รายการอ้างอิง

ภาษาไทย

ไพบูลย์ หังสพฤกษ์ และ เฮอิโช ไชโต. การปรับอากาศ. พิมพ์ครั้งที่ 2.
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ภาควิชาอุตสาหการ มหาวิทยาลัยเกษตรศาสตร์, 2534

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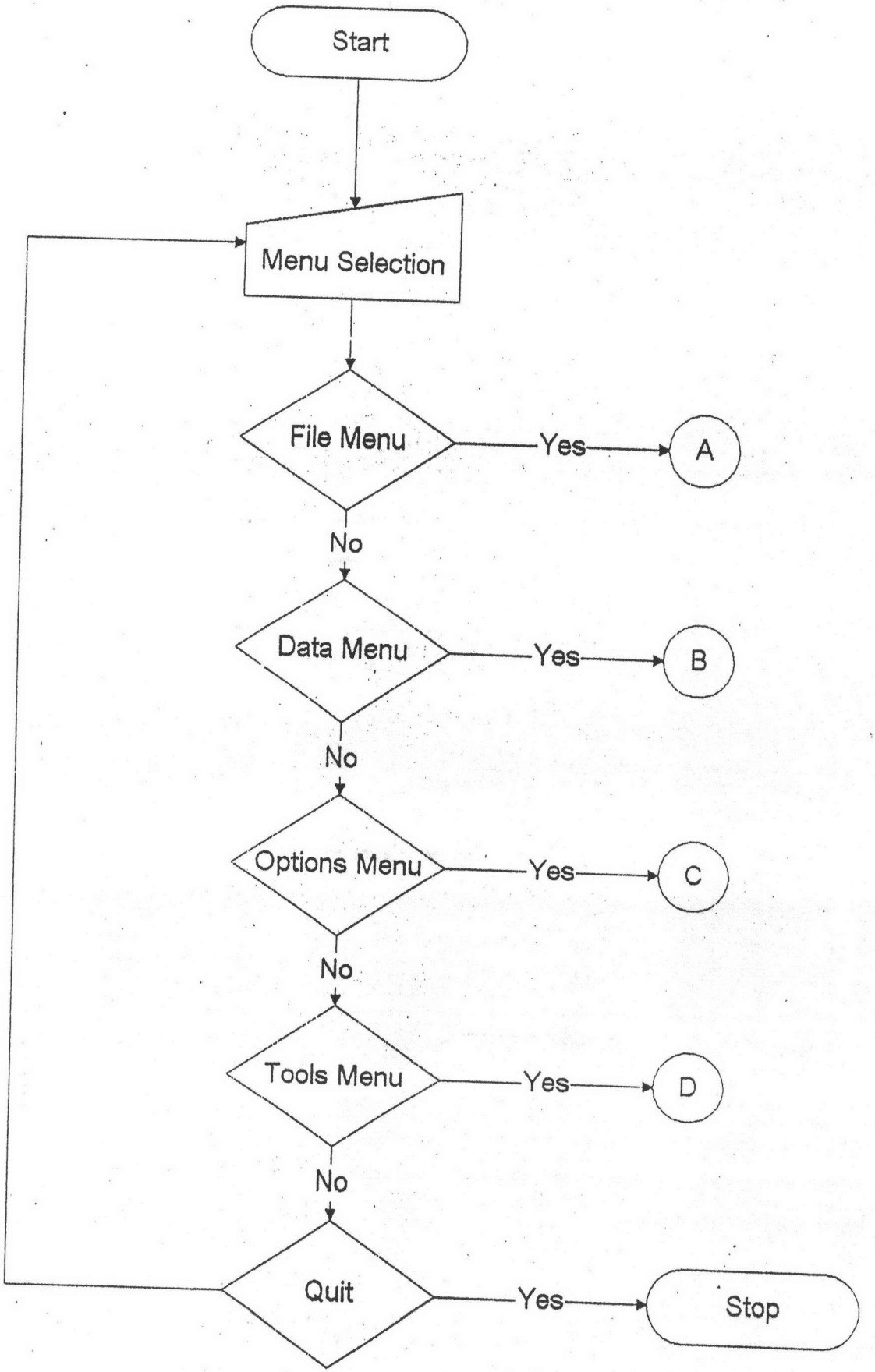
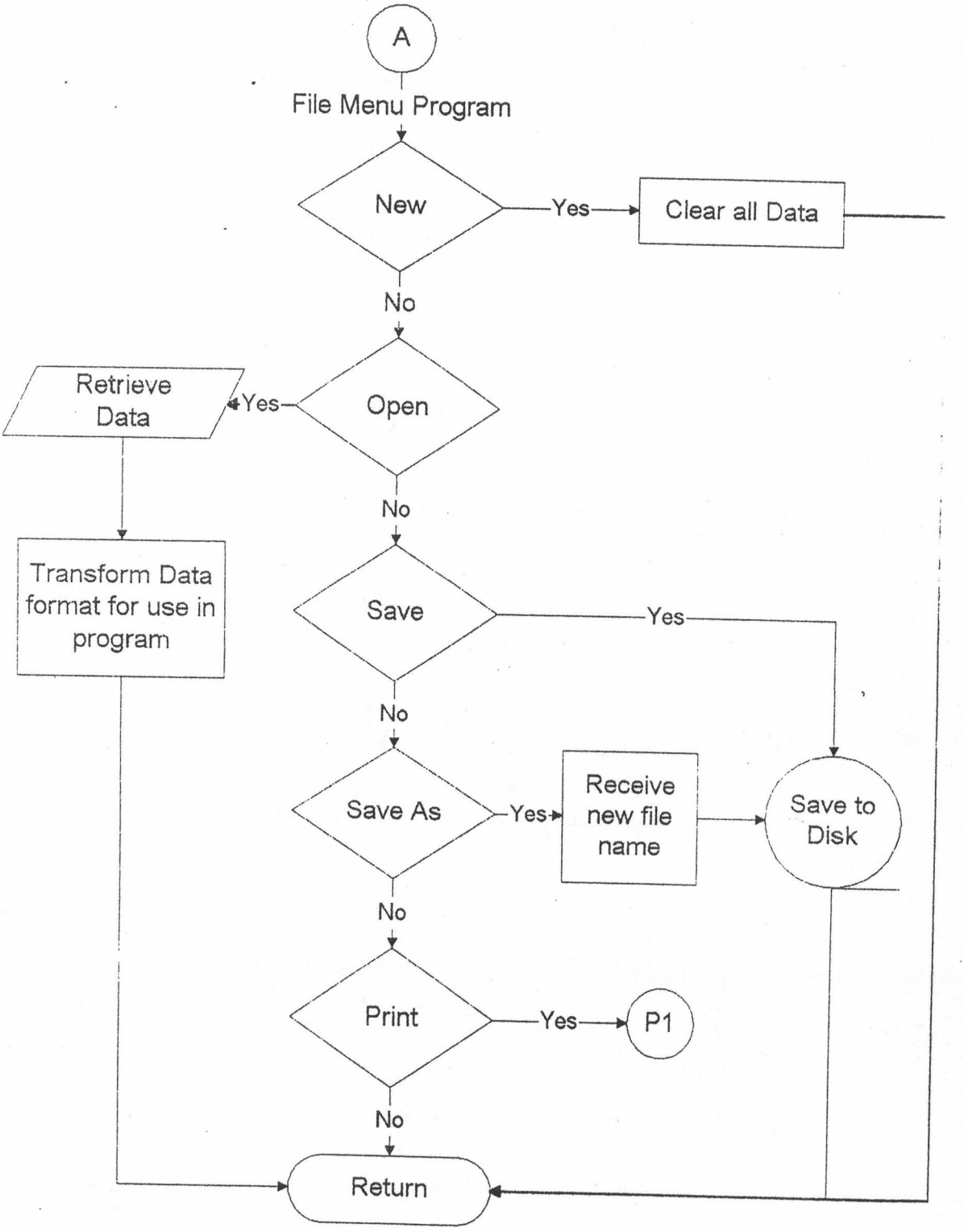
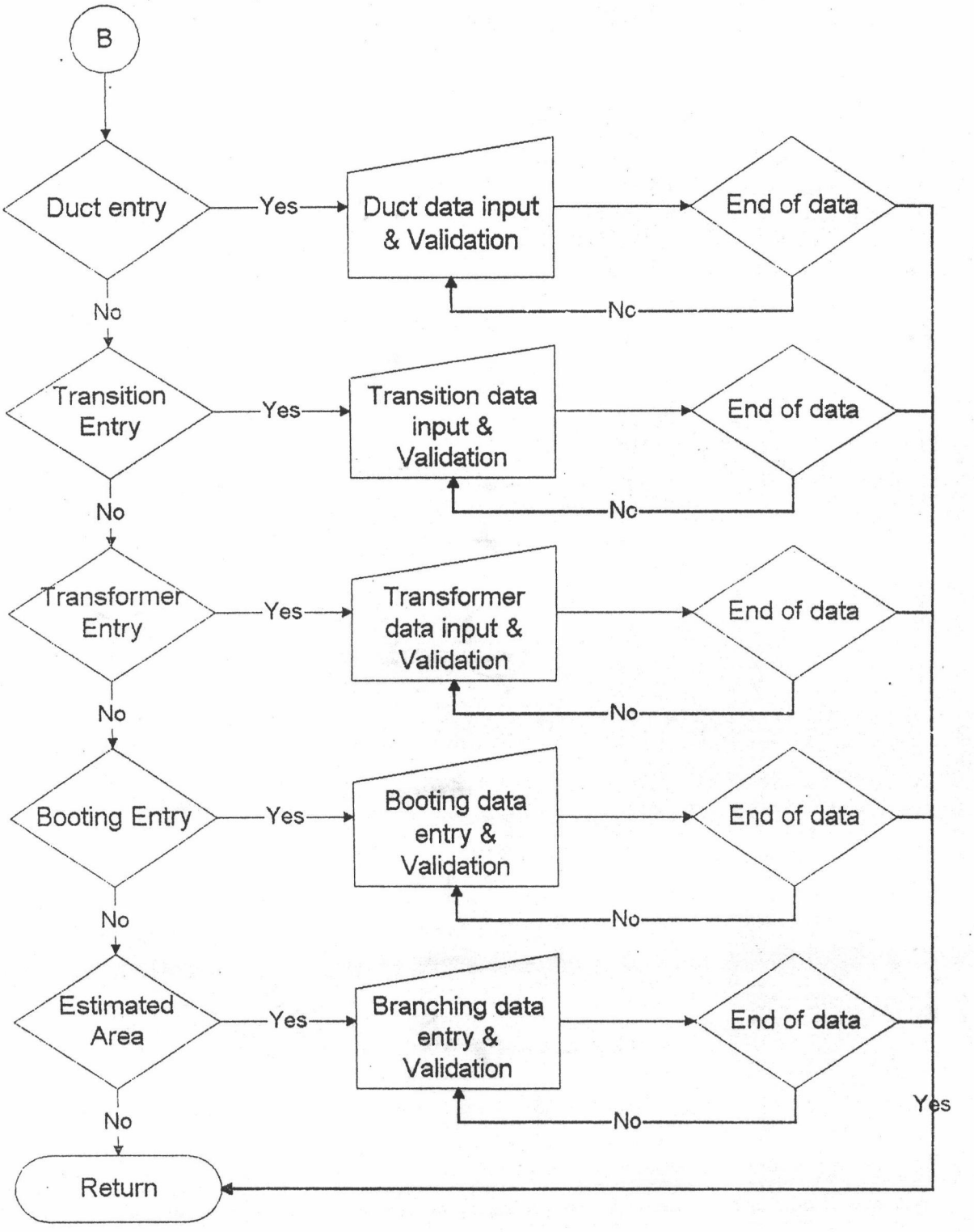
ภาคผนวก

