

APPENDIX A

Metric, Decimal and Fraction Conversions					
MILLI-METERS	INCHES		MILLI-METERS	INCHES	
	DECIMALS	FRACTIONS		DECIMALS	FRACTIONS
.1	.00394		11.9063	.46875	15/32
.2	.00787		12.00	.47244	
.3	.01181		12.3031	.484375	31/64
.3969	.015625	1/64	12.70	.5000	1/2
.4	.01575		13.00	.51181	
.5	.01969		13.0969	.515625	33/64
.6	.02362		13.4938	.53125	17/32
.7	.02756		13.8907	.546875	35/64
.7938	.03125	1/32	14.00	.55118	
.8	.0315		14.2875	.5625	9/16
.9	.03543		14.6844	.578125	37/64
1.00	.03937		15.00	.59055	
1.1906	.046875	3/64	15.0813	.59375	19/32
1.5875	.0625	1/16	15.4782	.609375	39/64
1.9844	.078125	5/64	15.875	.625	5/8
2.00	.07874		16.00	.62992	
2.3813	.09375	3/32	16.2719	.640625	41/64
2.7781	.109375	7/64	16.6688	.65625	21/32
3.00	.11811		17.00	.66929	
3.175	.125	1/8	17.0657	.671875	43/64
3.5719	.140625	9/64	17.4625	.6875	11/16
3.9688	.15625	5/32	17.8594	.703125	45/64
4.00	.15748		18.00	.70866	
4.3656	.171875	11/64	18.2563	.71875	23/32
4.7625	.1875	3/16	18.6532	.734375	47/64
5.00	.19685		19.00	.74803	
5.1594	.203125	13/64	19.05	.7500	3/4
5.5563	.21875	7/32	19.4469	.765625	49/64
5.9531	.234375	15/64	19.8438	.78125	25/32
6.00	.23622		20.00	.7874	
6.35	.2500	1/4	20.2407	.796875	51/64
6.7469	.265625	17/64	20.6375	.8125	13/16
7.00	.27559		21.00	.82677	
7.1438	.28125	9/32	21.0344	.828125	53/64
7.5406	.296875	19/64	21.4313	.84375	27/32
7.9375	.3125	5/16	21.8282	.859375	55/64
8.00	.31496		22.00	.86614	
8.3344	.328125	21/64	22.225	.875	7/8
8.7313	.34375	11/32	22.6219	.890625	57/64
9.00	.35433		23.00	.90551	
9.1281	.359375	23/64	23.0188	.90625	29/32
9.525	.375	3/8	23.4157	.921875	59/64
9.9219	.390625	25/64	23.8125	.9375	15/16
10.00	.3937		24.00	.94488	
10.3188	.40625	13/32	24.2094	.953125	61/64
10.7156	.421875	27/64	24.6063	.96875	31/32
11.00	.43307		25.00	.98425	
11.1125	.4375	7/16	25.0032	.984375	63/64
11.5094	.453125	29/64	25.4001	1.0000	1

APPENDIX B

English-Metric Conversion Chart

CONVERSION FACTORS

Unit	To	Unit	Multiply By	Unit	To	Unit	Multiply By
LENGTH				WEIGHT			
Millimeters.....	Inches.....		.03937	Grams.....	Ounces.....		.03527
Inches.....	Millimeters.....		25.4	Ounces.....	Grams.....		28.34953
Meters.....	Feet.....		3.28084	Kilograms.....	Pounds.....		2.20462
Feet.....	Meters.....		.3048	Pounds.....	Kilograms.....		.45359
Kilometers.....	Miles.....		.62137	WORK			
Miles.....	Kilometers.....		1.60935	Centimeter			
AREA				Kilograms.....	Inch Pounds.....		.8676
Square				Inch Pounds.....	Centimeter Kilograms...		1.15262
Centimeters.....	Square Inches.....		.155	Meter Kilograms.....	Foot Pounds.....		7.23301
Square Inches.....	Square Centimeters.....		6.45159	Foot Pounds.....	Newton Meters.....		1.3558
VOLUME				PRESSURE			
Cubic Centimeters.....	Cubic Inches.....		.06103	Kilograms/			
Cubic Inches.....	Cubic Centimeters.....		16.38703	Sq. Centimeter.....	Pounds/Sq. Inch.....		14.22334
Liters.....	Cubic Inches.....		61.025	Pounds/Sq. Inch.....	Kilograms/Sq.		
Cubic Inches.....	Liters.....		.01639	Centimeter.....			.07031
Liters.....	Quarts.....		1.05672	Bar.....	Pounds/Sq. Inch.....		14.504
Quarts.....	Liters.....		.94633	Pounds/Sq. Inch.....	Bar.....		.06895
Liters.....	Pints.....		2.11344	Atmosphere.....	Pounds/Sq. Inch.....		14.696
Pints.....	Liters.....		.47317	Pounds/Sq. Inch.....	Atmosphere.....		.06805
Liters.....	Ounces.....		33.81497	TEMPERATURE			
Ounces.....	Liters.....		.02957	Centigrade Degrees.....	Fahrenheit Degrees.....		$(C^{\circ} \times \frac{9}{5}) + 32$
				Fahrenheit Degrees.....	Centigrade Degrees.....		$(F^{\circ} - 32) \times \frac{5}{9}$

