REFERENCE WORKING PRESSURES AT APPROXIMATELY 4:1 DESIGN FACTOR, PSIG

Nominal Tube OD, in.		See Note*	Nominal Tube Wall Thickness, in.											
			0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.120	0.134	0.148	0.156	0.188
1/8	0.125	1	5,600	7,000										
		2	6,800	9,000										
		3	6,650	8,450										
3/16	0.186	1	3,750	4.650										
		2	4,250	5,500										
		3	4,250	5,450										
1/4	0.250	1	2,800	3,500	4,900	6,500								
		2	3,100	3,950	5,800	8,200								
		3	3,100	3,950	5,750	7,800								
5/16	0.312	1	2,250	2,800	3,900	5,200								
		2	2,400	3,100	4,500	6,250								
		3	2,450	3,100	4,500	6,150								
3/8	0.375	1	1,850	2,350	3,250	4,350	5,550	6,350						
		2	2,000	2,500	3,650	5,050	6,700	7,950						
		3	2,000	2,550	3,650	5,000	6,550	7,600						
1/2		1		1,750	2,450	3,250	4,150	4,750	5,450	6,000				
		2		1,850	2,650	3,650	4,800	5,600	6,600	7,450				
		3		1,850	2,700	3,650	4,800	5,550	6,450	7,200				
5/8	0.625	1		1,400	1,950	2,600	3,300	3,800	4,350	4,800				
		2		1,450	2,100	2,850	3,700	4,350	5,050	5,650				
		3		1,500	2,100	2,850	3,750	4,350	5,050	5,600				
3/4	0.750	1		1,150	1,650	2,150	2,750	3,150	3,650	4,000				
		2		1,200	1,700	2,350	3,050	3,500	4,100	4,600				
		3		1,200	1,750	2,350	3,050	3,550	4,150	4,600				
7/8	0.875	1		1,000	1,400	1,850	2,350	2,700	3,100	3,400				
		2		1,050	1,450	1,950	2,550	2,950	3,450	3,850				
		3		1,050	1,500	2,000	2,600	3,000	3,500	3,900				
1	1.000	1		875	1,200	1,600	2,050	2,350	2,700	3,000	3,350	3,700		
		2		900	1,250	1,700	2,200	2,550	3,000	3,300	3,750	4,200		
		3		900	1,300	1,750	2,250	2,600	3,000	3,350	3,800	4,200		
1-1/8	1.125	1			1,100	1,450	1,850	2,100	2,400	2,650	3,000	3,300		
		2			1,150	1,500	1,950	2,250	2,650	2,900	3,300	3,700		
		3			1,150	1,550	2,000	2,300	2,650	2,950	3,300	3,700		
1-1/4	1.250	1			1,000	1,300	1,650	1,900	2,200	2,400	2,700	2,950	3,100	3,750
		2			1,000	1,350	1,750	2,000	2,350	2,600	2,950	3,250	3,450	4,250
		3			1,000	1,350	1,750	2,050	2,350	2,650	2,950	3,300	3,500	4,300
1-1/2	1.500	1				1,100	1,400	1,600	1,800	2,000	2,250	2,450	2,600	3,150
		2				1,100	1,450	1,650	1,950	2,150	2,400	2,700	2,850	3,500
		3				1,150	1,450	1,700	1,950	2,150	2,450	2,700	2,850	3,500
1-3/4	1.750	1				925	1,200	1,350	1,550	1,700	1,900	2,100	2,250	2,700
		2				950	1,250	1,400	1,650	1,800	2,050	2,250	2,400	2,950
		3				950	1,250	1,450	1,650	1,850	2,050	2,300	2,400	2,950
2	2.000	1				800	1,050	1,200	1,350	1,500	1,650	1,850	1,950	2,350
		2				850	1,050	1,250	1,400	1,600	1,750	1,950	2,100	2,550
		3				850	1,100	1,250	1,450	1,600	1,800	2,000	2,100	2,550
2-1/4	2.250	1				700	900	1,050	1,200	1,350	1,500	1,650	1,750	2,100
		2				750	950	1,100	1,250	1,400	1,550	1,750	1,850	2,250
		3				750	950	1,100	1,250	1,400	1,600	1,750	1,850	2,250

*Pressure values listed opposite numbers 1, 2 and 3 for each tube OD were derived from the Barlow, Boardman, and Lame formulas respectively, with 12,500 PSI allowable stress factor.