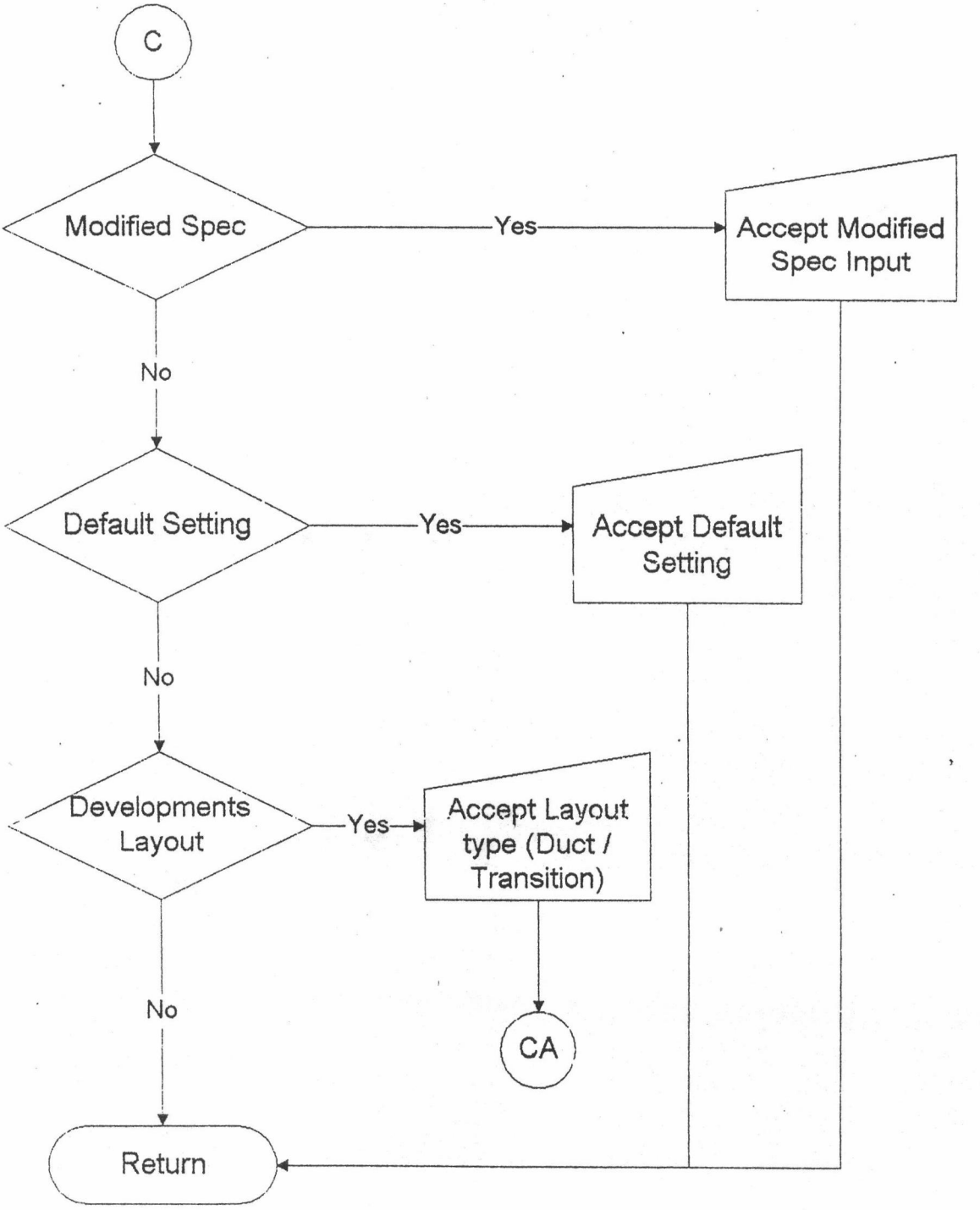
ภาคผนวก ก

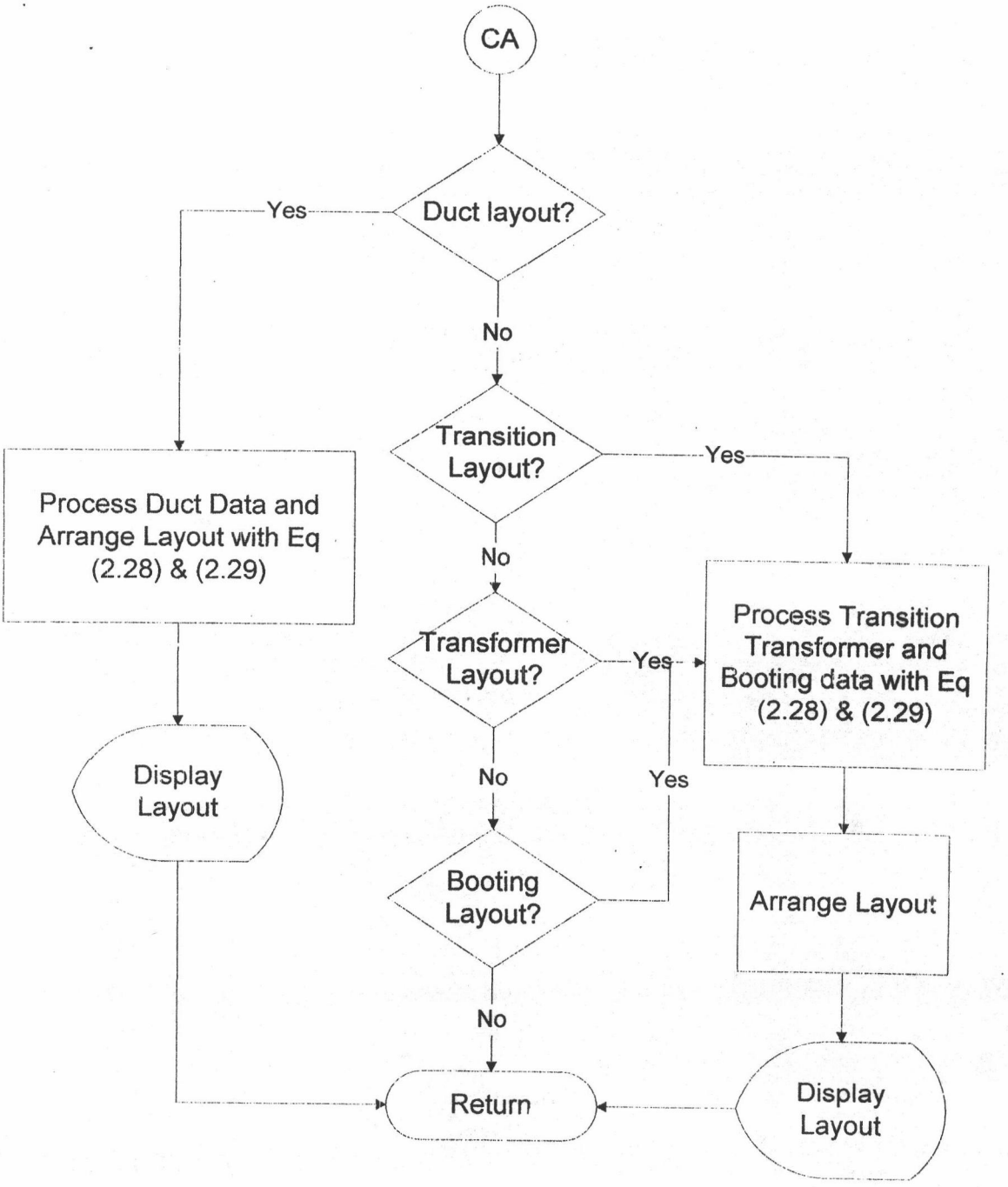
ไดอะแกรมแสดงลำดับการทำงานของโปรแกรมคอมพิวเตอร์

