	
87.8	370	395	420	445	467	489	512	534	

NOMINAL SIZE		500mm PANEL			600mm PANEL				
# OF TUBES		4	5	6	4	5	6	7	8
MEAN (30% VOLUME) PROPYLENE TEMPERATURE (°C)	35.0	48	51	55	35	36	38	40	42
	37.8	65	69	74	57	59	62	66	68
	40.6	82	88	93	79	83	87	90	95
	43.3	99	105	112	101	106	111	116	121
	46.1	116	123	131	123	129	135	141	147
	48.9	133	142	150	145	152	160	167	174
	51.7	150	160	170	168	176	184	193	201
	54.4	167	178	189	190	200	209	219	228
	57.2	184	197	209	213	223	234	245	255
	60.0	203	216	230	235	247	259	271	282
	62.8	219	234	248	258	271	284	296	309
	65.6	236	252	268	280	294	308	322	336
	68.3	253	270	287	304	319	334	349	364
	71.1	271	289	307	326	343	359	375	392
	73.9	288	307	326	350	368	385	403	420
	76.7	307	327	348	372	391	410	428	447
	79.4	326	348	369	396	416	436	456	476
82.2	345	368	390	420	441	462	483	504	
85.0	367	392	416	443	466	488	510	532	
87.8	388	414	440	467	490	513	537	560	

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%



**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		750mm PANEL					
# OF TUBES		5	6	7	8	9	10
MEAN WATER TEMPERATURE (°C)	35.0	45	47	49	50	52	54
	37.8	74	77	80	83	86	89
	40.6	103	107	112	116	120	124
	43.3	131	137	142	147	152	158
	46.1	160	166	173	179	186	192
	48.9	189	196	204	212	219	227
	51.7	218	226	235	244	252	261
	54.4	246	256	266	276	286	296
	57.2	275	286	297	308	319	330
	60.0	304	316	328	340	353	365
	62.8	333	346	359	373	386	399
	65.6	361	375	389	404	418	433
	68.3	390	406	421	437	453	468
	71.1	419	436	453	470	486	503
	73.9	448	466	484	502	520	538
	76.7	476	495	514	533	552	571
79.4	505	525	545	565	586	606	
82.2	534	555	576	598	619	640	
85.0	563	586	609	631	654	676	
87.8	591	615	639	662	686	710	

NOMINAL SIZE		750mm PANEL					
# OF TUBES		5	6	7	8	9	10
MEAN (30% VOLUME) ETHYLENE TEMPERATURE (°C)	35.0	39	40	42	43	45	46
	37.8	64	66	69	71	74	77
	40.6	89	92	97	100	104	107
	43.3	114	118	123	128	132	137
	46.1	139	145	150	156	161	167
	48.9	164	171	178	184	191	197
	51.7	190	198	205	213	220	228
	54.4	216	224	233	242	250	259
	57.2	242	251	261	271	280	290
	60.0	267	278	289	300	310	321
	62.8	293	305	317	329	340	352
	65.6	319	331	344	357	370	382
	68.3	346	360	373	387	401	415
	71.1	373	388	403	417	432	447
	73.9	399	415	431	447	463	479
	76.7	425	442	459	476	493	510
79.4	452	470	488	506	524	542	
82.2	479	498	518	537	556	575	
85.0	507	527	548	568	588	609	
87.8	533	555	576	597	619	640	

NOMINAL SIZE		750mm PANEL					
# OF TUBES		5	6	7	8	9	10
MEAN (30% VOLUME) PROPYLENE TEMPERATURE (°C)	35.0	41	43	45	45	47	49
	37.8	67	70	73	76	78	81
	40.6	94	98	102	106	110	113
	43.3	120	125	130	135	140	144
	46.1	147	153	159	165	170	176
	48.9	174	181	188	195	202	208
	51.7	201	209	217	225	233	241
	54.4	228	237	246	255	264	273
	57.2	255	265	275	285	296	306
	60.0	282	293	305	316	327	338
	62.8	309	321	334	346	358	371
	65.6	336	349	363	376	389	403
	68.3	364	379	393	408	422	437
	71.1	392	408	423	439	455	470
	73.9	419	436	453	470	486	503
	76.7	446	464	482	500	518	536
79.4	475	494	513	532	551	570	
82.2	503	523	543	564	584	604	
85.0	532	554	575	596	618	639	
87.8	559	582	604	627	649	671	