INCHES INTO MILLIMETERS

1 inch = 24.40005 mm

in.	mm.	in.	mm.	in.	mm.	in.	mm.
1/64	0.397	1-1/2	38.10	15	381.0	36	914.4
1/32	0.794	1-3/4	44.45	16	406.4	38	965.2
3/64	1.191	2	50.80	17	431.8	40	1016.0
1/16	1.588	2-1/2	63.50	18	457.2	42	1067.0
3/32	2.381	3	76.20	19	482.6	44	1118.0
1/8	3.175	3-1/2	88.90	20	508.0	46	1168.0
5/32	3.969	4	101.60	21	533.4	48	1219.0
3/16	4.763	4-1/2	114.30	22	558.8	50	1270.0
1/4	6.350	5	127.00	23	584.2	55	1397.0
5/16	7.938	6	152.40	24	609.6	60	1524.0
3/8	9.525	7	177.80	25	635.0	65	1651.0
7/16	11.110	8	203.20	26	660.4	70	1778.0
1/2	12.700	9	228.60	27	685.8	75	1905.0
5/8	15.880	10	254.00	28	711.2	80	2032.0
3/4	19.050	11	279.40	29	736.6	85	2159.0
7/8	22.230	12	304.80	30	762.0	90	2286.0
1	25.400	13	330.20	32	812.8	95	2413.0
1-1/4	31.750	14	355.60	34	863.6	100	2540.0

MILLIMETERS INTO INCHES

1 mm. = 0.03937000 in.

mm.	in.	mm.	in.	mm.	in.	mm.	in.
1	0.039	28	1.102	130	5.118	750	29.53
2	0.079	30	1.181	140	5.512	800	31.50
3	0.118	35	1.378	150	5.906	850	33.46
4	0.158	40	1.575	160	6.299	900	35.43
5	0.197	45	1.772	170	6.693	950	37.40
6	0.236	50	1.969	180	7.087	1000	39.37
7	0.276	55	2.165	190	7.480	1250	49.21
8	0.315	60	2.362	200	7.874	1500	59.05
9	0.354	65	2.559	250	9.842	1750	68.90
10	0.394	70	2.756	300	11.810	2000	78.74
12	0.472	75	2.953	350	13.780	2500	98.43
14	0.551	80	3.150	400	15.750	3000	118.10
16	0.630	85	3.346	450	17.720	3500	137.80
18	0.709	90	3.543	500	19.690	4000	157.50
20	0.787	95	3.740	550	21.650	4500	177.20
22	0.866	100	3.937	600	23.620	5000	196.90
24	0.945	110	4.331	650	25.590	7500	295.30
26	1.024	120	4.724	700	27.560	10000	393.70

HEAT COLORS

Degrees Fahrenheit

Faint Red	930
Blood Red	1075
Dark Cherry	1175
Medium Cherry	1275
Cherry	1375
Bright Cherry	1450
Salmon	1550
Dark Orange	1650
Orange	1725
Lemon	1830
Light Yellow	1975
White	2200
Blue White	2350

METRIC EQUIVALENTS

LENGTH

1 centimeter	.3937 inches	1 inch	2.5400 centimeters
1 meter	3.2800 feet	1 foot	.3048 meters
1 meter	1.0940 yards	1 yard	.9144 meters
1 kilometer	.6210 miles	1 mile	1.6100 kilometers

AREA

1 sq. cm.	.1550 sq. in.	1 sq. in.	6.4500 sq. cm.
1 sq. meter	10.7600 sq. ft.	1 sq. ft.	.0929 sq. meters
1 sq. meter	1.1960 sq. yd.	1 sq. yd.	.8360 sq. meters
1 sq. kilo.	.3860 sq. miles	1 sq. mile	2.5900 sq. kilo.

VOLUME

1 cubic cm.	.0610 cu. in.	1 cu. in.	16.3800 cu. in.
1 cubic m.	35.3150 cu. ft.	1 cu. ft.	.0280 cu. m.
1 cubic m.	1.3080 cu. yds.	1 cu. yd.	.7645 cu. in.

CAPACITY

1 liter	.0353 cu. ft.	1 cu. ft.	28.3200 liters
1 liter	.2643 gal.	1 gallon	3.7850 liters
1 liter	61.0230 cu. in.	1 cu. in.	.0164 liters
1 liter	2.2020 lbs. of fresh water at 62 degrees F.		