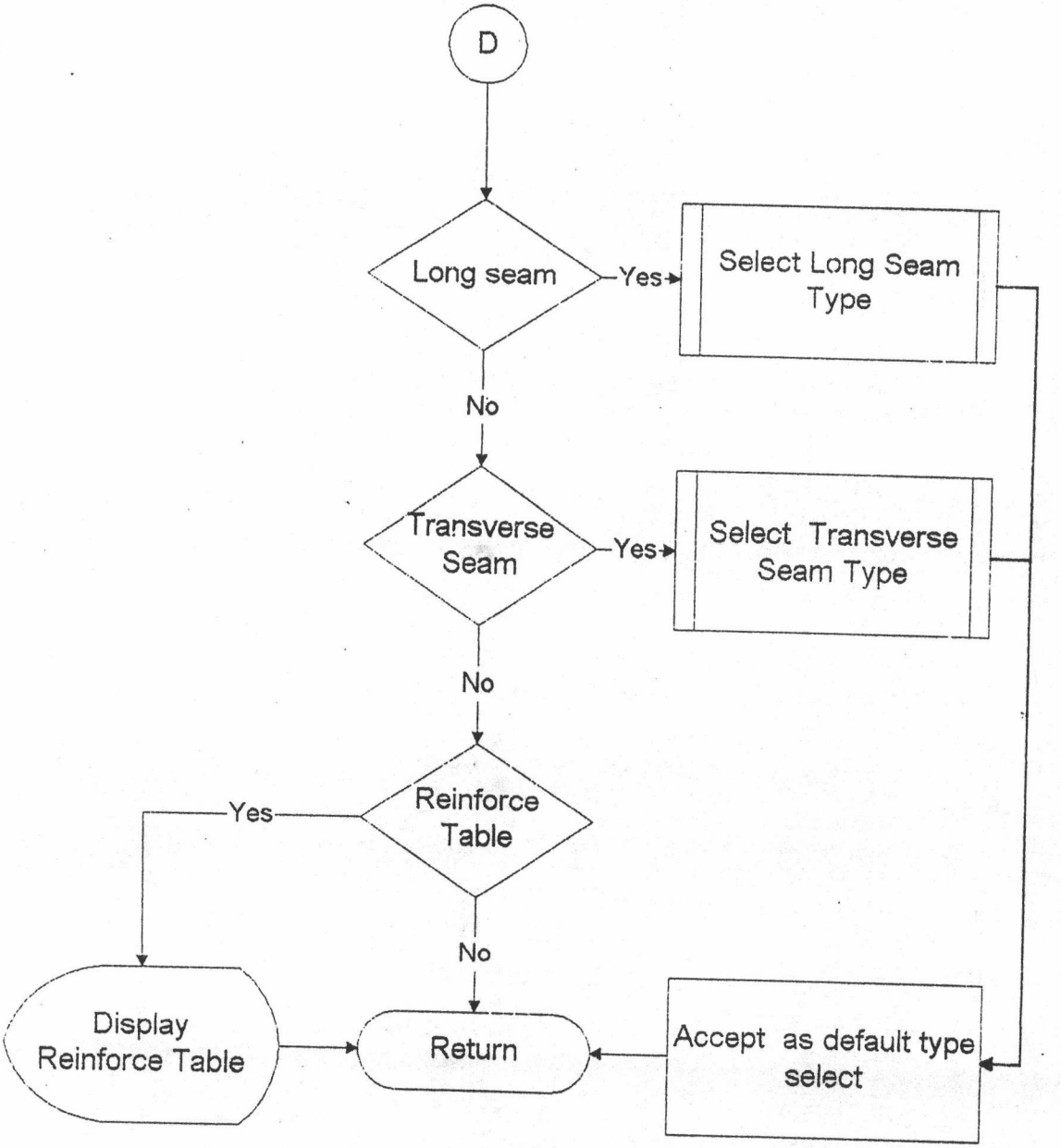

Start
Menu Selection
File Menu
Yes
A
No
Data Menu
Yes
B
No
Options Menu
Yes
C
No
Tools Menu
Yes
D
No
Quit
Yes
Stop

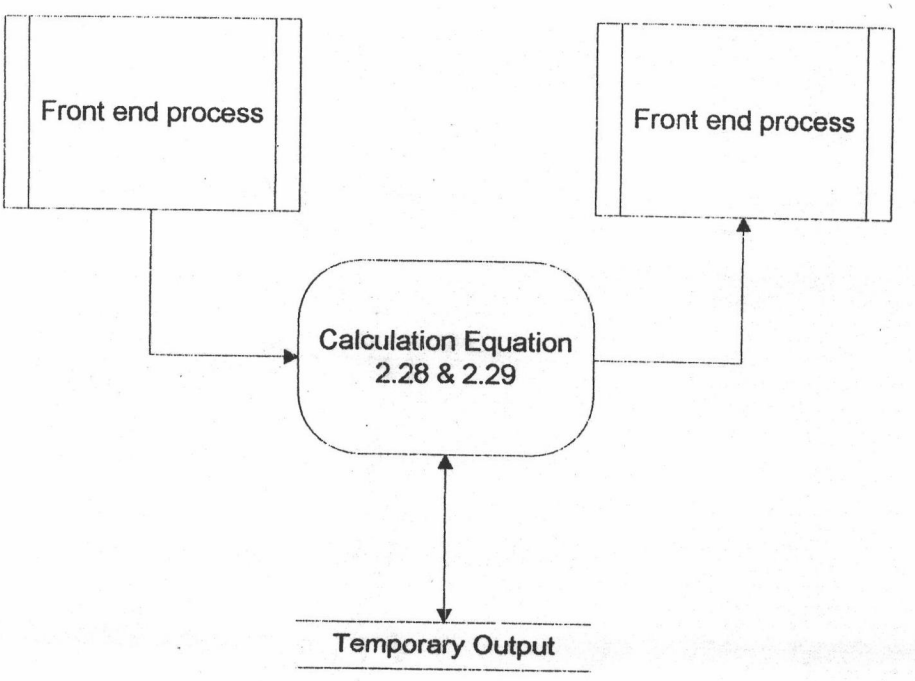

A
File Menu Program
New
Yes
Clear all Data
No
Retrieve Data
Yes
Open
No
Transform Data format for use in program
Save
Yes
No
Save As
Yes
Receive new file name
Save to Disk
No
Print
Yes
P1
No
Return


B
Duct entry
Yes
Duct data input & Validation
End of data
Nc
No
Transition Entry
Yes
Transition data input & Validation
End of data
Nc
No
Transformer Entry
Yes
Transformer data input & Validation
End of data
No
No
Booting Entry
Yes
Booting data entry & Validation
End of data
No
No
Estimated Area
Yes
Branching data entry & Validation
End of data
No
No
Yes
Return

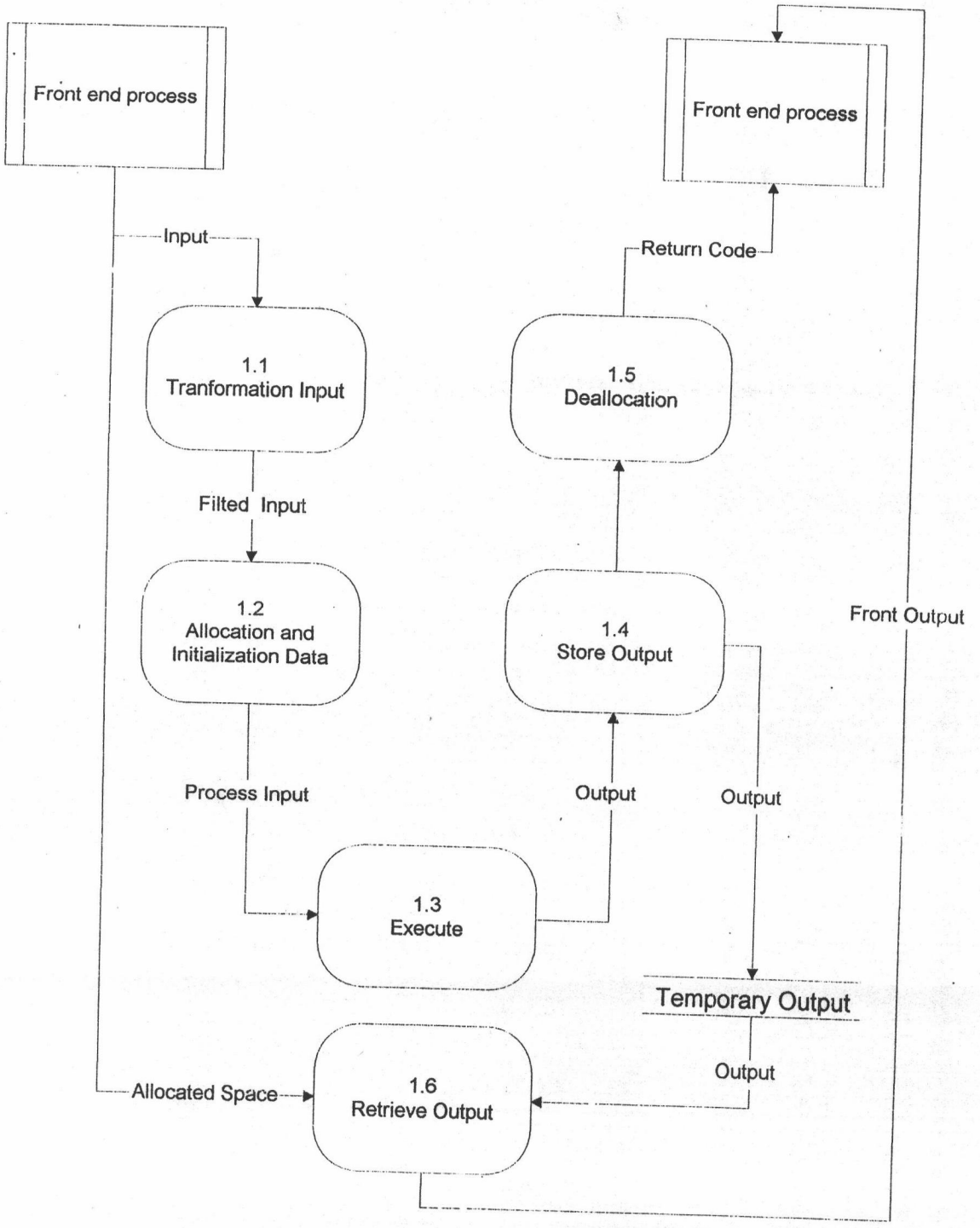

C
Modified Spec
Yes
Accept Modified Spec Input
No
Default Setting
Yes
Accept Default Setting
No
Developments Layout
Yes
Accept Layout type (Duct / Transition)
No
CA
Return