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%



**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		900mm PANEL						
# OF TUBES		6	7	8	9	10	11	12
MEAN WATER TEMPERATURE (°C)	35.0	50	52	53	55	57	58	60
	37.8	83	86	89	92	94	97	100
	40.6	117	120	124	128	132	136	140
	43.3	149	154	159	164	168	173	178
	46.1	182	188	194	200	206	212	218
	48.9	214	221	229	236	243	250	257
	51.7	247	255	264	272	280	289	297
	54.4	280	289	299	308	317	327	336
	57.2	313	323	334	344	355	365	376
	60.0	346	357	369	381	392	404	415
	62.8	379	391	404	417	429	442	455
	65.6	412	425	439	453	466	480	494
	68.3	445	460	475	490	504	520	534
	71.1	477	493	509	525	541	557	573
	73.9	511	527	545	562	578	596	613
	76.7	543	561	580	598	616	634	652
	79.4	576	595	615	634	653	672	691
82.2	609	629	649	670	690	710	730	
85.0	642	663	685	707	728	750	771	
87.8	675	697	720	742	765	788	810	

NOMINAL SIZE		900mm PANEL						
# OF TUBES		6	7	8	9	10	11	12
MEAN (30% VOLUME) ETHYLENE TEMPERATURE (°C)	35.0	43	45	45	47	49	50	51
	37.8	71	74	77	79	81	83	86
	40.6	101	104	107	111	114	118	121
	43.3	129	133	138	142	146	150	155
	46.1	158	163	168	174	179	184	189
	48.9	187	193	199	205	212	218	224
	51.7	216	223	230	237	245	252	259
	54.4	245	254	262	270	278	286	295
	57.2	275	284	293	302	311	321	330
	60.0	304	314	325	335	345	355	365
	62.8	334	345	357	368	379	390	401
	65.6	364	376	388	400	412	425	437
	68.3	394	407	421	434	447	460	473
	71.1	424	438	453	467	481	495	509
	73.9	455	470	485	500	515	531	546
	76.7	485	501	518	534	550	566	582
	79.4	515	532	550	567	584	602	619
82.2	547	565	583	601	619	638	656	
85.0	578	597	617	636	655	675	694	
87.8	609	629	650	670	690	711	731	

NOMINAL SIZE		900mm PANEL						
# OF TUBES		6	7	8	9	10	11	12
MEAN (30% VOLUME) PROPYLENE TEMPERATURE (°C)	35.0	45	47	48	50	52	53	55
	37.8	76	78	81	84	86	88	91
	40.6	107	110	113	117	121	124	128
	43.3	136	141	145	150	154	159	163
	46.1	167	172	178	183	189	194	200
	48.9	197	204	210	217	224	230	237
	51.7	228	236	243	251	258	266	274
	54.4	259	267	276	285	293	302	311
	57.2	290	299	309	319	328	338	348
	60.0	321	332	343	353	364	375	385
	62.8	352	364	376	387	399	411	422
	65.6	383	396	409	422	434	447	460
	68.3	415	429	443	457	471	485	498
	71.1	446	461	476	491	506	521	536
	73.9	478	494	510	526	541	558	573
	76.7	510	526	544	561	577	595	611
	79.4	542	560	578	596	614	632	650
82.2	574	593	612	631	650	670	689	
85.0	607	627	648	668	688	708	728	
87.8	639	660	681	702	723	745	766	

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%



**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		150mm PANEL		300mm PANEL			450mm PANEL			
# OF TUBES		1	2	2	3	4	3	4	5	6
MEAN WATER TEMPERATURE (°C)	35.0	12	15	8	9	10	13	14	15	15
	37.8	20	25	22	24	26	32	34	36	38
	40.6	29	34	36	39	43	50	54	57	60
	43.3	36	44	49	54	58	68	73	77	82
	46.1	44	53	62	68	75	87	93	98	104
	48.9	52	63	76	83	91	105	112	119	126
	51.7	60	72	89	98	107	124	132	140	148
	54.4	68	82	102	113	123	142	152	161	171
	57.2	76	91	116	128	139	161	171	182	193
	60.0	84	101	129	142	155	179	191	203	215
	62.8	92	111	143	157	171	197	211	224	237
	65.6	100	120	156	172	188	216	230	245	259
	68.3	108	130	170	187	204	237	252	268	284
	71.1	116	140	183	202	220	253	270	287	303
	73.9	124	149	197	217	237	271	289	307	325
	76.7	132	158	210	231	252	290	310	329	348
79.4	140	168	224	246	269	308	328	349	369	
82.2	148	178	237	260	284	327	349	370	392	
85.0	156	187	251	276	301	345	368	391	414	
87.8	164	197	264	291	317	364	389	413	437	

