Appendix

General Conversion Table

Multiply by	*To convert*	*To*	
2.54	Inches	Centimeters	.3937
30.48	Feet	Centimeters	.0328
.914	Yards	Meters	1.094
1.609	Miles	Kilometers	.621
.645	Square inches	Square cm.	.155
.836	Square yards	Square meters	1.196
16.39	Cubic inches	Cubic cm.	.061
28.3	Cubic feet	Liters	.0353
.4536	Pounds	Kilograms	2.2045
4.546	Gallons	Liters	.22
.068	Lbs./sq. in. (psi)	Atmospheres	14.7
.138	Foot pounds	Kg. m.	7.23
1.014	H.P. (DIN)	H.P. (SAE)	.9861
——	To obtain	From	Multiply by

Note: 1 cm. equals 10 mm.; 1 mm. equals .0394″.

Conversion—Common Fractions to Decimals and Millimeters

Inches			Inches			Inches		
Common Fractions	*Decimal Fractions*	*Millimeters (approx.)*	*Common Fractions*	*Decimal Fractions*	*Millimeters (approx.)*	*Common Fractions*	*Decimal Fractions*	*Millimeters (approx.)*
1/128	.008	0.20	11/32	.344	8.73	43/64	.672	17.07
1/64	.016	0.40	23/64	.359	9.13	11/16	.688	17.46
1/32	.031	0.79	3/8	.375	9.53	45/64	.703	17.86
3/64	.047	1.19	25/64	.391	9.92	23/32	.719	18.26
1/16	.063	1.59	13/32	.406	10.32	47/64	.734	18.65
5/64	.078	1.98	27/64	.422	10.72	3/4	.750	19.05
3/32	.094	2.38	7/16	.438	11.11	49/64	.766	19.45
7/64	.109	2.78	29/64	.453	11.51	25/32	.781	19.84
1/8	.125	3.18	15/32	.469	11.91	51/64	.797	20.24
9/64	.141	3.57	31/64	.484	12.30	13/16	.813	20.64
5/32	.156	3.97	1/2	.500	12.70	53/64	.828	21.03
11/64	.172	4.37	33/64	.516	13.10	27/32	.844	21.43
3/16	.188	4.76	17/32	.531	13.49	55/64	.859	21.83
13/64	.203	5.16	35/64	.547	13.89	7/8	.875	22.23
7/32	.219	5.56	9/16	.563	14.29	57/64	.891	22.62
15/64	.234	5.95	37/64	.578	14.68	29/32	.906	23.02
1/4	.250	6.35	19/32	.594	15.08	59/64	.922	23.42
17/64	.266	6.75	39/64	.609	15.48	15/16	.938	23.81
9/32	.281	7.14	5/8	.625	15.88	61/64	.953	24.21
19/64	.297	7.54	41/64	.641	16.27	31/32	.969	24.61
5/16	.313	7.94	21/32	.656	16.67	63/64	.984	25.00
21/64	.328	8.33						

Conversion—Millimeters to Decimal Inches

mm	*inches*	*mm*	*inches*	*mm*	*inches*	*mm*	*inches*	*mm*	*inches*
1	.039 370	31	1.220 470	61	2.401 570	91	3.582 670	210	8.267 700
2	.078 740	32	1.259 840	62	2.440 940	92	3.622 040	220	8.661 400
3	.118 110	33	1.299 210	63	2.480 310	93	3.661 410	230	9.055 100
4	.157 480	34	1.338 580	64	2.519 680	94	3.700 780	240	9.448 800
5	.196 850	35	1.377 949	65	2.559 050	95	3.740 150	250	9.842 500
6	.236 220	36	1.417 319	66	2.598 420	96	3.779 520	260	10.236 2[illegible]
7	.275 590	37	1.456 689	67	2.637 790	97	3.818 890	270	10.629 9[illegible]
8	.314 960	38	1.496 050	68	2.677 160	98	3.858 260	280	11.032 600
9	.354 330	39	1.535 430	69	2.716 530	99	3.897 630	290	11.417 300
10	.393 700	40	1.574 800	70	2.755 900	100	3.937 000	300	11.811 000
11	.433 070	41	1.614 170	71	2.795 270	105	4.133 848	310	12.204 700
12	.472 440	42	1.653 540	72	2.834 640	110	4.330 700	320	12.598 400
13	.511 810	43	1.692 910	73	2.874 010	115	4.527 550	330	12.992 100
14	.551 180	44	1.732 280	74	2.913 380	120	4.724 400	340	13.385 800
15	.590 550	45	1.771 650	75	2.952 750	125	4.921 250	350	13.779 500
16	.629 920	46	1.811 020	76	2.992 120	130	5.118 100	360	14.173 200
17	.669 290	47	1.850 390	77	3.031 490	135	5.314 950	370	14.566 900
18	.708 660	48	1.889 760	78	3.070 860	140	5.511 800	380	14.960 600
19	.748 030	49	1.929 130	79	3.110 230	145	5.708 650	390	15.354 300
20	.787 400	50	1.968 500	80	3.149 600	150	5.905 500	400	15.748 000
21	.826 770	51	2.007 870	81	3.188 970	155	6.102 350	500	19.685 000
22	.866 140	52	2.047 240	82	3.228 340	160	6.299 200	600	23.622 000
23	.905 510	53	2.086 610	83	3.267 710	165	6.496 050	700	27.559 000
24	.944 880	54	2.125 980	84	3.307 080	170	6.692 900	800	31.496 000
25	.984 250	55	2.165 350	85	3.346 450	175	6.889 750	900	35.433 00[illegible]
26	1.023 620	56	2.204 720	86	3.385 820	180	7.086 600	1000	39.370 0[illegible]
27	1.062 990	57	2.244 090	87	3.425 190	185	7.283 450	2000	78.740 000
28	1.102 360	58	2.283 460	88	3.464 560	190	7.480 300	3000	118.110 000
29	1.141 730	59	2.322 830	89	3.503 903	195	7.677 150	4000	157.480 000
30	1.181 100	60	2.362 200	90	3.543 300	200	7.874 000	5000	196.850 000

