

SPORLAN

PRESSURE-TEMPERATURE CHART

at Altitude – 5,000 feet above Sea Level

PSIG	TEMPERATURE °F					
	LIGHT GREEN	LIGHT BLUE	CORAL	ROSE	TEAL	WHITE
	REFRIGERANT - (SPORLAN CODE)					
	22 (V)	134a (J)	401A (X)	410A (Z)	507 (P)	717 (A)
5*	-56	-30	-32	-74	-67	-42
4*	-55	-29	-31	-73	-65	-41
3*	-53	-27	-29	-71	-64	-39
2*	-52	-25	-27	-70	-62	-37
1*	-50	-24	-26	-68	-60	-36
0	-48	-22	-24	-67	-59	-35
1	-46	-19	-21	-64	-56	-32
2	-43	-16	-18	-62	-53	-29
3	-40	-14	-16	-59	-51	-27
4	-38	-11	-13	-57	-48	-24
5	-35	-9	-11	-55	-46	-22
6	-33	-6	-8	-53	-44	-20
7	-31	-4	-6	-51	-42	-18
8	-29	-2	-4	-49	-40	-16
9	-27	0	-2	-47	-38	-14
10	-25	2	0	-45	-36	-13
11	-23	4	2	-44	-34	-11
12	-21	6	4	-42	-32	-9
13	-19	8	6	-40	-31	-8
14	-18	9	7	-39	-29	-6
15	-16	11	9	-37	-28	-5
16	-15	13	11	-36	-26	-3
17	-13	14	12	-34	-24	-2
18	-12	16	14	-33	-23	0
19	-10	17	15	-32	-22	1
20	-9	19	17	-30	-20	2
21	-7	20	18	-29	-19	4
22	-6	22	20	-28	-17	5
23	-5	23	21	-27	-16	6
24	-3	24	23	-25	-15	7
25	-2	26	24	-24	-14	9
26	-1	27	25	-23	-12	10
27	1	28	26	-22	-11	11
28	2	29	28	-21	-10	12
29	3	31	29	-20	-9	13
30	4	32	30	-19	-8	14
31	5	33	31	-18	-7	15
32	6	34	32	-17	-6	16
33	7	35	34	-16	-4	17
34	9	36	35	-15	-3	18
35	10	37	36	-14	-2	19
36	11	38	37	-13	-1	20
37	12	39	38	-12	0	21
38	13	40	39	-11	1	22
39	14	41	40	-10	2	23
40	15	43	41	-9	3	24
42	17	44	43	-7	4	25
44	19	46	45	-6	6	27
46	20	48	47	-4	8	29
48	22	50	49	-2	10	30
50	24	52	50	-1	12	32
52	26	54	52	1	13	33
54	27	55	53	2	15	35
56	29	57	54	4	16	36
58	30	59	55	5	18	38
60	32	60	56	7	19	39
62	34	62	57	8	21	41
64	35	63	58	9	22	42
66	36	65	59	11	24	43
68	38	66	60	12	25	45
70	39	67	61	13	27	46
72	41	69	62	15	28	47
74	42	70	63	16	29	48
76	43	72	64	17	31	49
78	45	73	65	18	32	51
80	46	74	66	19	33	52
85	49	77	68	22	36	55
90	52	80	71	25	39	57
95	55	83	74	28	42	60
100	58	86	77	30	45	62
105	60	89	80	33	47	65
110	63	92	82	35	50	67
115	66	94	85	37	52	69
120	68	97	88	39	55	71
125	71	99	90	42	57	74
130	73	102	93	44	59	76
135	75	104	95	46	61	78
140	77	106	97	48	64	80
145	80	108	100	50	66	82
150	82	111	102	52	68	83
155	84	113	104	54	70	85
160	86	115	106	55	72	87
165	88	117	108	57	74	89
170	90	119	110	59	76	90
175	92	121	112	61	77	92
180	93	122	114	62	79	94
185	95	124	116	64	81	95
190	97	126	118	66	83	97
195	99	128	120	67	84	99
200	101	130	122	69	86	100
205	102	131	124	70	88	102
210	104	133	125	72	89	103
220	107	136	129	75	93	106
230	110	140	132	78	96	109
240	113	143	135	80	99	111
250	116	146	139	83	102	114
260	119	149	142	86	104	117
275	124	153	146	89	108	120
290	128	157	150	93	112	124
305	131	161	154	96	116	127
320	135	164	158	100	120	130
335	139	168	162	103	123	134
350	142	172	166	106	127	137
365	146	175	169	109	130	140
380	149	178	173	112	133	143
400	153	183	178	116	137	146
420	158	187	182	120	141	150
440	162	191	186	123	145	153
460	165	194	190	127	148	157
480	169	198	194	130	152	160
500	173	202	198	133	155	163

* Inches mercury below one atmosphere

MAKE A SYSTEMATIC ANALYSIS

Based on the complaint and measurements taken

Changing Parts Might Be The First Reaction BUT...