MILLIMETERS TO FRACTIONS TO DECIMALS

	inches			inches	
mm.	frac.	dec.	mm.	frac.	dec.
.3969	1/64	.0156	13.0969	33/64	.5156
.7938	1/32	.0312	13.4938	17/32	.5312
1.1906	3/64	.0468	13.8906	35/64	.5468
1.5875	1/16	.0625	14.2875	9/16	.5625
1.9844	5/64	.0781	14.6844	37/64	.5781
2.3812	3/32	.0937	15.0812	19/32	.5937
2.7781	7/64	.1093	15.4781	39/64	.6093
3.1750	1/8	.1250	15.8750	5/8	.6250
3.5719	9/64	.1406	16.2719	41/64	.6406
3.9688	5/32	.1562	16.6688	21/32	.6562
4.3656	11/64	.1718	17.0656	43/64	.6718
4.7625	3/16	.1875	17.4625	11/16	.6875
5.1594	13/64	.2031	17.8594	45/64	.7031
5.5562	7/32	.2187	18.2562	23/32	.7187
5.9531	15/64	.2343	18.6531	47/64	.7343
6.3500	1/4	.2500	19.0500	3/4	.7500
6.7469	17/64	.2656	19.4469	49/64	.7656
7.1438	9/32	.2812	19.8438	25/32	.7812
7.5406	19/64	.2968	20.2406	51/64	.7968
7.9375	5/16	.3125	20.6375	13/16	.8125
8.3344	21/64	.3281	21.0344	53/64	.8281
8.7312	11/32	.3437	21.4312	27/32	.8437
9.1281	23/64	.3593	21.8281	55/64	.8593
9.5250	3/8	.3750	22.2250	7/8	.8750
9.9219	25/64	.3906	22.6219	57/64	.8906
10.3188	13/32	.4062	23.0188	29/32	.9062
10.7156	27/64	.4218	23.4156	59/64	.9218
11.1125	7/16	.4375	23.8125	15/16	.9375
11.5094	29/64	.4531	24.2094	61/64	.9531
11.9062	15/32	.4687	24.6062	31/32	.9687
12.3031	31/64	.4843	25.0031	63/64	.9843
12.7000	1/2	.5000	25.4000	1	1.0000

TECHNICAL DATA

FOR METRIC SIZING

METRIC TUBE SIZING PROCEDURE

Step By Step Instructions -

1. Taper the end of the tube approximately one third the diameter of the wall. Use the wire wheel.

2. Clean and polish the tube the entire length of the area to down sized.

3. Be sure that the tube is extremely clean on the outside for downswaging and extremely clean on the inside for upswaging.

4. Completely Clean the inside of the swaging die.

5. Lubricate the tube, engage the die over the end of the tibe and advance until the swaging die travels within a 1/4" of the end of the tube.

Metric Chart -

Millimeter Tube Size Required	American Tube Size
6MM	1/4"
8MM	5/16"
10MM	3/8" (UPSIZE)
12MM	1/2"
14MM	
15MM	5/8"
16MM	5/8" (UPSIZE)
18MM	SPECIAL ORDER
20MM	SPECIAL ORDER

METRIC TUBE DOWNSWAGE

FORMING

Down swage procedure pertains to the following conversion sizes.

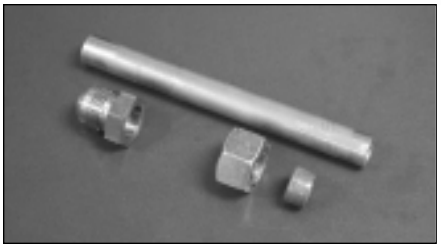
AMERICAN	→ converts →	**METRIC**
1/4” (.250)	→	6mm (.2362)
1/2” (.500)	→	12mm (.4724)
5/8” (.625)	→	14mm (.5512)
5/8” (.625)	→	15mm (.5905)
3/4” (.750)	→	18mm (.7087)
7/8” (.875)	→	20mm (.7874)
7/8” (.875)	→	22mm (.8661)

A. BY PRODUCT -

1. Usually Hydraulic Tube.

B. BY APPLICATION - Type Equipment, Cost?

figure 3: Photo of components



C. BY DESCRIPTION & SIZE OF COMPONENTS - Take Notes

D. SELECT COMPONENTS - *figure 3*

1. 5/8” X 8 (.065 wall) American Hydraulic Tube.
2. 15mm L metric nut.
3. 15mm L bite ring.
4. 5/8” x 5/8” SBM.