NOMINAL SIZE		150mm PANEL		300mm PANEL			450mm PANEL			
# OF TUBES		1	2	2	3	4	3	4	5	6
MEAN (25% VOLUME) ETHYLENE TEMPERATURE (°C)	35.0	11	14	8	9	10	12	13	14	14
	37.8	20	24	21	23	25	31	33	35	37
	40.6	28	33	35	37	41	48	52	55	58
	43.3	34	41	46	50	55	64	69	73	77
	46.1	42	50	59	65	70	82	87	93	98
	48.9	49	59	71	79	86	99	106	113	119
	51.7	57	69	84	93	101	117	125	133	141
	54.4	65	78	97	107	117	135	144	153	162
	57.2	72	87	110	121	132	153	163	173	183
	60.0	80	96	123	135	148	170	182	193	204
	62.8	88	105	136	150	163	188	201	213	226
	65.6	96	115	149	164	179	206	220	233	247
	68.3	103	124	162	178	195	226	241	256	271
	71.1	111	134	175	193	210	242	258	274	290
	73.9	119	143	189	208	227	260	277	294	312
	76.7	126	152	201	221	241	279	297	316	334
79.4	135	162	215	236	258	295	315	335	354	
82.2	142	171	227	250	272	314	335	356	376	
85.0	150	180	241	266	290	332	354	376	398	
87.8	159	190	255	280	306	351	375	398	422	

NOMINAL SIZE		150mm PANEL		300mm PANEL			450mm PANEL			
# OF TUBES		1	2	2	3	4	3	4	5	6
MEAN (25% VOLUME) PROPYLENE TEMPERATURE (°C)	35.0	12	15	8	9	10	13	14	15	15
	37.8	20	24	22	23	25	31	33	35	37
	40.6	28	33	35	38	42	49	53	56	59
	43.3	36	43	48	52	57	67	71	76	80
	46.1	44	52	61	67	73	85	91	97	102
	48.9	51	62	74	82	89	103	110	117	124
	51.7	59	71	88	96	105	122	130	138	146
	54.4	67	81	101	111	121	140	149	159	168
	57.2	75	90	114	126	137	158	169	179	190
	60.0	83	100	128	141	153	177	189	200	212
	62.8	91	109	141	155	170	195	208	221	234
	65.6	99	119	155	170	186	214	228	242	257
	68.3	107	129	168	185	202	234	250	266	281
	71.1	115	138	182	200	218	251	268	284	301
	73.9	123	148	196	215	235	269	287	305	323
	76.7	131	157	208	229	250	289	308	327	346
79.4	140	168	223	245	268	306	327	347	367	
82.2	148	177	236	259	283	326	348	369	391	
85.0	155	186	250	275	300	344	367	390	413	
87.8	164	197	264	290	317	364	388	412	436	

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%



**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		500mm PANEL			600mm PANEL				
# OF TUBES		4	5	6	4	5	6	7	8
MEAN WATER TEMPERATURE (°C)	35.0	53	56	60	38	40	42	44	46
	37.8	71	76	81	62	65	68	72	75
	40.6	90	96	102	86	91	95	99	104
	43.3	108	115	122	110	115	121	126	132
	46.1	126	134	143	134	140	147	154	161
	48.9	144	154	163	158	166	174	181	189
	51.7	163	173	184	182	191	200	209	218
	54.4	181	193	205	206	216	226	237	247
	57.2	199	212	226	230	241	253	264	276
	60.0	218	233	247	254	266	279	292	304
	62.8	236	251	267	278	291	305	319	333
	65.6	254	271	288	301	316	331	346	361
	68.3	271	289	307	325	342	358	374	391
	71.1	289	309	328	349	366	384	401	419
	73.9	308	328	349	374	393	411	430	449
	76.7	327	349	370	397	417	437	457	477
	79.4	346	369	392	421	442	463	484	505
82.2	365	390	414	445	467	490	512	534	
85.0	388	414	440	469	493	516	540	563	
87.8	411	438	465	493	518	543	567	592	

NOMINAL SIZE		500mm PANEL			600mm PANEL				
# OF TUBES		4	5	6	4	5	6	7	8
MEAN (25% VOLUME) ETHYLENE TEMPERATURE (°C)	35.0	51	54	57	36	38	40	42	44
	37.8	69	74	79	60	63	66	70	73
	40.6	86	92	98	82	87	91	95	100
	43.3	101	108	115	104	109	114	119	124
	46.1	119	127	135	126	133	139	145	152
	48.9	136	146	155	149	157	164	172	179
	51.7	154	164	175	172	181	189	198	207
	54.4	172	183	194	195	205	215	224	234
	57.2	189	202	214	218	229	240	251	262
	60.0	208	222	235	241	253	265	277	289
	62.8	224	239	254	264	278	291	304	317
	65.6	242	258	274	287	301	316	330	345
	68.3	259	276	294	311	326	342	358	373
	71.1	277	295	314	334	351	367	384	401
	73.9	295	314	334	358	376	394	412	430
	76.7	314	335	355	381	400	419	438	457
	79.4	332	354	376	404	424	444	465	485
82.2	351	374	397	427	449	470	491	513	
85.0	374	399	423	451	474	496	519	542	
87.8	396	422	449	476	499	523	547	571	