1. May not be necessary and...
2. Does not always solve the problem

SUPERHEAT AND SUCTION PRESSURE

symptoms can provide the real cause



POSSIBLE CAUSES

1. Moisture, dirt, wax
2. Undersized valve
3. High superheat adjustment
4. Gas charge condensation
5. Dead thermostatic element charge
6. Wrong thermostatic charge
7. Evaporator pressure drop — no external equalizer
8. External equalizer location
9. Restricted or capped external equalizer
10. Low refrigerant charge
11. Liquid line vapor
 - a. Vertical lift
 - b. High friction loss
 - c. Long or small line
 - d. Plugged drier or strainer
12. Low pressure drop across valve
 - a. Same as #11 above
 - b. Undersized distributor nozzle or circuits
 - c. Low condensing temperature

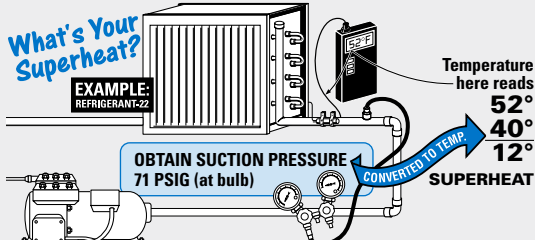
POSSIBLE CAUSES

1. Oversized valve
2. TEV seat leak
3. Low superheat adjustment
4. Bulb installation
 - a. Poor installation
 - b. Warm location
5. Wrong thermostatic charge
6. Bad compressor – low capacity
7. Moisture, dirt, wax
8. Incorrectly located external equalizer



POSSIBLE CAUSES

1. Low load
 - a. Not enough air
 - b. Dirty air filters
 - c. Air too cold
 - d. Coil icing
2. Poor air distribution
3. Poor refrigerant distribution
4. Improper compressor-evaporator balance
5. Evaporator oil logged
6. Flow from one TEV affecting another's bulb



SPORLAN

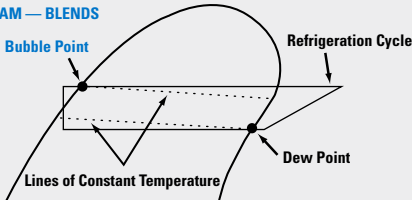
PRESSURE-TEMPERATURE CHART

at Altitude - 5,000 feet above Sea Level

PSIG	TEMPERATURE °F					
	BLUE	LIME GREEN	MEDIUM BROWN	LIME GREEN	ORANGE	REDDISH PURPLE
	REFRIGERANT - (SPORLAN CODE)					
	438A (V)	407A (V)	407C (N)	422D (V)	404A (S)	408A (S)
5*	-48	-52	-48	-51	-64	-62
4*	-46	-50	-47	-50	-63	-61
3*	-44	-49	-45	-48	-61	-59
2*	-43	-47	-44	-47	-60	-57
1*	-41	-46	-42	-45	-58	-56
0	-40	-44	-41	-44	-57	-54
1	-37	-41	-38	-41	-54	-51
2	-34	-39	-35	-38	-51	-49
3	-32	-36	-33	-36	-49	-46
4	-29	-34	-30	-33	-46	-44
5	-27	-32	-28	-31	-44	-41
6	-25	-29	-26	-29	-42	-39
7	-23	-27	-24	-27	-40	-37
8	-21	-25	-22	-25	-38	-35
9	-19	-24	-20	-23	-36	-33
10	-17	-22	-18	-21	-34	-31
11	-15	-20	-16	-19	-32	-29
12	-13	-18	-15	-18	-30	-27
13	-12	-17	-13	-16	-28	-26
14	-10	-15	-11	-14	-27	-24
15	-9	-13	-10	-13	-25	-22
16	-7	-12	-8	-11	-24	-21
17	-6	-11	-7	-10	-22	-19
18	-4	-9	-5	-8	-21	-18
19	-3	-8	-4	-7	-19	-16
20	-1	-6	-3	-5	-18	-15
21	0	-5	-1	-4	-17	-13
22	1	-4	0	-3	-15	-12
23	3	-2	1	-1	-14	-11
24	4	-1	3	0	-13	-9
25	5	0	4	1	-11	-8
26	6	1	5	2	-10	-7
27	8	2	6	3	-9	-6
28	9	3	7	5	-8	-5
29	10	5	8	6	-7	-3
30	11	6	10	7	-5	-2
31	12	7	11	8	-4	-1
32	13	8	12	9	-3	0
33	14	9	13	10	-2	1
34	15	10	14	11	-1	2
35	16	11	15	12	0	3
36	17	12	16	13	1	4
37	18	13	17	14	2	5
38	19	14	18	15	3	6
39	20	15	19	16	4	7
40	21	16	20	17	5	8
42	23	18	21	19	7	10
44	25	19	23	21	9	12
46	27	21	25	23	10	14
48	28	23	27	24	12	16
50	30	24	28	26	14	17
52	32	26	30	28	15	19
54	33	27	32	29	17	21
56	35	29	33	31	19	22
58	36	30	35	32	20	24
60	38	32	36	34	22	25
62	39	33	37	35	23	27
64	41	35	39	37	25	28
66	42	36	40	38	26	30
68	43	37	42	39	27	31
70	45	39	43	41	29	33
72	46	40	44	42	30	34
74	47	41	46	43	31	35
76	49	43	47	45	33	37
78	50	44	48	46	34	38
80	51	45	49	47	35	39
85	55	49	53	51	39	43
90	58	52	56	54	42	46
95	61	55	59	57	45	49
100	64	58	62	60	48	52
105	67	61	65	63	51	55
110	70	64	68	66	54	58
115	73	67	71	69	57	61
120	76	70	74	72	60	64
125	79	73	77	75	63	67
130	82	76	80	78	66	70
135	85	79	83	81	69	73
140	88	82	86	84	72	76
145	91	85	89	87	75	79
150	94	88	92	90	78	82
155	97	91	95	93	81	85
160	100	94	98	96	84	88
165	103	97	101	99	87	91
170	106	100	104	102	90	94
175	109	103	107	105	93	97
180	112	106	110	108	96	100
185	115	109	113	111	99	103
190	118	112	116	114	102	106
195	121	115	119	117	105	109
200	124	118	122	120	108	112
205	127	121	125	123	111	115
210	130	124	128	126	114	118
220	136	130	134	132	120	124
230	142	136	140	138	126	130
240	148	142	146	144	132	136
250	154	148	152	150	138	142
260	160	154	158	156	144	148
270	166	160	164	162	150	154
280	172	166	170	168	156	160
290	178	172	176	174	162	166
300	184	178	182	180	168	172
310	190	184	188	186	174	178
320	196	190	194	192	180	184
335	202	196	200	198	186	190
350	208	202	206	204	192	196
365	214	208	212	210	198	202
380	220	214	218	216	204	208
400	226	220	224	222	210	214
420	232	226	230	228	216	220
440	238	232	236	234	222	226
460	244	238	242	240	228	232
480	250	244	248	246	234	238
500	256	250	254	252	240	244

