QUICK ESTIMATES FOR WATTAGE REQUIREMENTS

42T: To Heat Steel

Weight in lbs.	Temperature Rise (°F)						
	50°	100°	200°	300°	400°	500°	600°
25	.06	.12	.25	.37	.50	.65	.75
50	.12	.25	.50	.75	1.00	1.25	1.50
100	.25	.50	1.00	1.50	2.00	2.50	3.00
150	.37	.75	1.50	2.25	3.00	3.75	4.50
200	.50	1.00	2.00	3.00	4.00	5.00	6.00
250	.65	1.25	2.50	3.75	5.00	6.25	7.50
300	.75	1.50	3.00	4.50	6.00	7.50	9.00
400	1.00	2.00	4.00	6.00	8.00	10.00	12.00
500	1.25	2.50	5.00	7.50	10.00	12.50	15.00
600	1.50	3.00	6.00	9.00	12.00	15.00	18.00
700	1.75	3.50	7.00	10.50	14.00	17.50	21.00
800	2.00	4.00	8.00	12.00	16.00	20.00	24.00
900	2.25	4.50	9.00	13.50	18.00	22.50	27.00
1000	2.50	5.00	10.00	15.00	20.00	25.00	30.00
	kw to heat in 1 hour						

43T: To Heat Air

Cu.ft./ minute (scfm)	Temperature Rise (°F)										
	50°	100°	150°	200°	250°	300°	350°	400°	450°	500°	600°
100	1.7	3.3	5	6.7	8.3	10.0	11.7	13.3	15.0	16.7	20.0
200	3.3	6.7	10.0	13.3	16.7	20.0	23.3	26.7	30.0	33.3	40.0
300	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0	45.0	50.0	60.0
400	6.7	13.3	20.0	26.7	33.3	40.0	46.7	53.3	60.0	66.7	80.0
500	8.3	16.7	25.0	33.3	41.7	50.0	58.3	66.7	75.0	83.3	100.0
600	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	120.0
700	11.7	23.3	35	46.7	58.3	70.0	81.7	93.3	105.0	116.7	140.0
800	13.3	26.7	40	53.3	66.7	80.0	93.3	106.7	120.0	133.3	160.0
900	15.0	30.0	45.0	60.0	75.0	90.0	105.0	120.0	135.0	150.0	180.0
1,000	16.7	33.3	50	66.7	83.3	100.0	116.7	133.3	150.0	166.7	200.0
1,100	18.3	36.7	55	73.3	91.7	110.0	128.3	146.7	165.0	183.3	220.0
1,200	20	40	60	80.0	100.0	120.0	140.0	160.0	180.0	200.0	240.0
	kw										

Use the maximum anticipated airflow. Chart 35T and below equations assume insulated duct (negligible heat loss), 70°F inlet air and 14 psia.

Quick estimates for other volumes

For Air:

$$kw = \frac{scfm^* \times \text{Temperature Rise (°F)}}{3000}$$

*Measured at normal temperature and pressure.

For Compressed Air:

$$kw = \frac{scfm^{**} \times \text{Density}^{**} \times \text{Temperature Rise (°F)}}{228}$$

**Measured at heater system inlet temperature and pressure.

44T: To Heat Water

Cubic feet	Gallons	Temperature Rise (°F)						
		20°	40°	60°	80°	100°	120°	140°
.66	5	0.3	0.5	0.8	1.1	1.3	1.6	1.9
1.3	10	0.5	1.1	1.6	2.1	2.7	3.2	3.7
2.0	13	0.8	1.6	2.4	3.2	4	4.8	5.6
2.7	20	1.1	2.2	3.2	4.3	5.3	6.4	7.5
3.3	25	1.3	2.7	4	5.3	6.7	8	9.3
4.0	30	1.6	3.2	4.8	6.4	8	9.6	12
5.3	40	2.1	4	6.4	8.5	11	13	15
6.7	50	2.7	5.4	8	10.7	13	16	19
8.0	60	3.3	6.4	9.6	12.8	16	19	22
9.4	70	3.7	7.5	11.2	15	19	22	26
10.7	80	4.3	8.5	13	17	21	26	30
12.0	90	5	10	14.5	19	24	29	34
13.4	100	5.5	11	16	21	27	32	37
16.7	125	7	13	20	27	33	40	47
20.0	150	8	16	24	32	40	48	56
		kw to heat in 1 hour						