NOMINAL SIZE		500mm PANEL			600mm PANEL				
# OF TUBES		4	5	6	4	5	6	7	8
MEAN (25% VOLUME) PROPYLENE TEMPERATURE (°C)	35.0	52	55	59	37	39	41	43	45
	37.8	69	74	79	61	64	66	70	73
	40.6	88	94	100	84	89	93	97	102
	43.3	105	113	120	108	113	119	124	129
	46.1	124	132	140	131	138	145	151	158
	48.9	142	151	161	155	163	171	178	186
	51.7	160	171	181	179	188	197	206	215
	54.4	178	190	202	203	213	223	233	243
	57.2	196	209	223	226	238	249	260	272
	60.0	216	230	244	250	263	276	288	301
	62.8	233	249	264	274	288	302	316	329
	65.6	251	268	285	298	313	328	343	358
	68.3	269	287	304	322	339	355	371	387
	71.1	287	306	325	346	363	381	398	415
	73.9	305	326	346	371	390	408	427	446
	76.7	325	347	368	395	414	434	454	474
	79.4	344	368	390	419	440	461	482	503
82.2	364	388	413	444	466	488	510	532	
85.0	387	413	439	468	491	515	538	561	
87.8	410	437	464	492	517	541	566	591	

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%



**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		750mm PANEL					
# OF TUBES		5	6	7	8	9	10
MEAN WATER TEMPERATURE (°C)	35.0	45	47	49	50	52	54
	37.8	74	77	80	83	86	89
	40.6	103	107	112	116	120	124
	43.3	131	137	142	147	152	158
	46.1	160	166	173	179	186	192
	48.9	189	196	204	212	219	227
	51.7	218	226	235	244	252	261
	54.4	246	256	266	276	286	296
	57.2	275	286	297	308	319	330
	60.0	304	316	328	340	353	365
	62.8	333	346	359	373	386	399
	65.6	361	375	389	404	418	433
	68.3	390	406	421	437	453	468
	71.1	419	436	453	470	486	503
	73.9	448	466	484	502	520	538
	76.7	476	495	514	533	552	571
79.4	505	525	545	565	586	606	
82.2	534	555	576	598	619	640	
85.0	563	586	609	631	654	676	
87.8	591	615	639	662	686	710	

NOMINAL SIZE		750mm PANEL					
# OF TUBES		5	6	7	8	9	10
MEAN (25% VOLUME) ETHYLENE TEMPERATURE (°C)	35.0	43	45	47	48	50	52
	37.8	72	75	78	81	84	87
	40.6	99	103	107	111	115	119
	43.3	124	129	134	139	144	149
	46.1	151	157	163	169	175	181
	48.9	179	186	193	200	207	214
	51.7	206	214	223	231	239	247
	54.4	234	243	252	262	271	280
	57.2	261	272	282	293	303	314
	60.0	289	301	312	324	335	347
	62.8	317	330	342	355	368	380
	65.6	344	358	372	385	399	413
	68.3	373	388	403	417	432	447
	71.1	401	417	433	449	465	481
	73.9	429	446	464	481	498	515
	76.7	457	475	493	511	530	548
79.4	484	504	523	542	562	581	
82.2	512	533	553	574	594	614	
85.0	542	564	585	607	629	650	
87.8	570	593	616	638	661	684	

NOMINAL SIZE		750mm PANEL					
# OF TUBES		5	6	7	8	9	10
MEAN (25% VOLUME) PROPYLENE TEMPERATURE (°C)	35.0	44	46	48	49	51	53
	37.8	72	75	78	81	84	87
	40.6	101	105	110	114	117	121
	43.3	129	134	139	144	149	155
	46.1	157	163	170	176	182	189
	48.9	186	193	201	208	215	223
	51.7	214	223	231	240	248	257
	54.4	243	252	262	272	281	291
	57.2	271	282	293	304	315	326
	60.0	300	312	324	336	348	360
	62.8	329	342	355	368	382	395
	65.6	357	371	386	400	414	428
	68.3	387	402	418	433	448	464
	71.1	416	432	449	466	482	499
	73.9	445	463	480	498	516	534
	76.7	473	492	511	530	549	568
79.4	502	522	543	563	583	603	
82.2	532	553	574	596	617	638	
85.0	562	584	607	629	652	674	
87.8	590	614	637	661	685	708	