To change decimal millimeters to decimal inches, position the decimal point where desired on either side of the millimeter measurement shown and reset the inches decimal by the same number of digits in the same direction. For example, to convert .001 mm into decimal inches, reset the decimal behind the 1 mm (shown on the chart) to .001; change the decimal inch equivalent (.039″ shown to .000039″).

Tap Drill Sizes

Screw & Tap Size	National Fine or S.A.E. Threads Per Inch	Use Drill Number
No. 5	44	37
No. 6	40	33
No. 8	36	29
No. 10	32	21
No. 12	28	15
1/4	28	3
5/16	24	1
3/8	24	Q
7/16	20	W
1/2	20	29/64
9/16	18	33/64
5/8	18	37/64
3/4	16	11/16
7/8	14	13/16
1 1/8	12	1 3/64
1 1/4	12	1 11/64
1 1/2	12	1 27/[illegible]

Screw & Tap Size	National Coarse or U.S.S. Threads Per Inch	Use Drill Number
No. 5	40	39
No. 6	32	36
No. 8	32	29
No. 10	24	25
No. 12	24	17
1/4	20	8
5/16	18	F
3/8	16	5/16
7/16	14	U
1/2	13	27/64
9/16	12	31/64
5/8	11	17/32
3/4	10	21/32
7/8	9	49/64
1	8	7/8
1 1/8	7	63/64
1 1/4	7	1 7/[illegible]

Decimal Equivalent Size of the Number Drills

Drill No.	Decimal Equivalent	Drill No.	Decimal Equivalent	Drill No.	Decimal Equivalent
80	.0135	53	.0595	26	.1470
79	.0145	52	.0635	25	.1495
78	.0160	51	.0670	24	.1520
77	.0180	50	.0700	23	.1540
76	.0200	49	.0730	22	.1570
75	.0210	48	.0760	21	.1590
74	.0225	47	.0785	20	.1610
73	.0240	46	.0810	19	.1660
72	.0250	45	.0820	18	.1695
71	.0260	44	.0860	17	.1730
70	.0280	43	.0890	16	.1770
69	.0292	42	.0935	15	.1800
68	.0310	41	.0960	14	.1820
67	.0320	40	.0980	13	.1850
66	.0330	39	.0995	12	.1890
65	.0350	38	.1015	11	.1910
64	.0360	37	.1040	10	.1935
63	.0370	36	.1065	9	.1960
62	.0380	35	.1100	8	.1990
61	.0390	34	.1110	7	.2010
60	.0400	33	.1130	6	.2040
59	.0410	32	.1160	5	.2055
58	.0420	31	.1200	4	.2090
57	.0430	30	.1285	3	.2130
56	.0465	29	.1360	2	.2210
55	.0520	28	.1405	1	.2280
54	.0550	27	.1440		

Decimal Equivalent Size of the Letter Drills

Letter Drill	Decimal Equivalent	Letter Drill	Decimal Equivalent	Letter Drill	Decimal Equivalent
A	.234	J	.277	S	.348
B	.238	K	.281	T	.358
C	.242	L	.290	U	.368
D	.246	M	.295	V	.377
E	.250	N	.302	W	.386
F	.257	O	.316	X	.397
G	.261	P	.323	Y	.404
H	.266	Q	.332	Z	.413
I	.272	R	.339		

ANTI-FREEZE INFORMATION

Freezing and Boiling Points of Solutions According to Percentage of Alcohol or Ethylene Glycol

Freezing Point of Solution	Alcohol Volume %	Alcohol Solution Boils at	Ethylene Glycol Volume %	Ethylene Glycol Solution Boils at
20°F.	12	196°F.	16	216°F.
10°F.	20	189°F.	25	218°F.
0°F.	27	184°F.	33	220°F.
–10°F.	32	181°F.	39	222°F.
–20°F.	38	178°F.	44	224°F.
–30°F.	42	176°F.	48	225°F.