Quick estimates for other volumes

$$kw = \frac{\text{gal./hr. x 8.34 x Temperature Rise (°F)}}{3412}$$

$$\text{gal.hr.} = \frac{\text{kw x 3412}}{\text{8.34 x Temperature Rise (°F)}}$$

45T: To Heat Oil

Cubic feet	Gallons	Temperature Rise (°F)					
		50°	100°	200°	300°	400°	500°
.5	3.74	.3	.5	1	2	2	3
1	7.48	.5	1	2	3	4	6
2	14.96	1	1	2	4	6	11
3	22.25	2	3	6	9	12	16
4	29.9	2	4	8	12	16	22
5	37.4	3	4	9	15	20	25
10	74.8	5	9	18	29	40	52
15	112.5	7	14	28	44	60	77
20	149.6	9	18	37	58	80	102
25	187	11	22	46	72	100	127
30	222.5	13	27	56	86	120	151
35	252	16	31	65	100	139	176
40	299	18	36	74	115	158	201
45	336.5	20	40	84	129	178	226
50	374	22	45	93	144	197	252
		kw to heat in 1 hour					

Add 5% for uninsulated tanks.

Quick estimates for other volumes

$$kw = \frac{\text{Gallons x Temperature Rise (°F)}}{\text{800 x Process Start-up Time (hrs.)}}$$

DETERMINING WATTAGE REQUIREMENTS FOR ENCLOSURE HEATERS

Enclosure Surface Area—Square Feet	TEMPERATURE RISE FROM MINIMUM EXPECTED AMBIENT TEMPERATURE TO DESIRED ENCLOSURE TEMPERATURE (°F)													
	20		40		60		80		100		120		140	
50	670	160	1340	320	2010	480	2680	640	3350	800	4020	960	4690	1120
40	540	130	1075	260	1610	385	2145	515	2680	640	3220	770	3755	900
30	405	100	805	195	1210	290	1610	385	2010	480	2415	580	2815	675
25	335	80	670	160	1005	240	1340	320	1675	400	2010	480	2345	560
20	270	65	540	130	805	195	1075	260	1340	320	1610	385	1880	450
15	205	50	405	100	605	145	805	195	1005	240	1210	290	1410	340
10	135	35	270	65	405	100	540	130	670	160	805	195	940	225
9	120	30	245	60	365	90	485	115	605	145	725	175	845	205
7.5	100	25	200	50	300	75	400	100	500	125	600	150	700	175
6	80	20	160	40	245	60	325	80	405	100	485	115	565	135
5	70	20	135	35	205	50	270	65	335	80	405	100	470	115
4	55	15	110	30	160	55	215	55	270	65	320	80	375	90
3	40	10	80	20	120	30	160	40	200	50	240	60	280	70
2	30	10	55	15	90	20	110	30	135	35	165	40	190	45

Required wattage — Double above values in areas with extreme wind factors.
uninsulated cabinet insulated cabinet

Match above values from chart to a standard Enclosure Heater. Use multiple heaters where necessary.

KW REQUIREMENT FOR MAINTAINING TANK TEMPERATURES AGAINST HEAT LOSSES

To use graph, assume a requirement for maintaining a fluid temperature of 250°F in an ambient of 30°F in a tank 12' diameter by 20' long. Chart is based upon still air.

A. Connect 12' on scale 2 with 20' on scale 6 (line A). The intersection of this line with scale 4 is the surface area of the cylindrical portion of the tank (approximately 800 sq. ft.). The intersection of line A with scale 3 is the tank volume (approximately 17,000 gallons).