CA
Duct layout?
Yes
No
Process Duct Data and Arrange Layout with Eq (2.28) & (2.29)
Display Layout
Transition Layout?
Yes
No
Transformer Layout?
Yes
No
Booting Layout?
Yes
No
Process Transition Transformer and Booting data with Eq (2.28) & (2.29)
Arrange Layout
Display Layout
Return


D
Long seam
Yes
Select Long Seam Type
No
Transverse Seam
Yes
Select Transverse Seam Type
No
Reinforce Table
Yes
No
Display Reinforce Table
Return
Accept as default type select

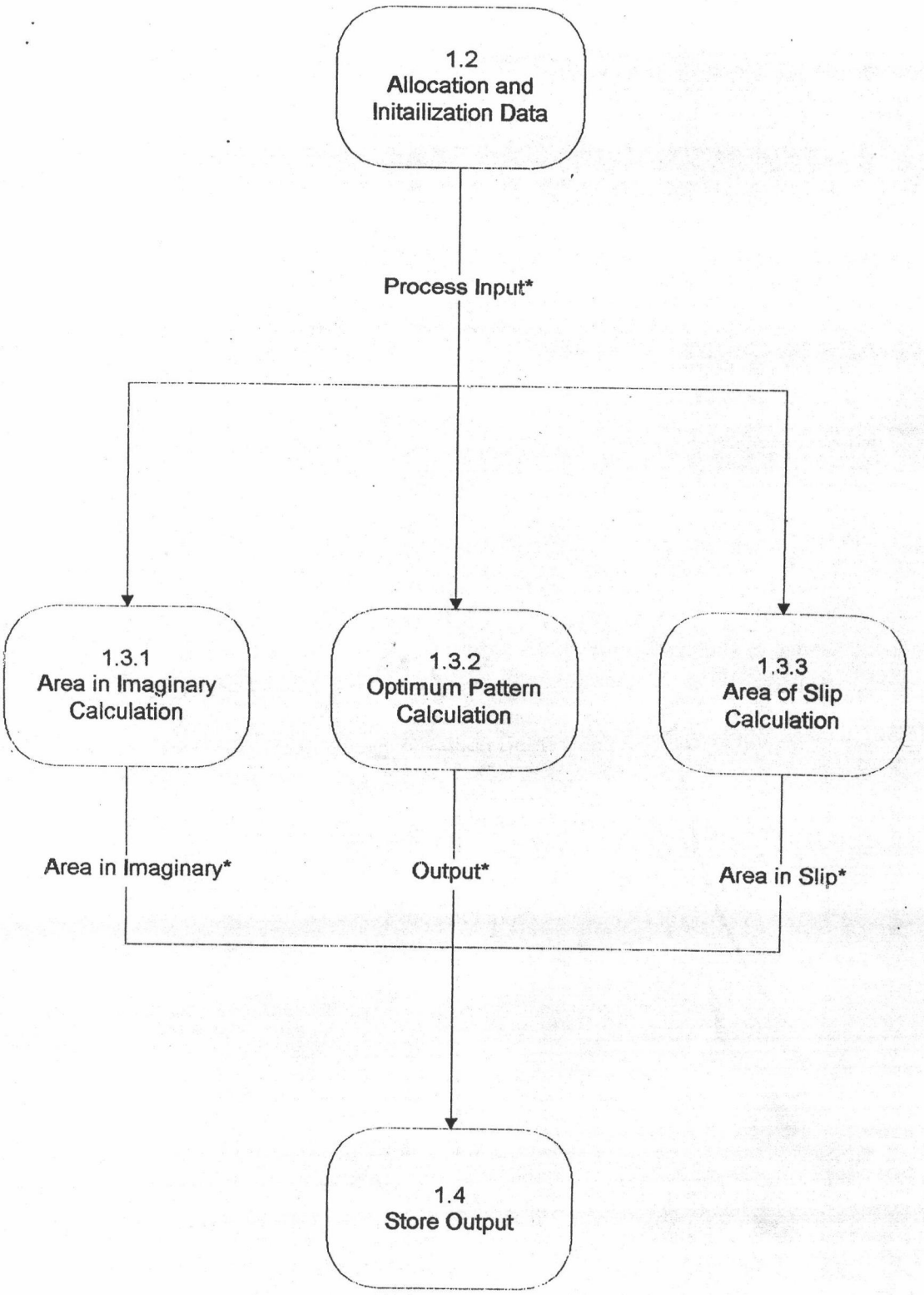


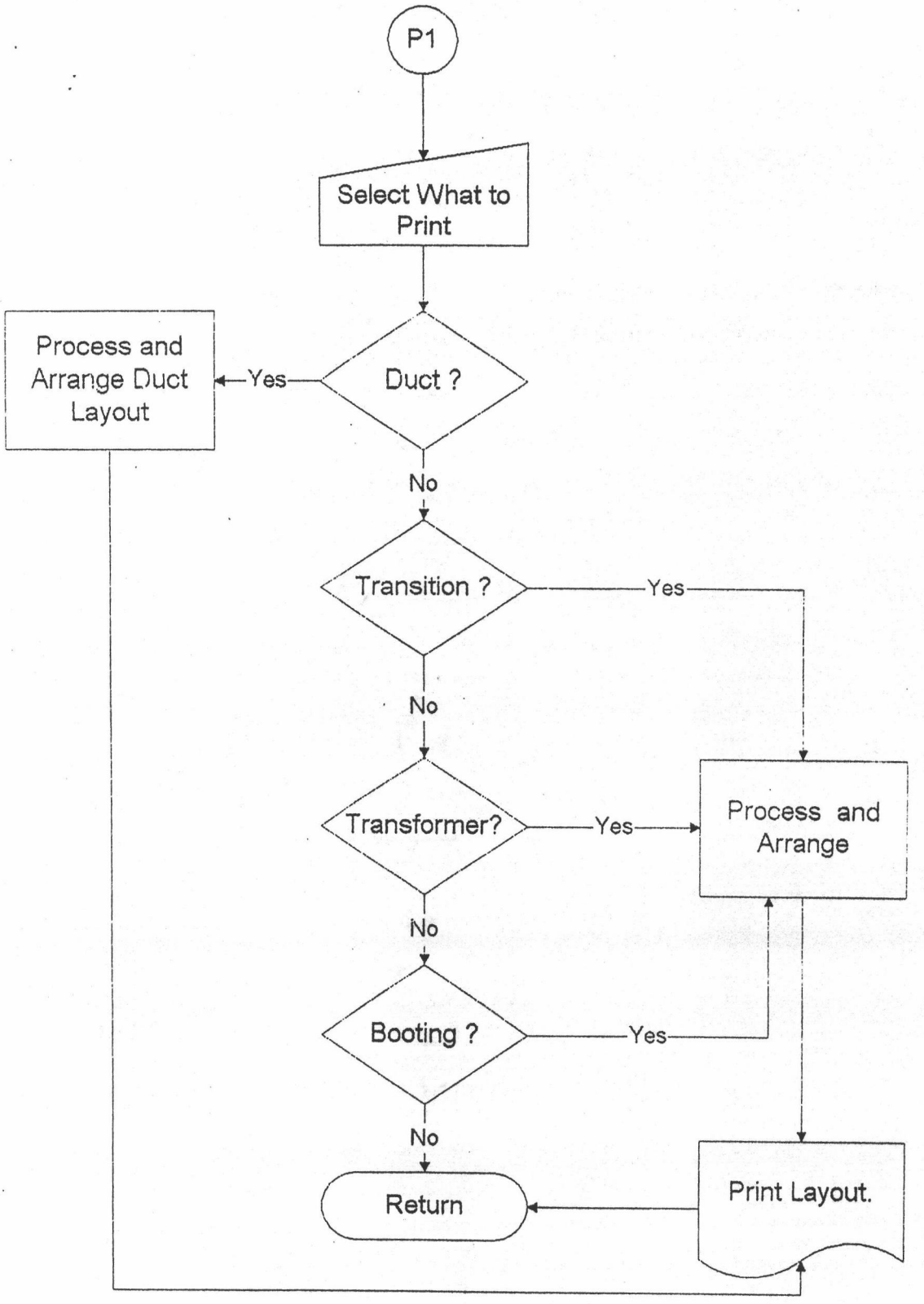
Data Flow Level 0



Data Flow Level 1

Notice : Process 1.1 is corespond with procedure 3.1 in this report.
Process 1.3 is corespond with procedure 3.2, 3.3.1, 3.3.2, and 3.3.3in this report.


1.2
Allocation and
Initailization Data
Process Input*
1.3.1
Area in Imaginary
Calculation
1.3.2
Optimum Pattern
Calculation
1.3.3
Area of Slip
Calculation
Area in Imaginary*
Output*
Area in Slip*
1.4
Store Output


P1
Select What to Print
Process and Arrange Duct Layout
Yes
Duct ?
No
Transition ?
Yes
No
Transformer?
Yes
Process and Arrange
No
Booting ?
Yes
No
Return
Print Layout.