Note: above boiling points are at sea level. For every 1,000 feet of altitude, boiling points are approximately 2°F. lower than those shown. For every pound of pressure exerted by the pressure cap, the boiling points are approximately 3°F. higher than those shown.

To Increase the Freezing Protection of Anti-Freeze Solutions Already Installed

Cooling System Capacity Quarts	Number of Quarts of **ALCOHOL** Anti-Freeze Required to Increase Protection													
	From +20°F. to					From +10°F. to					From 0°F. to			
	0°	−10°	−20°	−30°	−40°	0°	−10°	−20°	−30°	−40°	−10°	−20°	−30°	−40°
10	2	2¾	3½	4	4½	1	2	2⅔	3¼	3¾	1	1¾	2½	3
12	2½	3¼	4	4¾	5¼	1¼	2¼	3	3¾	4½	1¼	2	2¾	3½
14	3	4	4¾	5½	6	1½	2½	3½	4½	5	1¼	2½	3¼	4
16	3¼	4½	5½	6¼	7	1¾	3	4	5	5¾	1½	2¾	3¾	4¾
18	3¾	5	6	7	7¾	2	3¼	4½	5¾	6½	1¾	3	4¼	5¼
20	4	5½	6¾	7¾	8¾	2	3¼	5	6¼	7¼	1¾	3½	4¾	5¾
22	4½	6	7½	8½	9½	2¼	4	5½	6¾	8	2	3¾	5¼	6½
24	5	6¾	8	9¼	10½	2½	4½	6	7½	8¾	2¼	4	5½	7
26	5¼	7¼	8¾	10	11¼	2¾	4¾	6½	8	9½	2½	4½	6	7½
28	5¾	7¾	9½	11	12	3	5¼	7	8¾	10¼	2½	4¾	6½	8
30	6	8¾	10	11¾	13	3	5½	7½	9¼	10¾	2¾	5	7	8¾

Test radiator solution with proper tester. Determine from the table the number of quarts of solution to be drawn off from a full cooling system and replace with concentrated anti-freeze, to give the desired increased protection. For example, to increase protection of a 22-quart cooling system containing Alcohol anti-freeze, from +10°F. to −20°F. will require the replacement of 5½ quarts of solution with concentrated anti-freeze.

Cooling System Capacity Quarts	Number of Quarts of **ETHYLENE GLYCOL** Anti-Freeze Required to Increase Protection													
	From +20°F. to					From +10°F. to					From 0°F. to			
	0°	−10°	−20°	−30°	−40°	0°	−10°	−20°	−30°	−40°	−10°	−20°	−30°	−40°
10	1¾	2¼	3	3½	3¾	¾	1½	2¼	2¾	3¼	¾	1½	2	2½
12	2	2¾	3½	4	4½	1	1¾	2½	3¼	3¾	1	1¾	2½	3¼
14	2¼	3¼	4	4¾	5½	1¼	2	3	3¾	4½	1	2	3	3½
16	2½	3½	4½	5¼	6	1¼	2½	3½	4¼	5¼	1¼	2¼	3¼	4
18	3	4	5	6	7	1½	2¾	4	5	5¾	1½	2½	3¾	4¾
20	3¼	4½	5¾	6¾	7½	1¾	3	4¼	5½	6½	1½	2¾	4¼	5¼
22	3½	5	6¼	7¼	8¼	1¾	3¼	4¾	6	7¼	1¾	3¼	4½	5½
24	4	5½	7	8	9	2	3½	5	6½	7½	1¾	3½	5	6
26	4¼	6	7½	8¾	10	2	4	5½	7	8¼	2	3¾	5½	6¾
28	4½	6¼	8	9½	10½	2¼	4¼	6	7½	9	2	4	5¾	7¼
30	5	6¾	8½	10	11½	2½	4½	6½	8	9½	2¼	4¼	6¼	7¾

Test radiator solution with proper hydrometer. Determine from the table the number of quarts of solution to be drawn off from a full cooling system and replace with undiluted anti-freeze, to give the desired increased protection. For example, to increase protection of a 22-quart cooling system containing Ethylene Glycol (permanent type) anti-freeze, from +20°F. to −20°F. will require the replacement of 6¼ quarts of solution with undiluted anti-freeze.