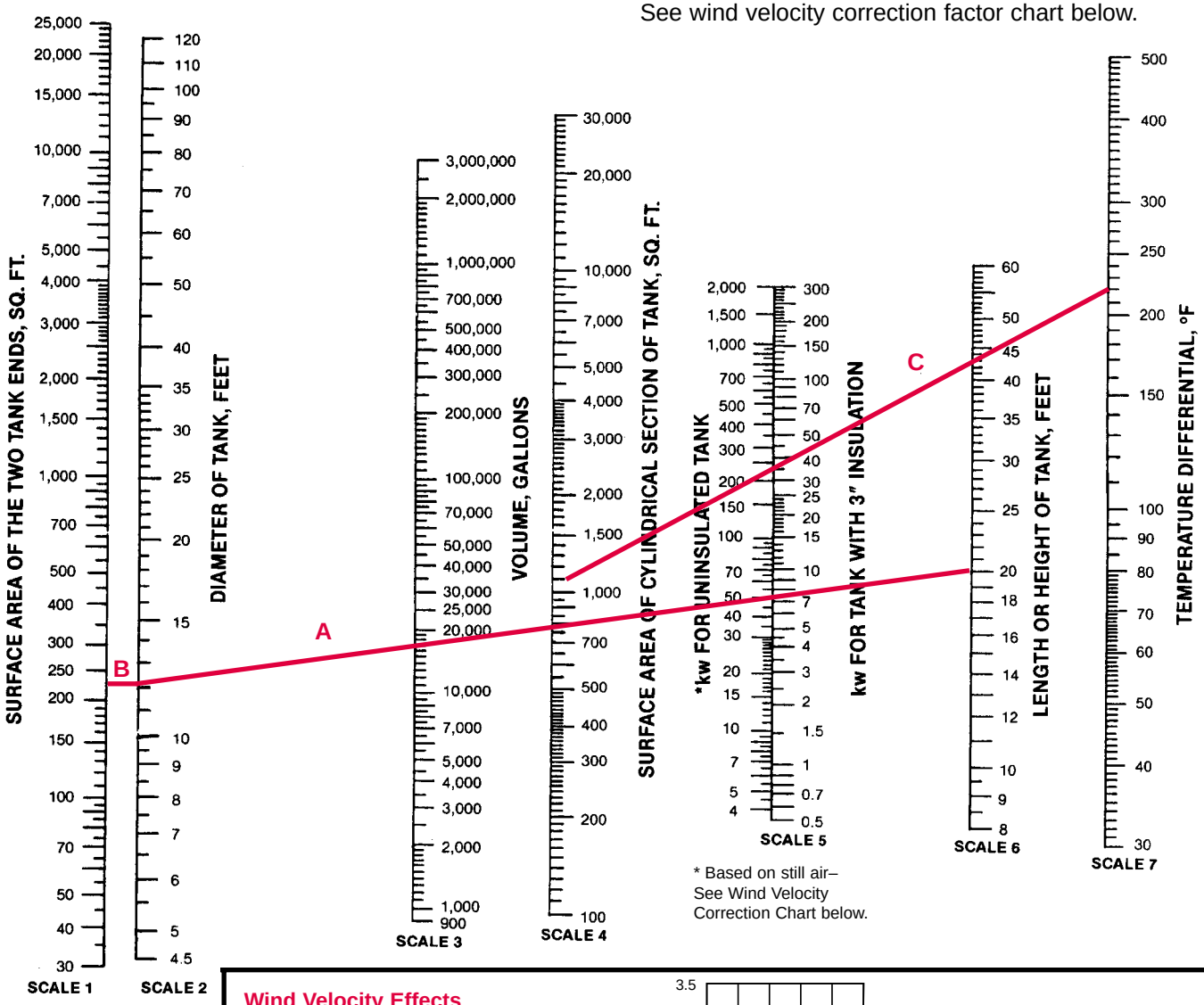
B. Draw horizontal line B to scale 1 to determine the surface area of the tank ends (approximately 225 sq. ft.).

C. Adding A and B is the total surface area of the tank (1,025 sq. ft.). Connect 1,025 on scale 4 and 220°F (250-30°F) on scale 7 with line C. The kw required is where line C intersects scale 5.

Insulated tank = 35kw

Uninsulated tank = 250kw

See wind velocity correction factor chart below.



* Based on still air– See Wind Velocity Correction Chart below.

Wind Velocity Effects On exposed, Bare and Insulated Surfaces

1. Determine surface heat losses at still air conditions as per calculation or chart above.
2. Multiply result by wind correction factor from above for total heat loss.