CRIMP CHART-REDUCED O.D. AIR CONDITIONING BARRIER HOSE

HOSE: GOODYEAR GALAXY REDUCED O.D. BARRIER HOSE

Atco reducded beadlock fitting only

SIZE	5/16	13/32	1/2	5/8
DASH SIZE	-6	-8	-10	-12
DIAMETER (Fin.-Crimp)(Fin.-Swage)	.550	.630	.730	.890
CRIMP TRAVEL	.110	.140	.115	.135
DIE SIZE	#3 Bubble	#6 Bubble	#6 Bubble	#8 Bubble
DIAL INDICATOR SETTING	**DIAL IS ALWAYS 1/2 OF THE CRIMP TRAVEL**			
CRIMP/SWAGE LENGTH	1.100	1.100	1.100	1.100

CRIMP CHART-AUTOMOTIVE AIR CONDITIONING

HOSE: SAE J-2064 BARRIER HOSE

Fitting: Bead Lock/Bubble Crimp Couplings

Locate the top edge of the crimp die tooth .300 from the front of the shell (ferrule) on all sizes.

SIZE	5/16	13/32	1/2	5/8
# SIZE	#6	#8	#10	#12
CRIMP DIAMETER	.660	.830	.936	1.014
CRIMP TRAVEL	.162	.160	.154	.191
DIE SIZE	#6 Bubble	#8 Bubble	#10 Bubble	#12 Bubble
FERRULE PRE-CRIMP DIAMETER	.822	.990	1.090	1.205
DIAL INDICATOR SETTING	**DIAL IS ALWAYS 1/2 OF THE CRIMP TRAVEL**			
CRIMP/SWAGE LENGTH	1.100	1.100	1.100	1.100

POWER STERRING CRIMP CHART

HOSE: SAE 100R3

***Tubes n' Hoses* Special Power Steering Ferrule**

SIZE	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2
DASH SIZE	-3	-4	-5	-6	-8	-10	-12	-16	-20	-24	-32
CRIMP DIAMETER		.550		.695	.850						
CRIMP TRAVEL		.140		.180	.210						
DIE SIZE		#3 P/S Bubble		#4 P/S Bubble	#10 A/C Bubble						
PRE-CRIMP DIAMETER		.690		.875	10.60						
DIAL INDICATOR SETTING	**DIAL IS ALWAYS 1/2 OF THE CRIMP TRAVEL**										
GAUGE PRESSURE											
CRIMP LENGTH		.750		.800	1.200						
STAKE (LOCATION)		FLUSH		FLUSH	FLUSH						
STAKE (TRAVEL)		#3S S/D .040 after firm contact with stem		#4 S/D .040 after firm contact with stem	#5 S/D .040 after firm contact with stem						

WEATHERHEAD
FITTINGS
CRIMP SPECS FOR *Tubes n' Hoses* Crimper
ONE PIECE FITTINGS
SAE 100R1AT HOSE

SIZE	3/16	1/4	3/8	1/2	5/8	3/4	1	1 1/4
DASH SIZE	-3	-4	-6	-8	-10	-12	-16	-20
DIAMETER (PRE-CRIMP) (PRE-SWAGE)	.687	.710	.902	1.092	1.184	1.398	1.688	2.100
DIAMETER (FIN.-CRIMP) (FIN.-SWAGE	.530	.560	.740	.865	1.015	1.160	1.455	1.785
CRIMP/SWAGE DIE *(SIZE/TYPE)	#3 SM	#3 SM	#4 SM	#5 SM	#5 SM	#6 SM	#8 SM	#9 SM
CRIMP/SWAGE (TRAVEL)	.157	.150	.162	.227	.169	.238	.233	.315
CRIMP/SWAGE (LENGTH)								

CRIMP SPECS FOR *Tubes n' Hoses* Crimper
ONE PIECE FITTINGS
SAE 100R2AT HOSE

SIZE	3/16	1/4	3/8	1/2	5/8	3/4	1	1 1/4
DASH SIZE	-3	-4	-6	-8	-10	-12	-16	-20
DIAMETER (PRE-CRIMP) (PRE-SWAGE)	.687	.710	.902	1.092	1.184	1.398	1.688	2.100
DIAMETER (FIN.-CRIMP) (FIN.-SWAGE	.575	.630	.790	.930	1.065	1.210	1.520	1.870
CRIMP/SWAGE DIE *(SIZE/TYPE)	#3 SM	#3 SM	#4 SM	#5 SM	#5 SM	#6 SM	#8 SM	#9 SM
CRIMP/SWAGE (TRAVEL)	.112	.080	.112	.162	.119	.188	.168	.230
CRIMP/SWAGE (LENGTH)	◆	◆	◆	◆	◆	◆	◆	◆