ภาคผนวก ข

ตารางมาตราฐานต่าง ๆ ในการสร้างความแข็งแรงของท่อลม

ตารางที่ ข.1 1/2" W.G. Rectangular Duct Reinforcement

1/2" W.G. STATIC POS. OR NEG.	TABLE 1-3 RECTANGULAR DUCT REINFORCEMENT							
		MINIMUM RIGIDITY CLASS ON MINIMUM GAGE DUCT						
DUCT DIMENSION	NO REINFORCEMENT DUCT GAGE	REINFORCEMENT SPACING						
		10'	8'	5'	4'	3'	2½'	2'
10" dn.	↑							
11, 12"	↑							
13, 14"	↑							
15, 16"	↑							
17, 18"	26 ga.							
19, 20"	24 ga.	A-26	→	→	→	→	→	→
21, 22"	22 ga.	A-26	→	→	→	→	→	→
23, 24"	22 ga.	A-26	→	→	→	→	→	→
25, 26"	20 ga.	A-26	→	→	→	→	→	→
27, 28"	18 ga.	B-24	B-26	→	→	→	→	→
29, 30"	18 ga.	B-24	B-26	→	→	→	→	→
31–36"	16 ga.	C-22	C-24	C-26	→	→	→	→
37–42"		D-20	D-24	D-26	C-26	→	→	→
43–48"		E-20	D-22	D-26	→	→	→	→
49–54"		E-18	E-20	D-26	→	→	→	→
55–60"		F-18	F-20	E-24	E-26	→	→	→
61–72"	NOT ALLOWED	H-16 F+rod	G-18 F+rod	F-22	F-24	→	→	→
73–84"			H-16 F+rod	H-22 F+rod	G-24 F+rod	→	→	→
85–96"			I-16 F+rod	H-20 F+rod	H-22 F+rod	→	→	→
97" UP				H-18	→	→	→	→

ตารางที่ ข.2 1" W.G. Rectangular Duct Reinforcement

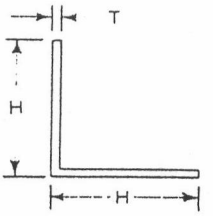
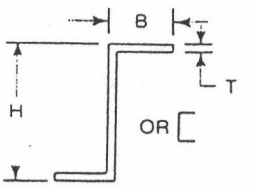
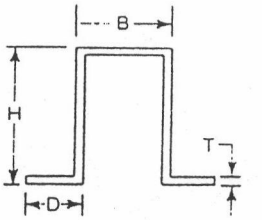
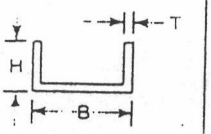
1" W.G. STATIC POS. OR NEG.	TABLE 1-4 RECTANGULAR DUCT REINFORCEMENT							
		MINIMUM RIGIDITY CLASS ON MINIMUM GAGE DUCT						
DUCT DIMENSION	NO REINFORCEMENT DUCT GAGE	REINFORCEMENT SPACING						
		10'	8'	5'	4'	3'	2½'	2'
10" dn.	↑							
11, 12"	26 ga.							
13, 14"	24 ga.	A-26	→	→	→	→	→	→
15, 16"	22 ga.	A-24	A-26	→	→	→	→	→
17, 18"	22 ga.	A-24	A-26	→	→	→	→	→
19, 20"	20 ga.	A-24	A-26	→	→	→	→	→
21, 22'	18 ga.	A-24	→	A-26	→	→	→	→
23, 24"	18 ga.	B-24	→	A-26	→	→	→	→
25, 26"	18 ga.	B-22	B-24	A-26	→	→	→	→
27, 28"	16 ga.	C-22	C-24	B-26	→	→	→	→
29, 30"	16 ga.	C-22	C-24	B-26	→	→	→	→
31–36"		D-20	D-22	C-26	→	→	→	→
37–42"		E-18	D-20	D-24	D-26	→	→	→
43–48"		F-16	E-18	E-24	D-26	→	→	→
49–54"		G-16 F+rod	F-18	E-22	E-24	→	→	→
55–60"			G-18 F+rod	F-22	F-24	→	→	→
61–72"	NOT			H-18 F+rod	G-22 F+rod	G-24 F+rod	→	→
73–84"	ALLOWED			I-18 F+rod	H-20 F+rod	→	→	H-22 F+rod
85–96"				J-16 F+rod	I-18 F+rod	I-20 F+rod	→	I-22 F+rod
97" UP							H-18t	→

ตารางที่ ข.3 2" W.G. Rectangular Duct Reinforcement

2" W.G. STATIC POS. OR NEG.	TABLE 1-5 RECTANGULAR DUCT REINFORCEMENT							
		MINIMUM RIGIDITY CLASS ON MINIMUM GAGE DUCT						
DUCT DIMENSION	NO REINFORCE-MENT DUCT GAGE	REINFORCEMENT SPACING						
		10′	8′	5′	4′	3′	2½′	2′
10" dn.	26 ga.							
11, 12"	24 ga.	X	A-26	→	→	→	→	→
13, 14"	22 ga.	X	A-24	A-26	→	→	→	→
15, 16"	20 ga.	A-22	A-24	A-26	→	→	→	→
17, 18"	20 ga.	A-22	A-24	A-26	→	→	→	→
19, 20"	18 ga.	B-20	B-22	A-26	→	→	→	→
21, 22"	16 ga.	B-20	B-22	A-26	→	→	→	→
23, 24"	16 ga.	C-20	C-22	B-26	→	→	→	→
25, 26"		C-20	C-22	B-26	→	→	→	→
27, 28"		C-18	C-20	C-24	B-26	→	→	→
29, 30"		D-18	D-20	C-24	C-26	→	→	→
31–36"		E-16	E-18	D-22	D-24	→	→	→
37–42"			E-16	E-22	E-24	→	→	→
43–48"			G-16	F-20	E-22	E-24	→	→
49–54"				G-18 F+rod	F-20	F-24	→	→
55–60"				H-18 F+rod	G-20 F+rod	G-22 F+rod	G-24 F+rod	→
61–72"	NOT			I-16 F+rod	H-18 F+rod	H-22 F+rod	→	H-24 F+rod
73–84"	ALLOWED				J-18 F+rod	I-20 F+rod	→	I-22 F+rod
85–96"					K-16 G+rod	K-18 G+rod	J-20 F+rod	→
97" UP							H-18t	→

ตารางที่ ข.4 Intermediate Reinforcement

TABLE 1-10 INTERMEDIATE REINFORCEMENT

MINIMUM RIGIDITY CLASS	EI*	 ANGLE H x T (MIN)	WT/LF	 ZEE H x B x T (MIN	WT/LF	 HAT SECTION H x B x D x T (MIN)	WT/LF	 CHANNEL H x B x T (MIN)	WT/LF
A	0.5								
B	1.0			3/4 x 1/2 x 20 ga.	.28				
C	2.5	1 x 18 ga. 1 x 16 ga. 3/4 x 1/8	.34 .44 .59	3/4 x 1/2 x 18 ga.	.36			3/4 x 3 x 18 ga.	.81
D	5	1 1/4 x 18 ga. 1 x 1/8	.45 .80	1 x 3/4 x 20 ga.	.35			1 1/8 x 3¼ x 18 ga.	1.0
E	10	1 1/4 x .090 1 1/2 x 16 ga.	.80 .66	1 x 3/4 x .090 1 1/2 x 3/4 x 20 ga.	.78 .41		.7	1 x 2 x 1/8	1.6
F	15	1 1/2 x 1/8*	1.23	1 x 3/4 x 1/8 1 1/2 x 3/4 x 18 ga.	1.03 .54	1½ x 3/4 x 5/8 x 20 ga. 1½ x 1½ x 3/4 x 20 ga.	.7 1.1	1¼ x 3½ x 16 ga. 1 1/8 x 3 x 1/8	1.32 2.1
G	25	1 1/2 x 3/16	.96	1 1/2 x 3/4 x 1/8 2 x 1 1/8 x 20 ga.	1.23 .6	1½ x 3/4 x 5/8 x 16 ga. 1½ x 1½ x 3/4 x 18 ga. 2 x 1 x 3/4 x 20 ga.	.82 1.1 .99		
H	50	2 x 1/8	1.65	2 x 1 1/8 x 16 ga.	.94	1½ x 3/4 x 5/8 x 1/8 1½ x 1½ x 3/4 x .090 2 x 1 x 3/4 x 18 ga.	2.1 1.9 1.2	1.4 x 3	4.1
I	75	2 x 3/16	2.44	2 x 1 1/8 x .090	1.33	2 x 1 x 3/4 x .090 2½ x 2 x 3/4 x 16 ga.	2.03 1.88	2 x 2 x 1/8 1.5 x 3	2.4 5.0
J	100	2 x 1/4 2 1/2 x 1/8	3.2 2.1	2 x 1 1/8 x 1/8 3 x 1 1/8 x 16 ga.	1.74 1.2	2 x 1 x 3/4 x 1/8 2½ x 2 x 3/4 x .090	2.63 2.67	1.6 x 4	5.4
K	150	2 1/2 x 3/16	3.1	3 x 1 1/8 x .090	1.64	2½ x 2 x 3/4 x 1/8 3 x 1½ x 3/4 x 16 ga.	3.57 2.0	NOT GIVEN	
L	200	2 1/2 x 1/4	4.1	3 x 1 1/8 x 1/8	2.15	3 x 1½ x 3/4 x .090	2.82		

ตารางที่ ข.5 Transverse Joint Reinforcement

TABLE 1-11 TRANSVERSE JOINT REINFORCEMENT

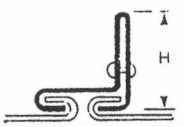
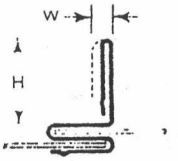
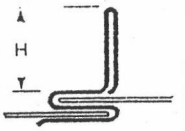
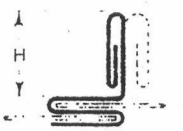
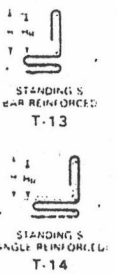
MINIMUM RIGIDITY CLASS	EI	 T-2 STANDING DRIVE SLIP		 T-10 STANDING S		 T-11 STANDING S		 T-12 STANDING S		 T-13 T-14	
		H x T	WT/LF	H x T	WT/LF	H x T	WT/LF	H x T	WT/LF	H x T + HR	WT/LF
A	0.5	↑		↑		1/2 x 26 ga.	.5	↑		↑	
B	1.0	1 1/8 x 26 ga.	.5	↑		1/2 x 22 ga.	.7	↑		↑	
C	2.5	1 1/18 x 22 ga.	.8	1 x 26 ga.	.6	1 x 26 ga.	.6	↑		↑	
D	5	NOT GIVEN		1 x 24 ga.	.7	1 x 24 ga.	.7	1 1/8 x 26 ga.	.7	↑	
E	10	↑		1 1/8 x 20 ga. w = 3/16"	.9	NOT GIVEN		1 1/8 x 18 ga.	1.4	↑	
F	15	↑		1 5/8 x 22 ga. w = 3/16"	1.0	↑		1 1/2 x 24 ga.	1.0	1 1/2 x 24 ga. 1 1/2 x 1/8 Bar	1.5
G	25	↑		1 5/8 x 18 ga. w = 3/16"	1.5	↑		1 1/2 x 18 ga.	1.7	1 1/2 x 22 ga. 1½ x 1/8 Bar	1.6
H	50	↑		NOT GIVEN		↑		NOT GIVEN		1 1/2 x 20 ga. 1½ x 1½ x 3/16	2.9
I	75	↑		↑		↑		↑		2 x 20 ga. 2 x 2 x 1/8 ga.	2.9
J	100	↑		↑		↑		↑		2 x 20 ga. 2 x 2 x 3/16	3.7
K	150	↑		↑		↑		↑		NOT GIVEN	
L	200	↓		↓		↓		↓		↓	