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%



**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		900mm PANEL						
# OF TUBES		6	7	8	9	10	11	12
MEAN WATER TEMPERATURE (°C)	35.0	50	52	53	55	57	58	60
	37.8	83	86	89	92	94	97	100
	40.6	117	120	124	128	132	136	140
	43.3	149	154	159	164	168	173	178
	46.1	182	188	194	200	206	212	218
	48.9	214	221	229	236	243	250	257
	51.7	247	255	264	272	280	289	297
	54.4	280	289	299	308	317	327	336
	57.2	313	323	334	344	355	365	376
	60.0	346	357	369	381	392	404	415
	62.8	379	391	404	417	429	442	455
	65.6	412	425	439	453	466	480	494
	68.3	445	460	475	490	504	520	534
	71.1	477	493	509	525	541	557	573
	73.9	511	527	545	562	578	596	613
	76.7	543	561	580	598	616	634	652
	79.4	576	595	615	634	653	672	691
82.2	609	629	649	670	690	710	730	
85.0	642	663	685	707	728	750	771	
87.8	675	697	720	742	765	788	810	

NOMINAL SIZE		900mm PANEL						
# OF TUBES		6	7	8	9	10	11	12
MEAN (25% VOLUME) ETHYLENE TEMPERATURE (°C)	35.0	48	50	51	53	54	55	57
	37.8	81	84	87	90	92	95	98
	40.6	112	115	119	123	127	130	134
	43.3	140	145	150	154	159	164	168
	46.1	171	177	183	189	194	200	206
	48.9	203	209	216	223	230	237	243
	51.7	234	242	250	258	265	273	281
	54.4	266	275	284	292	301	310	319
	57.2	297	307	317	327	337	347	357
	60.0	329	340	351	362	373	384	395
	62.8	361	373	385	397	409	421	433
	65.6	393	406	419	432	445	458	471
	68.3	425	439	454	468	482	496	510
	71.1	457	472	487	502	517	533	548
	73.9	489	505	522	538	554	571	587
	76.7	521	538	556	573	590	608	625
	79.4	553	571	590	608	626	645	663
82.2	584	603	623	642	662	682	701	
85.0	618	638	659	680	700	721	741	
87.8	651	672	694	716	737	759	781	

NOMINAL SIZE		900mm PANEL						
# OF TUBES		6	7	8	9	10	11	12
MEAN (25% VOLUME) PROPYLENE TEMPERATURE (°C)	35.0	49	51	52	54	56	57	59
	37.8	81	84	87	90	92	95	98
	40.6	115	117	121	125	129	133	137
	43.3	146	151	156	160	165	170	175
	46.1	178	184	190	196	202	208	214
	48.9	211	218	225	232	239	246	253
	51.7	243	251	260	268	276	284	292
	54.4	276	285	294	304	313	322	331
	57.2	309	319	329	340	350	360	371
	60.0	342	353	365	376	387	399	410
	62.8	375	387	400	412	424	437	450
	65.6	408	421	435	448	462	476	489
	68.3	441	456	471	485	500	515	529
	71.1	473	489	505	521	536	553	568
	73.9	507	524	541	558	574	592	608
	76.7	540	558	576	594	612	630	648
	79.4	573	592	612	631	649	669	688
82.2	606	626	647	667	687	708	728	
85.0	640	662	683	705	726	747	769	
87.8	674	696	719	741	763	786	808	

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%



**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE	150mm PANEL		300mm PANEL			450mm PANEL				
# OF TUBES	1	2	2	3	4	3	4	5	6	
MEAN WATER TEMPERATURE (°C)	35.0	12	15	8	9	10	13	14	15	15
	37.8	20	25	22	24	26	32	34	36	38
	40.6	29	34	36	39	43	50	54	57	60
	43.3	36	44	49	54	58	68	73	77	82
	46.1	44	53	62	68	75	87	93	98	104
	48.9	52	63	76	83	91	105	112	119	126
	51.7	60	72	89	98	107	124	132	140	148
	54.4	68	82	102	113	123	142	152	161	171
	57.2	76	91	116	128	139	161	171	182	193
	60.0	84	101	129	142	155	179	191	203	215
	62.8	92	111	143	157	171	197	211	224	237
	65.6	100	120	156	172	188	216	230	245	259
	68.3	108	130	170	187	204	237	252	268	284
	71.1	116	140	183	202	220	253	270	287	303
	73.9	124	149	197	217	237	271	289	307	325
	76.7	132	158	210	231	252	290	310	329	348
79.4	140	168	224	246	269	308	328	349	369	
82.2	148	178	237	260	284	327	349	370	392	
85.0	156	187	251	276	301	345	368	391	414	
87.8	164	197	264	291	317	364	389	413	437	