Inches	Decimals	MM	Inches	Decimals	MM
1/64.....	.016.....	.397	33/64.....	.516.....	13.097
1/32.....	.031.....	.794	17/32.....	.531.....	13.494
3/64.....	.047.....	1.191	35/64.....	.547.....	13.891
1/16.....	.063.....	1.588	9/16.....	.563.....	14.288
5/64.....	.078.....	1.984	37/64.....	.578.....	14.684
3/32.....	.094.....	2.381	19/32.....	.594.....	15.081
7/64.....	.109.....	2.778	39/64.....	.609.....	15.478
1/8.....	.125.....	3.175	5/8.....	.625.....	15.875
9/64.....	.141.....	3.572	41/64.....	.641.....	16.272
5/32.....	.156.....	3.969	21/32.....	.656.....	16.669
11/64.....	.172.....	4.366	43/64.....	.672.....	17.066
3/16.....	.188.....	4.763	11/16.....	.687.....	17.463
13/64.....	.203.....	5.159	45/64.....	.703.....	17.859
7/32.....	.219.....	5.556	23/32.....	.719.....	18.256
15/64.....	.234.....	5.953	47/64.....	.734.....	18.653
1/4.....	.250.....	6.350	3/4.....	.750.....	19.050
17/64.....	.266.....	6.747	49/64.....	.766.....	19.447
9/32.....	.281.....	7.144	25/32.....	.781.....	19.844
19/64.....	.297.....	7.541	51/64.....	.797.....	20.241
5/16.....	.313.....	7.938	13/16.....	.813.....	20.638
21/64.....	.328.....	8.334	53/64.....	.828.....	21.034
11/32.....	.344.....	8.731	27/32.....	.844.....	21.431
23/64.....	.359.....	9.128	55/64.....	.859.....	21.828
3/8.....	.375.....	9.525	7/8.....	.875.....	22.225
25/64.....	.391.....	9.922	57/64.....	.891.....	22.622
13/32.....	.406.....	10.319	29/32.....	.906.....	23.019
27/64.....	.422.....	10.716	59/64.....	.922.....	23.416
7/16.....	.438.....	11.113	15/16.....	.938.....	23.813
29/64.....	.453.....	11.509	61/64.....	.953.....	24.209
15/32.....	.469.....	11.906	31/32.....	.969.....	24.606
31/64.....	.484.....	12.303	63/64.....	.984.....	25.003
1/2.....	.500.....	12.700			

Courtesy of Snap-on.

APPENDIX C

Metric Conversion Chart

METRIC CONVERSION: lb. ft. to N·m

The chart below can be used to convert pound foot to newton metre. The left hand column lists pound foot in multiples of 10 and the numbers at the top of the columns list the second digit. Thus 36 pound foot is found by following the 30 pound foot line to the right to “6” and the conversion is 49 N·m.

lb. ft.	0	1	2	3	4	5	6	7	8	9
	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m
0	0	1.36	2.7	4.1	5.4	6.8	8.1	9.5	10.9	12.2
10	13.6	14.9	16.3	17.6	19	20.3	21.7	23.1	24.4	25.8
20*	27	28	30	31	33	34	35	37	38	39
30	41	42	43	45	46	47	49	50	52	53
40	54	56	57	58	60	61	62	64	65	66
50	68	69	71	72	73	75	76	77	79	80
60	81	83	84	85	87	88	90	91	92	94
70	95	96	98	99	100	102	103	104	106	107
80	109	110	111	113	114	115	117	118	119	121
90	122	123	125	126	127	129	130	132	133	134
100	136	137	138	140	141	142	144	145	146	148

*Above 20 lb. ft. the converted N·m readings are rounded to the nearest N·m

METRIC CONVERSION: kg·cm to N·m

The chart below can be used to convert kilogram centimetre to newton metre. The left hand column lists kg·cm in multiples of 10 and the numbers at the top of the columns list the second digit. Thus 72 kg·cm is found by following the 70 kg·cm line to the right to “2” and the conversion is 7.1 N·m.

kg· cm.	0	1	2	3	4	5	6	7	8	9
	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m	N·m
0	0	.098	.20	.29	.39	.49	.59	.69	.78	.88
10	.98	1.08	1.18	1.27	1.37	1.47	1.57	1.67	1.76	1.86
20	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.8
30	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8
40	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8
50	4.9	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8
60	5.9	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8
70	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8
80	7.9	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7
90	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7
100	9.8	9.9	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7

One oz. in. = 28.35 gms. in.