TABLE 1-12 TRANSVERSE JOINT REINFORCEMENT

MINIMUM RIGIDITY CLASS		3" W.G. MAXIMUM POCKET LOCK T-17 BAR REINFORCED POCKET LOCK T-18 ANGLE REINFORCED POCKET LOCK T-19			T-20 CAPPED FLANGE			T-22 COMPANION ANGLES		T-23 FLANGED		3/8" MIN. T-24 FLANGED	
	EI	H	LOCK T, DUCT T, HR	WT/LF	H x T	U	WT/LF	H x T	WT/LF	H x T	WT/LF	H x T	WT/LF
A	0.5												
B	1.0				3/4 x 26 ga.	24 ga.	.4						
C	2.5	T-17 1"	26 ga. Lock on 26 ga.	.6	1 x 24 ga.	24 ga.	.5			1 x 24 ga.	1.0		
D	5	T-17 1"	24 ga. Lock on 24 ga.	.7	1 x 22 ga.	22 ga.	.6			1 x 22 ga.	1.0	1 x 24 ga.	
E	10	T-18 1"	22 ga. Lock 1 x 1/8 Bar	1.4	1 1/2 x 24 ga.	22 ga.	.8	TWO 1 x 1/8	1.7	1 x 16 ga. 1 1/2 x 24 ga.	1.0	1 3/8 x 24 ga.	
F	15	T-17 1½"	22 ga. Lock	1.0	1 1/2 x 20 ga.	20 ga.	1.0			1 1/2 x 22 ga. 1 1/2 x 20 ga.	1.0 1.0	1 3/8 x 20 ga.	
G	25	T-18 1½"	22 ga. Lock 1 1/2 x 1/8 Bar	1.6				TWO 1 1/4 x 1/8	2.1	1 1/2 x 18 ga.	1.5	1 3/8 x 18 ga. WITH TWIN TIE RODS **	
H	50	T-19 1½"	20 ga. Lock 1 1/2 x 3/16 Angle	2.9	2 x 16 ga.	20 ga.	1.5	TWO 1 1/2 x 1/8	2.6	2 x 18 ga.	1.5		
I	75	T-19 1½"	20 ga. Lock 2 x 1/8 Angle	2.8	2 x 16 ga. **			TWO* 1 1/2 x 3/16	3.7	2 x 16 ga.	2.0		
J	100	T-19 1½"	20 ga. Lock 2 x 3/16 Angle	3.5				TWO* 1 1/2 x 1/4	4.7	2" x 18 ga. WITH TIE RODS			
K	150	T-19 1½"	20 ga. Lock 2 1/2 x 3/16 Angle	4.2				TWO* 2 x 3/16	4.9				
L	200		NOT GIVEN					TWO* 2 x 1/4	6.5				

TABLE 1-13 TRANSVERSE JOINT REINFORCEMENT

MINIMUM RIGIDITY CLASS		T-15 STANDING SEAM		STANDING SEAM OR WELDED FLANGE REINFORCED						T-21 WELDED FLANGE	
				26 TO 22 GA. DUCT			20 TO 16 GA. DUCT				
	EI	H_S x T	WT/LF	H_S	H x H x T	WT/LF	H_S	H x H x T	WT/LF	H_S x T	WT/LF
A	0.5	1/2 x 24 ga.	.2							1/2 x 22 ga.	.1
B	1.0	3/4 x 24 ga.	.3							1/2 x 16 ga. 3/4 x 22 ga.	.2 .2
C	2.5	1 x 24 ga.	.5							3/4 x 18 ga. 1 x 22 ga.	.3
D	5	3/4 x 16 ga. 1 x 20 ga.	.3 .5	1"	1 x 1 x 16 ga.	1.0				1 x 18 ga. 1 1/4 x 22 ga.	.4 .3
E	10	1 x 16 ga. 1 1/2 x 24 ga.	.7 .7	1"	1 x 1 x 1/8	1.4	1"	1 x 1 x 16 ga.	1.0	1 1/4 x 18 ga. 1 1/2 x 22 ga.	.5 .4
F	15	1 1/2 x 20 ga.	.7	1½"	1½ x 1½ x 16 ga.	1.8	1¼"	1¼ x 1¼ x 16 ga.	1.7	1 1/4 x 16 ga. 1 1/2 x 20 ga.	.6 .4
G	25	1 1/2 x 18 ga.	.8	1½" 1½"	1½ x 1½ x 1/8 2 x 2 x 16 ga.	2.0	1½"	1½ x 1½ x 1/8	2.4	1 1/2 x 16 ga.	.7
H	50	SEE T-16 AND TIE ROD OPTIONS		1½"	2 x 2 x 1/8*	2.7	1½" 1½"	1½ x 1½ x 3/16 2 x 2 x 16 ga.	2.8 2.0	SEE T-21a AND TIE ROD OPTIONS	
I	75						1½"	2 x 2 x 1/8*	2.7		
J	100			1½"	2 x 2 x 3/16*	3.5	1½"	2 x 2 x 3/16*	3.5		
K	150			1½"	2½ x 2½ x 3/16*	4.1					
L	200			1½"	2½ x 2½ x 1/4	5.3	1½"	2½ x 2½ x 3/16*	4.1		

ตารางที่ ข.6 Galvanized Sheet Thickness Tolerances

GALVANIZED SHEET THICKNESS TOLERANCES

Gage	Thickness In Inches			Weight				Thickness In Millimeters		
	Min.	Max.	Nom.	Min. lb/sf	Nom. lb/sf	Max. lb/sf	Nom. kg/m²	Nom.	Min.	Max.
33	.0060	.0120	.0090	.2409	.376	.486		.2286	.1524	.3048
32	.0104	.0164	.0134	.4204	.563	.665		.3404	.2642	.4166
31	.0112	.0172	.0142	.4531	.594	.698		.3607	.2845	.4369
30	.0127	.0187	.0157	.5143	.656	.759	3.20	.3988	.3188	.4788
29	.0142	.0202	.0172	.5755	.719	.820		.4369	.3569	.5169
28	.0157	.0217	.0187	.6367	.781	.881	3.81	.4750	.3950	.5550
27	.0172	.0232	.0202	.6979	.844	.943		.5131	.4331	.5931
26	.0187	.0247	.0217	.7591	.906	1.004	4.42	.5512	.4712	.6312
25	.0207	.0287	.0247	.8407		1.167		.6274	.5274	.7274
24	.0236	.0316	.0276	.9590	1.156	1.285	5.64	.7010	.6010	.8010
23	.0266	.0346	.0306	1.0814		1.408		.7772	.6772	.8772
22	.0296	.0376	.0336	1.2038	1.406	1.530	6.86	.8534	.7534	.9534
21	.0326	.0406	.0366	1.3263		1.653		.9296	.8296	1.0296
20	.0356	.0436	.0396	1.4486	1.656	1.775	8.08	1.006	.906	1.106
19	.0406	.0506	.0456	1.6526		2.061		1.158	1.028	1.288
18	.0466	.0566	.0516	1.8974	2.156	2.305	10.52	1.311	1.181	1.441
17	.0525	.0625	.0575	2.1381		2.546		1.461	1.331	1.591
16	.0575	.0695	.0635	2.342	2.656	2.832	12.96	1.613	1.463	1.763
15	.0650	.0770	.0710	2.6481		3.138		1.803	1.653	1.953
14	.0705	.0865	.0785	2.8725	3.281	3.525	16.01	1.994	1.784	2.204
13	.0854	.1014	.0934	3.4804		4.133		2.372	2.162	2.582
12	.0994	.1174	.1084	4.0516	4.531	4.786	22.11	2.753	2.523	2.983
11	.1143	.1323	.1233	4.6595		5.394		3.132	2.902	3.362
10	.1292	.1472	.1382	5.2675	5.781	6.002	28.21	3.510	3.280	3.740
9	.1442	.1622	.1532	5.8795		6.614		3.891	3.661	4.121
8	.1591	.1771	.1681	6.4874	6.875	7.222		4.270	4.040	4.500

NOTES:

1. Based on ASTM A525 (Hot Dip Galvanized sheet) and Manufacturers' Standards.
2. Tolerances are valid for 48" and 60" wide coil and cut length stock—other dimensions apply to other sheet widths and to strip.
3. The lock forming grade of steel will conform to ASTM A527.
4. The steel producing industry recommends that steel be ordered by decimal thickness only. Thickness and zinc coating class can be stenciled on the sheet. The gage designation is retained for residual familiarity reference only.
5. Minimum weight in this table is based on the following computation:
   Minimum sheet thickness minus 0.001" of G60 coating times 40.8 lb per s.f. per inch plus 0.0369 lb/sf of zinc.
   G90 stock would be comparably calculated from:
   (t−.00153") 40.8 − 0.0564 = minimum weight.
   However, scale weight may run 2% (or more) greater than theoretical weight. Actual weight may be near 40.82 lb. per s.f. per inch.
6. G60 coating, per ASTM A525 and ASTM A90, has 0.60 oz/sf (triple spot test) total for two sides. 0.59 oz/sf of zinc equals 0.001". 1 oz is 0.0017". G90 coating is 0.90 oz/sf (triple spot), or 0.00153". Magnetic gage measurement of zinc coating may have 15% error.