NOMINAL SIZE	150mm PANEL		300mm PANEL			450mm PANEL				
# OF TUBES	1	2	2	3	4	3	4	5	6	
MEAN (20% VOLUME) ETHYLENE TEMPERATURE (°C)	35.0	12	15	8	9	10	13	14	15	15
	37.8	21	26	23	25	27	33	35	37	39
	40.6	29	34	36	39	43	50	53	56	59
	43.3	35	42	47	51	56	65	70	74	78
	46.1	42	51	59	65	71	83	89	94	100
	48.9	50	60	72	80	87	101	108	114	121
	51.7	58	69	85	94	102	119	127	134	142
	54.4	66	79	99	108	118	137	146	155	164
	57.2	73	88	112	123	134	154	165	175	185
	60.0	81	97	125	137	150	172	184	195	207
	62.8	89	107	138	152	165	190	203	216	228
	65.6	97	116	151	166	181	208	222	236	250
	68.3	105	126	164	181	197	229	244	259	274
	71.1	113	135	177	195	213	245	261	277	294
	73.9	120	144	191	210	229	263	280	298	315
	76.7	128	153	203	224	244	282	301	319	338
79.4	136	164	218	239	261	299	319	339	359	
82.2	144	173	230	253	276	318	339	360	381	
85.0	152	182	244	269	293	336	358	381	403	
87.8	160	192	258	283	309	355	379	402	426	

NOMINAL SIZE	150mm PANEL		300mm PANEL			450mm PANEL				
# OF TUBES	1	2	2	3	4	3	4	5	6	
MEAN (20% VOLUME) PROPYLENE TEMPERATURE (°C)	35.0	12	15	8	9	10	13	14	15	15
	37.8	20	25	22	24	26	32	34	35	37
	40.6	29	34	36	39	42	49	53	56	59
	43.3	36	43	48	53	58	68	72	77	81
	46.1	44	53	61	68	74	86	92	97	103
	48.9	52	62	75	82	90	104	111	118	125
	51.7	60	72	88	97	106	123	131	139	147
	54.4	68	81	102	112	122	141	151	160	169
	57.2	76	91	115	127	138	160	170	181	192
	60.0	84	101	129	142	155	178	190	202	214
	62.8	92	110	142	157	171	197	210	223	236
	65.6	100	120	156	171	187	215	230	244	258
	68.3	108	130	169	186	203	236	252	268	283
	71.1	116	139	183	201	220	253	270	286	303
	73.9	124	149	197	217	237	271	289	307	325
	76.7	132	158	210	231	252	291	310	329	349
79.4	141	169	224	247	269	308	329	349	370	
82.2	149	178	237	261	285	328	350	372	393	
85.0	156	187	252	277	302	346	369	392	415	
87.8	165	198	265	292	319	366	390	415	439	

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%



**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		500mm PANEL			600mm PANEL				
# OF TUBES		4	5	6	4	5	6	7	8
MEAN WATER TEMPERATURE (°C)	35.0	53	56	60	38	40	42	44	46
	37.8	71	76	81	62	65	68	72	75
	40.6	90	96	102	86	91	95	99	104
	43.3	108	115	122	110	115	121	126	132
	46.1	126	134	143	134	140	147	154	161
	48.9	144	154	163	158	166	174	181	189
	51.7	163	173	184	182	191	200	209	218
	54.4	181	193	205	206	216	226	237	247
	57.2	199	212	226	230	241	253	264	276
	60.0	218	233	247	254	266	279	292	304
	62.8	236	251	267	278	291	305	319	333
	65.6	254	271	288	301	316	331	346	361
	68.3	271	289	307	325	342	358	374	391
	71.1	289	309	328	349	366	384	401	419
	73.9	308	328	349	374	393	411	430	449
	76.7	327	349	370	397	417	437	457	477
	79.4	346	369	392	421	442	463	484	505
82.2	365	390	414	445	467	490	512	534	
85.0	388	414	440	469	493	516	540	563	
87.8	411	438	465	493	518	543	567	592	