◆TOP OF DIE FLUSH WITH CRIMP MARK
*S= SMOOTH B=BUBBLE

ALWAYS CHECK YOUR FINISHED CRIMP SPECS

DASH NUMBERING SYSTEM

CONVERSION CHART		
DASH NUMBER	JIC	SAE
-3	3/16	-
-4	1/4	3/16
-5	5/16	1/4
-6	3/8	5/16
-8	1/2	13/32
-10	5/8	1/2
-12	3/4	5/8
-14	7/8	-
-16	1	7/8
-20	1 1/4	1 1/8
-24	1 1/2	1 3/8
-32	2	1 13/16
-40	2 1/2	2 3/8
-48	3	-
-60	4	-
When using hydraulic fittings you can interchange all sizes except 3/8 & 3/4.		

GATES MEGACRIMP FITTINGS

Crimp Specs For Tubes n' Hoses Crimper

ONE PIECE FITTINGS 1 WIRE

DASH SIZE	MEGACRIMP FITTINGS	DESCRIPTION	HOSE SIZE	FERRULE DESCRIPTION	FINISHED CRIMP O.D.	CRIMP DIES	DIAL READOUT
		1 WIRE			+/- .010		
4	MEGACRIMP	100R1AT	1/4"	ONE PIECE	.705	4	.232/.116
6	MEGACRIMP	100R1AT	3/8"	ONE PIECE	.845	4	.238/.119
8	MEGACRIMP	100R1AT	1/2"	ONE PIECE	1.010	5	.209/.105
10	MEGACRIMP	100R1AT	5/8"	ONE PIECE	1.135	6	.265/.133
12	MEGACRIMP	100R1AT	3/4"	ONE PIECE	1.350	7	.285/.143
16	MEGACRIMP	100R1AT	1"	ONE PIECE	1.760	9	.343/1.72

ONE PIECE FITTINGS 2 WIRE

DASH SIZE	PART NUMBER	DESCRIPTION	HOSE SIZE	FERRULE DESCRIPTION	FINISHED CRIMP O.D.	CRIMP DIES	DIAL READOUT
		2 WIRE			+/- .010		
4	MEGACRIMP	100R2AT	1/4"	ONE PIECE	.705	4	.267/.134
6	MEGACRIMP	100R2AT	3/8"	ONE PIECE	.845	5	.283/.142
8	MEGACRIMP	100R2AT	1/2"	ONE PIECE	1.010	5	.249/.125
10	MEGACRIMP	100R2AT	5/8"	ONE PIECE	1.135	7 then 6	.300/.150
12	MEGACRIMP	100R2AT	3/4"	ONE PIECE	1.350	7	.330/.165
16	MEGACRIMP	100R2AT	1"	ONE PIECE	1.760	9	.373/186

****ALWAYS CHECK YOUR FINISHED CRIMP SPECS. THESE SPECS HAVE NOT BEEN TESTED YET.**

CRIMP SPECS - WEATHERHEAD E-SERIES FITTINGS FOR STAINLESS STEEL TEFLON

WEATHERHEAD E-SERIES FITTING	HOSE I.D.	CRIMP O.D.	DIE	READOUT
-04E	1/4"	0.405	#2	.150/.75
.05E	5/16"	0.475	#3	.205/.103
-06E	3/8"	0.545	#3	.214/.107
-08E	1/2"	0.695	#4	.250/.125
-12E	3/4"	0.978	#5	.266/.133
-16E	1"	1.225	#6	.278/.139

CRIMP SPECS - WEATHERHEAD E-SERIES FITTINGS FOR THERMOPLASTIC HOSE

WEATHERHEAD E-SERIES FITTING	HOSE I.D.	CRIMP O.D.	DIE	READOUT
-04E	1/4"	0.455	#2	.101/.51
.05E	5/16"	0.555	#5	.125/.64
-06E	3/8"	0.615	#3	.144/.72
-08E	1/2"	0.765	#4	.180/.90
-12E	3/4"	1.035	#5	.209/.105
-16E	1"	1.295	#6	.208/.104

CRIMP SPECS- MEGACRIMP FITTINGS FOR THERMOPLASTIC HOSE

MEGACRIMP FITTINGS	HOSE I.D.	CRIMP O.D.	DIE	READOUT
-04	1/4"	0.715	#2	.259/.130
.05	5/16"	0.765	#3	.323.162
-06	3/8"	0.865	#3	.265/.133
-08	1/2"	1.025	#4	.245/.123
-12	3/4"	1.32	#5	.362/.181
IMPORTANT: Check all finished crimp specs. You may have to use more than one set of dies to complete crimp on some sizes.				