NARROWSCOPE DUCT CONSTRUCTION TABLE 1-4 EX

1" W.G. STATIC POS. OR NEG. SMACNA ©	TRANSVERSE JOINT REINFORCEMENT										INTERMEDIATE REINFORCEMENT	
① DUCT DIM.	② DUCT GA. (MIN.)	③ REINF. SPACING (MAX.)	④ REINF. CODE GRADE	⑤ DRIVE SLIP T-3; HEMMED 'S' SLIP T-6 — SLIP GAGE	⑤ BACKUP	⑥ STANDING S T-10	⑦ STANDING S T-12	⑧ STANDING S (BAR REINFORCED) T-13; STANDING S (ANGLE REINFORCED) T-14	⑨ POCKET LOCK T-17; BAR REINFORCED POCKET LOCK T-18; ANGLE REINFORCED POCKET LOCK T-19	⑩ COMPANION ANGLES (CAULK OR GASKET) T-22	⑪ ANGLE	⑫ ZEE
12" dn	26	None		24	None	H × T	H × T	H × T + HR	H	LOCK T. DUCT T. HR	H × T	H × T (MIN)	H × B × T (MIN)
13"-26"	26	5'	A	24	*	↑	↑	↑		↑	↑	↑	↑
27"-36"	24	5'	C	24	*	1 × 26 ga.			T-17 1	26 ga. Lock		1 - 18 ga. or ⅜ - ⅛	¾ × ½ × 18 ga.
37"-42"	24	5'	D	24	*	1 × 24 ga.	1¼ × 26 ga.		T-17 1	24 ga. Lock		1¼ - 18 ga. or 1 - ⅛	1 × ¾ × 20 ga
43"-48"	24	5'	E	24	*	1⅛ × 20 ga. w = 3/16"	1¼ × 18 ga.		T-18 1	22 ga Lock 1 × ⅛ Bar	TWO 1 × ⅛	1¼ × .090 or 1½ - 16 ga.	1 × ¾ × .090 or 1½ × ¾ × 20 ga.
49"-54"	22	5'											
55"-60"	22	5'	F	24	*	1⅛ × 22 ga. w = 3/16"	1½ × 24 ga.	1½ × 24 ga. 1½ × ⅛ Bar	T-17 1½	22 ga. Lock	↑	1½ - ⅛	1 × ¾ × ⅛ or 1½ × ¾ × 18 ga.
61"-72"	22	2½'	G	24	*	1⅛ × 18 ga. w = 3/16"	1½ × 18 ga.	1½ × 22 ga. 1½ × ⅛ Bar	T-18 1½	22 ga. Lock 1½ × ⅛ Bar	TWO 1¼ × ⅛	1½ × 3/16	1½ × ¾ × ⅛ or 2 × 1¼ × 20 ga.
73"-84"	20	2½'	H	22	*	NOT GIVEN	NOT GIVEN	1½ × 20 ga. 1½ × 1½ × 3/16	T-19 1½'	20 ga. Lock 1½ × 3/16 Angle	TWO 1½ × ⅛	2 × ⅛	2 × 1¼ × 16 ga.
85"-96"	20	2½'	I	22	*	↓	↓	2 × 20 ga. 2 × 2 × ⅛	T-19 1½'	20 ga. Lock 2 × ⅛ Angle	TWO 1½ × 3/16	2 × 3/16	2 × 1¼ × .090
97" Up	18	2½'	J					2 × 20 ga. 2 × 2 × 3/16	T-19 1½'	20 ga. Lock 2 × 3/16 Angle	TWO 1½ × ⅛	2 × ⅛ or 2½ × ⅛	2 × 1¼ × ⅛ or 3 × 1¼ × 16 ga.

NOTES:

1. *Means use back-up member from columns 11 or 12. Exception: the drive only requires back-up over 20" length.
2. Spacing in column 3 refers to joint-to-joint, joint-to-intermediate or intermediate-to-intermediate
3. The same sheet thickness must be used on all sides of duct. Each duct dimension, width or depth, controls the minimum reinforcement requirements for that particular side.
4. Duct sides 19" wide and larger which have more than ten square feet of unbraced panel shall be beaded or crossbroken unless the ducts will have external insulation or internal liner. This applies to ducts of 20 ga. or less.
5. Contents of the narrow scope tables and these notes do not constitute all requirements for the construction's compliance. Complete details are provided in the manual entitled *HVAC Duct Construction Standards, Metal and Flexible.*
   The manual is available from local SMACNA chapter offices or the National Association office; inquire for terms.
6. Construction conforming to the standard does not prevent some traditionally acceptable rumble (noise) under sudden pressure change conditions such as start up and shut down of systems.
7. Ducts with 4 ft. joint spacing shall conform as if 4' and 2' were given in Column 3 where 5' and 2½' are shown.

COMMENT:

Construction tables are prepared in "narrow scope" for 2" water gauge and 1" water gauge pressure classifications. These tables have been produced for the convenience of those contractors or engineers who wish to have fewer options

Sheet Metal and Air Conditioning
Contractors Association, Vienna Va.

NARROWSCOPE DUCT CONSTRUCTION TABLE 1-5 EX

2" W.G. STATIC POS. OR NEG. — SMACNA ©

TRANSVERSE JOINT REINFORCEMENT

INTERMEDIATE REINFORCEMENT

(1) DUCT DIM.	(2) DUCT GA. (MIN.)	(3) REINF. SPACING (MAX.)	(4) REINF. CODE GRADE	(5) DRIVE SLIP T-3 / HEMMED "S" SLIP T-6 — SLIP GAGE	(5) BACKUP	(6) STANDING S T-10	(7) STANDING S T-12	(8) STANDING S (BAR REINFORCED) T-13 / STANDING S (ANGLE REINFORCED) T-14	(9) POCKET LOCK T-17 / BAR REINFORCED POCKET LOCK T-18 / ANGLE REINFORCED POCKET LOCK T-19 — H	(9) LOCK T, DUCT T, HR	(10) COMPANION ANGLES (CAULK OR GASKET) T-22	(11) ANGLE	(12) ZEE
10" dn	26	None		24	None	H × T	H × T	H × T + HR	H	LOCK T, DUCT T, HR	H × T	H × T (MIN)	H × B × T (MIN)
11"-22"	26	5'	A	24	*	↑	↑	↑		↑	↑	↑	↑
23"-30"	24	5'	C	24	*	1 × 26 ga.	1½ × 26 ga.		T-17 1"	26 ga. Lock	↑	1 × 18 ga. or ¾ × ⅛	¾ × ½ × 18 ga.
31"-42"	22	5'	E	24	*	1⅛ × 20 ga. w = 3/16"	1⅛ × 18 ga.	↑	T-18 1"	22 ga. Lock 1 × ⅛ Bar	TWO 1 × ⅛	1¼ × .090 or 1½ × 16 ga.	1 × ¾ × .090 or 1½ × ¾ × 20 ga.
43"-48"	24	2½'											
49"-54"	24	2½'	F	24	*	1⅜ × 22 ga. w = 3/16"	1½ × 24 ga.	1½ × 24 ga. 1½ × ⅛ Bar	T-17 1½"	22 ga. Lock	↑	1½ × ⅛	1 × ¾ × ⅛ or 1½ × ¾ × 18 ga.
55"-60"	22	2½'	G	24	*	1⅜ × 18 ga. w = 3/16"	1½ × 18 ga.	1½ × 22 ga. 1½ × ⅛ Bar	T-18 1½"	22 ga. Lock 1½ × ⅛ Bar	TWO 1¼ × ⅛	1½ × 3/16	1½ × ⅜ × ⅛ or 2 × 1⅛ × 20 ga.
61"-72"	22	2½'	H	24	*	NOT GIVEN	NOT GIVEN	1½ × 20 ga. 1½ × 3/16 Angle	T-19 1½"	20 ga. Lock 1½ × 3/16 Angle	TWO 1½ × ⅛	2 × ⅛	2 × 1⅛ × 16 ga.
73"-84"	20	2½'	I	22	*			2 × 20 ga. 2 × ⅛ ga. Angle	T-19 1½"	20 ga. Lock 2 × ⅛ Angle	TWO 1½ × 3/16	2 × 3/16	2 × 1⅛ × .090
85"-96"	20	2½'	J	22	*			2 × 20 ga. 2 × 3/16 Angle	T-19 1½"	20 ga. Lock 2 × 3/16 Angle	TWO 1½ × ¼	2 × ¼ or 2½ × ⅛	2 × 1⅛ × ⅛ or 3 × 1½ × 16 ga.
97" Up	18	2½'	K					NOT GIVEN	T-19 1½"	20 ga. Lock 2½ × 3/16 Angle	TWO 2 × 3/16 or 2 × ¼	2½ × 3/16 or 2½ × ¼	3 × 1⅛ × .090 or 3 × 1½ × ⅛

NOTES:

1. * Means use back-up member from columns 11 or 12. Exception: the drive only requires back-up over 20" length.
2. Spacing in column 3 refers to joint-to-joint, joint-to-intermediate or intermediate-to-intermediate.
3. The same sheet thickness must be used on all sides of duct. Each duct dimension, width or depth, controls the minimum reinforcement requirements for that particular side.
4. Duct sides 19" wide and larger which have more than ten square feet of unbraced panel shall be beaded or crossbroken unless the ducts will have external insulation or internal liner. This applies to ducts of 20 ga. or less.
5. Contents of the narrow scope tables and these notes do not constitute all requirements for the construction's compliance. Complete details are provided in the manual entitled *HVAC Duct Construction Standards, Metal and Flexible.* The manual is available from local SMACNA chapter offices or the National Association office; inquire for terms.
6. Construction conforming to the standard does not prevent some traditionally acceptable rumble (noise) under sudden pressure change conditions such as start up and shut down of systems.
7. Ducts with 4 ft. joint spacing shall conform as if 4' and 2' were given in Column 3 where 5' and 2½' are shown.

COMMENT:

Construction tables are prepared in "narrow scope" for 2" water gauge and 1" water gauge pressure classifications. These tables have been produced for the convenience of those contractors or engineers who wish to have fewer options.

Sheet Metal and Air Conditioning Contractors Association, Vienna Va.