NOMINAL SIZE		500mm PANEL			600mm PANEL				
# OF TUBES		4	5	6	4	5	6	7	8
MEAN (20% VOLUME) ETHYLENE TEMPERATURE (°C)	35.0	52	55	59	38	39	41	43	45
	37.8	73	78	83	64	67	70	74	77
	40.6	89	95	101	85	90	94	98	103
	43.3	103	110	117	105	110	116	121	126
	46.1	120	129	137	128	134	141	147	154
	48.9	138	147	157	151	159	166	174	181
	51.7	156	166	177	174	183	192	200	209
	54.4	174	185	197	198	208	217	227	237
	57.2	192	204	217	221	232	243	254	265
	60.0	210	224	238	244	256	269	281	293
	62.8	227	242	257	268	281	294	308	321
	65.6	245	261	278	290	305	319	334	349
	68.3	262	280	297	315	330	346	362	378
	71.1	280	299	317	338	355	372	389	405
	73.9	298	318	338	362	381	399	417	435
	76.7	317	338	359	385	404	424	443	462
	79.4	336	359	381	409	429	450	470	491
82.2	355	379	402	433	454	476	498	519	
85.0	378	403	428	457	479	502	525	548	
87.8	400	427	453	480	504	528	552	577	

NOMINAL SIZE		500mm PANEL			600mm PANEL				
# OF TUBES		4	5	6	4	5	6	7	8
MEAN (20% VOLUME) PROPYLENE TEMPERATURE (°C)	35.0	52	55	59	37	39	41	43	45
	37.8	70	75	80	61	64	67	71	74
	40.6	89	95	101	85	90	94	98	103
	43.3	106	114	121	109	114	119	125	130
	46.1	125	133	141	132	139	146	152	159
	48.9	143	153	162	156	164	172	180	188
	51.7	161	172	183	180	189	198	207	216
	54.4	180	192	204	204	214	225	235	245
	57.2	198	211	224	228	240	251	262	274
	60.0	217	232	246	252	265	278	290	303
	62.8	235	250	266	276	290	304	318	332
	65.6	253	270	287	300	315	330	345	360
	68.3	271	289	307	325	341	357	374	390
	71.1	289	308	328	349	366	384	401	418
	73.9	308	328	349	374	393	411	430	449
	76.7	327	349	371	398	417	437	457	477
	79.4	346	370	393	422	443	464	485	506
82.2	366	391	415	447	469	491	513	536	
85.0	390	416	442	471	494	518	541	565	
87.8	412	440	467	495	520	545	570	594	

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%



**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		750mm PANEL					
# OF TUBES		5	6	7	8	9	10
MEAN WATER TEMPERATURE (°C)	35.0	45	47	49	50	52	54
	37.8	74	77	80	83	86	89
	40.6	103	107	112	116	120	124
	43.3	131	137	142	147	152	158
	46.1	160	166	173	179	186	192
	48.9	189	196	204	212	219	227
	51.7	218	226	235	244	252	261
	54.4	246	256	266	276	286	296
	57.2	275	286	297	308	319	330
	60.0	304	316	328	340	353	365
	62.8	333	346	359	373	386	399
	65.6	361	375	389	404	418	433
	68.3	390	406	421	437	453	468
	71.1	419	436	453	470	486	503
	73.9	448	466	484	502	520	538
	76.7	476	495	514	533	552	571
79.4	505	525	545	565	586	606	
82.2	534	555	576	598	619	640	
85.0	563	586	609	631	654	676	
87.8	591	615	639	662	686	710	

NOMINAL SIZE		750mm PANEL					
# OF TUBES		5	6	7	8	9	10
MEAN (20% VOLUME) ETHYLENE TEMPERATURE (°C)	35.0	44	46	48	49	51	53
	37.8	76	79	82	85	88	91
	40.6	102	106	111	115	119	123
	43.3	126	131	136	141	146	151
	46.1	153	159	165	172	178	184
	48.9	181	188	195	203	210	217
	51.7	209	217	225	234	242	250
	54.4	237	246	256	265	275	284
	57.2	265	275	286	296	307	318
	60.0	293	304	316	328	339	351
	62.8	321	334	346	359	372	385
	65.6	348	362	376	390	404	418
	68.3	377	392	407	423	438	453
	71.1	406	422	438	455	471	487
	73.9	434	452	469	486	504	521
	76.7	462	480	499	517	536	554
79.4	490	510	529	549	569	588	
82.2	519	539	560	581	602	622	
85.0	548	570	592	614	636	658	
87.8	576	599	622	645	668	691	