One lb. in. = 1.152 kg·cm

One lb. ft. = .138 kg·m

One kg·cm = .8679 lb. in.

One kg·cm = 7.233 lb. ft.

One N·cm = .0885 lb. in.

One N·m = .7375 lb. ft.

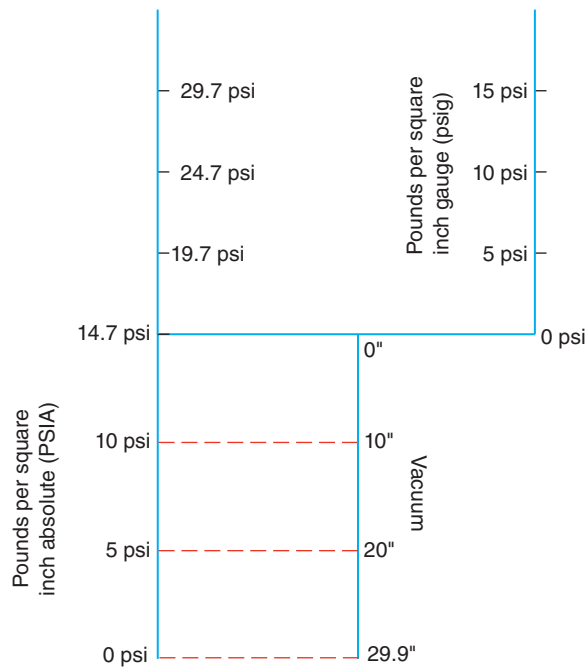
Courtesy of Snap-on Tools

APPENDIX D

A Comparison of Various Pressure Standards

Pressure vs. Vacuum			
PSIG	PSI (abs)	BAR	IN·Hg
2	16	1.14	–
1	15	1.07	–
0	14.2	1.00	0
–1	13	0.94	2
–2	12	0.87	4
–3	11	0.80	6
–4	10	0.72	9
–5	9	0.64	11
–6	8	0.57	13
–7	7	0.50	15
–8	6	0.44	18
–9	5	0.37	20
–10	4	0.30	22
–11	3	0.22	24
–12	2	0.14	26
–13	1	0.07	28
–14	0	0.00	30

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APPENDIX E

Common Acronyms

A/C	air conditioning	ABS	antilock brake system
A/F sensor	air/fuel ratio sensor	TC	traction control
A/T	automatic transmission/transaxle	VSC	vehicle stability control
M/T	manual transmission/transaxle	TWC	three way catalyst
AAT sensor	ambient air temperature sensor	TWC + OC	three way catalyst + oxidation catalyst
APP sensor	accelerator pedal position sensor	PCM	powertrain control module
IAT sensor	intake air temperature sensor	ECM	electronic control module
FT	fuel trim	O2S	oxygen sensor
MAF sensor	mass airflow sensor	HO2S	heated oxygen sensor
IAC	idle air control	FF	flex fuel
DLC	data link connector	HEV	hybrid electric vehicle
GEN	generator	EV	electric vehicle
BARO	barometric air pressure sensor	EREV	extended range electric vehicle
LTFT	long term fuel trim	4WD	four wheel drive
STFT	short term fuel trim	FWD	front wheel drive
BPP sensor	brake pedal position sensor	RWD	rear wheel drive
CMP	camshaft position sensor	AWD	all wheel drive
CKP	crankshaft position sensor	FF	freeze frame
EVAP	evaporative emission control system	FRP	fuel rail pressure
TCC	torque converter clutch	TB	throttle body
TBI	throttle body injection	WOT	wide open throttle
MIL	malfunction indicator light/lamp	GND	ground
CL	closed loop	g/s	grams per second
OL	open loop	ATF	automatic transmission fluid
CVT	continuously variable transmission	PS fluid	power steering fluid
ECT	engine coolant temperature sensor	OBD I	onboard diagnostic system 1 st generation
RPM	revolutions per minute	OBD II	onboard diagnostic system 2 nd generation
KS	knock sensor	PSP	power steering pressure
GDI	gasoline direct injection	PID	parameter identification
EFI	electronic fuel injection	PCV	positive crankcase ventilation
SEFI	sequential electronic fuel injection	TR	transmission range
PFI	port fuel injection	PWM	pulse width modulation
CMFI	central multipoint fuel injection	TAC	throttle actuator control
DTC	diagnostic trouble code	TOT	transmission oil temperature
DPFE	differential/delta pressure feedback EGR	VCM	vehicle control module
EGR	exhaust gas recirculation	B+	battery positive voltage
ICM	ignition control module	IMRC	intake manifold runner control
VSS	vehicle speed sensor	TCM	transmission control module
WSS	wheel speed sensor		