* Inches mercury below one atmosphere

P-H DIAGRAM — BLENDS



To determine superheat, use **Dew Point** values. To determine subcooling, use **Bubble Point** values.

APPROXIMATE PRESSURE CONTROL SETTINGS at Altitude - 5,000 Feet above Sea Level

Pressure - Pounds Per Square Inch Gauge

APPLICATION	TEMPERATURE RANGE (°F)	EVAPORATOR TD (°F)	REFRIGERANT							
			22		134a		404A		507	
			Out	In	Out	In	Out	In	Out	In
Beverage Cooler	35 to 38	15	43	68	20	36	54	85	57	89
Floral Cooler										
Produce Cooler										
Smoked Meat Cooler	32 to 35	15	40	64	18	33	52	80	55	84
Meat Reach Thru										
Service Deli										
Seafood										
Multi-Deck Fresh Meat	26 to 29	15	34	56	14	28	45	71	47	74
Frozen Glass Door	-10 to 0	10	12	26	-	-	17	35	19	38
Frozen Walk-In										
Frozen Ice Cream										
Frozen Food - Open Type	-30 to -20	10	2	13	-	-	6	19	7	20

Pressure control settings assume a suction line pressure loss equivalent to 2°F.

CARRYING CAPACITY OF REFRIGERATION LINES

Tons of Refrigeration - 200 Feet Equivalent Pipe Length

TYPE L COPPER TUBE O.D. Inches	REFRIGERANT						IRON PIPE SIZE Inches	SCHEDULE	REFRIGERANT 717 (Ammonia)	
	22		134a		404A / 507				Liquid Line	Suction Line
	Liquid Line	Suction Line	Liquid Line	Suction Line	Liquid Line	Suction Line				
3/8	0.99	0.09	0.73	0.06	0.71	0.04	3/8	80	10.2	0.41
1/2	2.37	0.23	1.77	0.13	1.71	0.10	1/2	80	20.1	0.81
5/8	4.48	0.43	3.36	0.25	3.23	0.18	3/4	80	45.5	1.85
7/8	11.9	1.13	8.97	0.67	8.58	0.49	1	80	89.4	3.64
1-1/8	24.3	2.30	18.3	1.36	17.5	0.99	1-1/4	80	192	7.84
1-3/8	42.6	4.02	32.2	2.38	30.6	1.74	1-1/2	80	293	12.0
1-5/8	67.6	6.37	51.1	3.78	48.4	2.76	2	40	683	28.0
2-1/8	141	13.2	107	7.88	101	5.74	2-1/2	40	1090	44.7
2-5/8	250	23.4	190	14.0	179	10.2	3	40	1930	79.1
3-1/8	400	37.5	304	22.4	286	16.3	3-1/2	40	2820	116
3-5/8	595	55.7	453	33.3	425	24.2	4	40	3930	162
4-1/8	841	78.7	641	47.0	600	34.2	5	40	7100	292

Refrigerants 22, 134a, 404A, and 507 values are based on 100°F liquid temperature and the stated evaporator temperature. Refrigerant 717 (ammonia) values are based on 86°F liquid temperature and 20°F evaporator temperature. Both suction and liquid line values are based on a pressure drop equivalent to 1°F change in saturation temperature. For additional information on refrigerant line sizing, consult ASHRAE's Refrigeration Handbook or equipment manufacturer.



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