NOMINAL SIZE		750mm PANEL					
# OF TUBES		5	6	7	8	9	10
MEAN (20% VOLUME) PROPYLENE TEMPERATURE (°C)	35.0	44	46	48	49	51	53
	37.8	73	76	79	82	85	88
	40.6	102	106	111	115	119	123
	43.3	130	135	140	145	151	156
	46.1	158	165	171	177	184	190
	48.9	187	195	202	210	217	225
	51.7	216	224	233	242	250	259
	54.4	245	254	264	274	284	294
	57.2	273	284	295	306	317	328
	60.0	302	314	327	339	351	363
	62.8	331	345	358	371	384	398
	65.6	359	374	388	403	417	431
	68.3	389	405	421	436	452	467
	71.1	419	436	452	469	486	503
	73.9	448	466	484	502	520	538
	76.7	476	495	515	534	553	572
79.4	506	526	546	567	587	607	
82.2	535	557	578	599	621	642	
85.0	565	588	610	633	656	678	
87.8	594	617	641	665	689	712	

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%



**TWA
PANEL SYSTEMS, INC.**

NOMINAL SIZE		900mm PANEL						
# OF TUBES		6	7	8	9	10	11	12
MEAN WATER TEMPERATURE (°C)	35.0	50	52	53	55	57	58	60
	37.8	83	86	89	92	94	97	100
	40.6	117	120	124	128	132	136	140
	43.3	149	154	159	164	168	173	178
	46.1	182	188	194	200	206	212	218
	48.9	214	221	229	236	243	250	257
	51.7	247	255	264	272	280	289	297
	54.4	280	289	299	308	317	327	336
	57.2	313	323	334	344	355	365	376
	60.0	346	357	369	381	392	404	415
	62.8	379	391	404	417	429	442	455
	65.6	412	425	439	453	466	480	494
	68.3	445	460	475	490	504	520	534
	71.1	477	493	509	525	541	557	573
	73.9	511	527	545	562	578	596	613
	76.7	543	561	580	598	616	634	652
	79.4	576	595	615	634	653	672	691
82.2	609	629	649	670	690	710	730	
85.0	642	663	685	707	728	750	771	
87.8	675	697	720	742	765	788	810	

NOMINAL SIZE		900mm PANEL						
# OF TUBES		6	7	8	9	10	11	12
MEAN (20% VOLUME) ETHYLENE TEMPERATURE (°C)	35.0	49	51	52	54	56	57	59
	37.8	85	88	91	94	96	99	103
	40.6	116	119	123	127	131	135	139
	43.3	142	147	152	156	161	166	171
	46.1	174	179	185	191	197	203	208
	48.9	205	212	219	226	233	240	246
	51.7	237	245	253	261	269	277	285
	54.4	269	278	287	296	305	314	323
	57.2	301	311	321	331	341	351	361
	60.0	333	344	355	366	377	389	400
	62.8	365	377	390	402	414	426	438
	65.6	397	410	424	437	450	464	477
	68.3	430	445	459	474	488	502	517
	71.1	462	477	493	508	524	539	555
	73.9	495	511	528	544	561	577	594
	76.7	527	544	562	580	597	615	632
	79.4	559	578	597	615	634	653	671
82.2	592	611	631	651	670	690	710	
85.0	625	646	667	687	708	729	750	
87.8	657	679	701	723	745	767	789	

NOMINAL SIZE		900mm PANEL						
# OF TUBES		6	7	8	9	10	11	12
MEAN (20% VOLUME) PROPYLENE TEMPERATURE (°C)	35.0	49	51	52	54	56	57	59
	37.8	82	85	88	91	93	96	99
	40.6	116	119	123	126	130	134	138
	43.3	147	152	157	162	167	172	176
	46.1	180	186	192	198	204	210	216
	48.9	212	220	227	234	241	248	255
	51.7	245	253	262	270	278	286	294
	54.4	278	287	297	306	315	325	334
	57.2	311	321	332	342	353	363	373
	60.0	344	356	367	379	390	402	413
	62.8	377	390	403	415	428	440	453
	65.6	410	424	438	452	465	479	493
	68.3	444	459	474	489	503	518	533
	71.1	477	493	509	525	540	557	572
	73.9	511	527	545	562	578	596	613
	76.7	544	562	580	598	616	635	653
	79.4	577	596	616	635	654	673	693
82.2	610	631	651	672	692	712	733	
85.0	644	665	687	709	730	752	773	
87.8	678	700	723	745	768	791	813	

OUTPUTS EXPRESSED IN WATTS/LINEAL METRE OF PANEL AND ARE BASED ON 21°C ROOM TEMPERATURE. FOR EVERY 1°C DECREASE IN ROOM TEMPERATURE BELOW 21°C, THE OUTPUT INCREASES BY 2%. FOR EVERY 1°C INCREASE IN ROOM TEMPERATURE ABOVE 21°C, THE OUTPUT DECREASES BY 2%