ANTI-FREEZE CHART

Temperatures Shown in Degrees Fahrenheit
+32 is Freezing

Cooling System Capacity Quarts	Quarts of **ALCOHOL** Needed for Protection to Temperatures Shown Below												
	1	2	3	4	5	6	7	8	9	10	11	12	13
10	+23°	+11°	− 5°	−27°									
11	+25	+13	0	−18	−40°								
12		+15	+ 3	−12	−31								
13		+17	+ 7	− 7	−23								
14		+19	+ 9	− 3	−17	−34°							
15		+20	+11	+ 1	−12	−27							
16		+21	+13	+ 3	− 8	−21	−36°						
17		+22	+16	+ 6	− 4	−16	−29						
18		+23	+17	+ 8	− 1	−12	−25	−38°					
19		+24	+17	+ 9	+ 2	− 8	−21	−32					
20			+18	+11	+ 4	− 5	−16	−27	−39°				
21			+19	+12	+ 5	− 3	−12	−22	−34				
22			+20	+14	+ 7	0	− 9	−18	−29	−40°			
23			+21	+15	+ 8	+ 2	− 7	−15	−25	−36°			
24			+21	+16	+10	+ 4	− 4	−12	−21	−31			
25			+22	+17	+11	+ 6	− 2	− 9	−18	−27	−37°		
26			+22	+17	+12	+ 7	+ 1	− 7	−14	−23	−32		
27			+23	+18	+13	+ 8	+ 3	− 5	−12	−20	−28	−39°	
28			+23	+19	+14	+ 9	+ 4	− 3	− 9	−17	−25	−34	
29			+24	+19	+15	+10	+ 6	− 1	− 7	−15	−22	−30	−39°
30			+24	+20	+16	+11	+ 7	+ 1	− 5	−12	−19	−27	−35

+ Figures are above Zero, but below Freezing.

− Figures are below Zero. Also below Freezing.

Cooling System Capacity Quarts	Quarts of **ETHYLENE GLYCOL** Needed for Protection to Temperatures Shown Below													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
10	+24°	+16°	+ 4°	−12°	−34°	−62°								
11	+25	+18	+ 8	− 6	−23	−47								
12	+26	+19	+10	0	−15	−34	−57°							
13	+27	+21	+13	+ 3	− 9	−25	−45							
14			+15	+ 6	− 5	−18	−34							
15			+16	+ 8	0	−12	−26							
16			+17	+10	+ 2	− 8	−19	−34	−52°					
17			+18	+12	+ 5	− 4	−14	−27	−42					
18			+19	+14	+ 7	0	−10	−21	−34	−50°				
19			+20	+15	+ 9	+ 2	− 7	−16	−28	−42				
20				+16	+10	+ 4	− 3	−12	−22	−34	−48°			
21				+17	+12	+ 6	0	− 9	−17	−28	−41			
22				+18	+13	+ 8	+ 2	− 6	−14	−23	−34	−47°		
23				+19	+14	+ 9	+ 4	− 3	−10	−19	−29	−40		
24				+19	+15	+10	+ 5	0	− 8	−15	−23	−34	−46°	
25				+20	+16	+12	+ 7	+ 1	− 5	−12	−20	−29	−40	−50°
26					+17	+13	+ 8	+ 3	− 3	− 9	−16	−25	−34	−44
27					+18	+14	+ 9	+ 5	− 1	− 7	−13	−21	−29	−39
28					+18	+15	+10	+ 6	+ 1	− 5	−11	−18	−25	−34
29					+19	+16	+12	+ 7	+ 2	− 3	− 8	−15	−22	−29
30					+20	+17	+13	+ 8	+ 4	− 1	− 6	−12	−18	−25

For capacities over 30 quarts divide true capacity by 3. Find quarts Anti-Freeze for the $\frac{1}{3}$ and multiply by 3 for quarts to add.

For capacities under 10 quarts multiply true capacity by 3. Find quarts Anti-Freeze for the tripled volume and divide by 3 for quarts to add.

THE LIFE OF THE PARTY IS DEAD.

He killed himself.

He didn't mean to. But he had lost control of his drinking. And after the party, he iost control of his driving and killed himself.

Now his friends shake their heads and stare at the ground and wonder why. But the sad fact is his friends weren't friends. His friends let him die.

They knew he didn't drink only at parties. They knew he was a problem drinker. And still, they let him drive.

Last year, problem drinkers were responsible for 19,000 highway deaths. If one of your friends has a drinking problem, there are many ways you can help him. But first you must help him stay alive.

If you are really his friend, don't help him drink.

If he has been drinking, don't let him drive. Drive him yourself. Call a cab. Take his car keys. Everything you think you can't do, you must do.

We were lucky this time. The life of the party killed only himself.

Write Drunk Driver, Box 2345, Rockville, Maryland 20852.

WHEN A PROBLEM DRINKER DRIVES, IT'S YOUR PROBLEM.

U.S. DEPARTMENT OF TRANSPORTATION • NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

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