TABLES 1-3, 1-4 AND 1-5 AS COMPOSITE

Pressure Class (Water gage) →	½"	½"	1"	1"	2"	2"	½"	½"	1"	1"	2"	2"	½"	½"	1"	1"	2"	2"
Duct Gage →	22	22	22	22	22	22	24	24	24	24	24	24	26	26	26	26	26	26
Duct Dimensions ↓																		
7" dn.													← NOT REQUIRED →					
8-10"																	A/5[D]	A/8[D]
11, 12"											A/5[D]	A/8[D]			A/10[D]	A/8[D]	A/5[D]	A/4[D]
13, 14"					A/10[D]	A/8[D]			A/10[D]	A/8[D]	A/5[D]	A/8[D]			A/5[D]	A/8[D]	A/5[D]	A/4[D]
15, 16"					A/10[D]	A/8[D]			A/10[D]	A/8[D]	A/5[D]	A/8[D]			A/5[D]	A/8[D]	A/5[D]	A/4[D]
17, 18"			A/10[D]	A/8[D]	A/5[D]	B/8			A/10[D]	A/8[D]	A/5[D]	A/4[D]	A/10[D]	A/8[D]	A/5[D]	A/8[D]	A/5[D]	A/4[D]
19, 20"			A/10	A/8	A/5	B/8	A/10	A/8	A/10	A/8	A/5	A/4	A/10	A/8	A/5	A/4	A/5	A/4
21, 22"			B/10	B/8	B/5	C/8	A/10	A/8	B/10	B/8	B/5	B/4	A/10	A/8	A/5	A/4	B/5	B/4
23, 24"			B/10	B/8	B/5	C/8	A/10	A/8	A/5	B/8	B/5	B/4	A/10	A/8	A/5	A/4	B/5	B/4
25, 26"	A/10	A/8	B/10	B/8	B/5	C/8	A/10	A/8	B/5	C/8	C/5	B/4	B/5	B/8	B/5	B/4	B/2½	B/4
27, 28"	B/10	B/8	C/10	C/8	C/5	B/4	B/10	B/8	B/5	C/8	C/5	C/4	B/5	B/8	B/5	B/4	C/2½	C/4
29, 30"	B/10	B/8	C/10	C/8	C/5	C/4	B/10	B/8	B/5	C/8	D/2½	D/4	C/5	C/4	C/5	C/4		
31-36"	C/10	C/8	C/5	D/8	D/5	D/4	C/5	C/8	C/5	C/4	E/2½	E/4	D/5	C/4	D/2½	D/4		
37-42"	D/5	D/8	D/5	D/4	E/5	E/4	D/5	D/8	D/5	D/4	E/2½	E/2	D/5	D/4	D/2½	D/4		
43-48"	D/5	D/8	E/5	D/4	E/2½	E/4	D/5	D/4	E/5	D/4	F/2½	F/2	D/5	D/4				
49-54"	D/5	D/4	E/5	E/4	F/2½	F/2	D/5	D/4	E/2½	E/4			E/2½	E/4				
55-60"	E/5	E/4	F/5	F/4	G/2½	G/2	E/5	E/4	F/2½	F/4								
61-72"	F/5	F/4	G/2½	G/4	H/2½	H/2	F/2½	F/4										
73-84"	H/5	G/4					G/2½	G/4		NOT ALLOWED								
85-96"	H/2½	H/4																
97" up																		

Standing reinforcement is not required on duct sizes above this heavy line. Flat Slips and drives or other choice may be used. Flat Slips and Drives must not be less than one gage below duct gage and not less than 24 gage.

Flat Slips and Drives may be backed with Stiffeners from Table 1-10 and thereby qualified for this Table. Where the superscript D occurs the flat drive is accepted as Class A. See Table 1-18.

None of the requirements of the standards are waived by this chart.

THIS NUMBER IS THE SPACING INTERVAL BETWEEN REINFORCEMENTS.

THIS LETTER DENOTES TYPE OF REINFORCEMENT TO BE SELECTED FROM EITHER JOINT TABLES 1-11 TO 1-13 OR INTERMEDIATE TABLE 1-10

ตารางที่ ข.9 1/2", 1", 2" As Composite

TABLES 1-3, 1-4 AND 1-5 AS COMPOSITE

Pressure Class (Water gage) →	½"	½"	1"	1"	2"	2"	½"	½"	1"	1"	2"	2"	½"	½"	1"	1"	2"	2"
Duct Gage →	16	16	16	16	16	16	18	18	18	18	18	18	20	20	20	20	20	20
Duct Dimensions ↓																		
7" dn.																		
8-10"																		
11, 12"																		
13, 14"																		
15, 16"																		
17, 18"																		
19, 20"																	B/10	B/8
21, 22"											B/10	B/8			A/10	A/8	B/10	B/8
23, 24"											C/10	C/8			B/10	B/8	B/10	C/8
25, 26"					C/10	C/8					C/10	C/8			B/10	B/8	C/10	C/8
27, 28"					C/10	C/8			C/10	C/8	C/10	C/8	B/10	B/8	C/10	C/8	C/5	C/8
29, 30"					D/10	D/8			C/10	C/8	D/10	D/8	B/10	B/8	C/10	C/8	C/5	D/8
31-36"			D/10	D/8	E/10	E/8	C/10	C/8	D/10	D/8	D/5	E/8	C/10	C/8	D/10	D/8	D/5	D/4
37-42"	D/10	D/8	E/10	E/8	E/5	E/8	D/10	D/8	E/10	D/8	E/5	E/4	D/10	D/8	D/5	D/8	E/5	E/4
43-48"	E/10	D/8	F/10	F/8	F/5	G/8	E/10	D/8	E/5	E/8	F/5	E/4	E/10	D/8	E/5	D/4	F/5	E/4
49-54"	E/10	E/8	G/10	F/8	G/5	F/4	E/10	E/8	E/5	F/8	G/5	F/4	D/5	E/8	E/5	E/4	F/2½	F/4
55-60"	F/10	F/8	F/5	G/8	H/5	G/4	F/10	F/8	F/5	G/8	H/5	G/4	E/5	F/8	F/5	F/4	G/2½	G/4
61-72"	H/10	G/8	H/5	G/4	I/5	H/4	F/5	G/8	H/5	G/4	H/2½	H/4	F/5	F/4	G/2½	G/4	H/2½	H/2
73-84"	H/5	H/8	I/5	H/4	I/2½	J/4	H/5	G/4	I/5	H/4	I/2½	J/4	H/5	G/4	H/2½	H/4	I/2½	I/2
85-96"	H/5	I/8	J/5	I/4	J/2½	K/4	H/5	H/4	I/2½	I/4	J/2½	J/2	H/5	H/4	I/2½	I/2	J/2½	J/2
97" up	H/5	H/4	J/2½	J/2	K/2½	K/2	H/5	H/4	J/2½	J/2	K/2½	K/2						

Standing reinforcement is not required on duct sizes above this heavy line. Flat Slips and drives or other choice may be used. Flat Slips and Drives must not be less than one gage below duct gage and not less than 24 gage.

NOT REQUIRED

Flat Slips and Drives may be backed with Stiffeners from Table 1-10 and thereby qualified for this Table.

None of the requirements of the standards are waived by this chart.

THIS NUMBER IS THE SPACING INTERVAL BETWEEN REINFORCEMENTS.

THIS LETTER DENOTES TYPE OF REINFORCEMENT TO BE SELECTED FROM EITHER JOINT TABLES 1-11 TO 1-13 OR INTERMEDIATE TABLE 1-10

ภาคผนวก ค

ชนิดและรูปแบบการพับตะเข็บของท่อลม

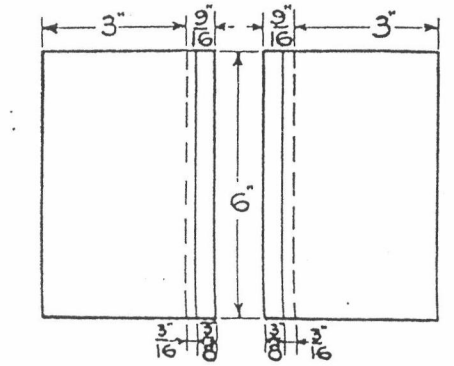


FIG.1. ALLOWANCE FOR SEAM

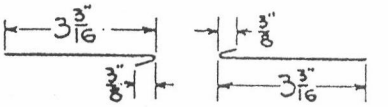


FIG.2. FORMING LOCKS

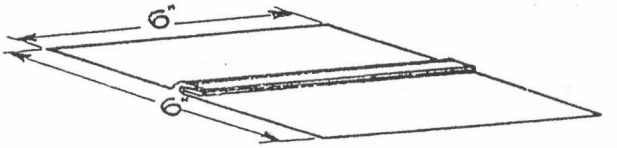


FIG.5. PERSPECTIVE VIEW OF GROOVED LOCK SEAM

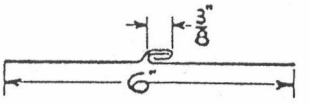


FIG.4. END VIEW OF SEAM

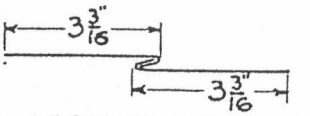


FIG.3. ASSEMBLING SEAM

Plate 1, Grooved lock seam

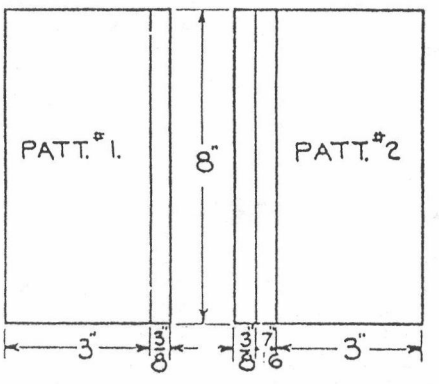


FIG.1 LAYING OUT PATTERNS

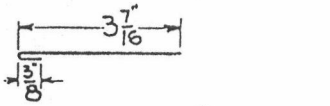


FIG. 2 PATT.# 2.

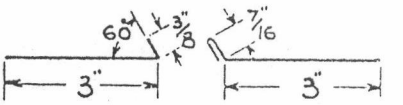


FIG.4 PATT.#1

FIG.3 PATT.#2

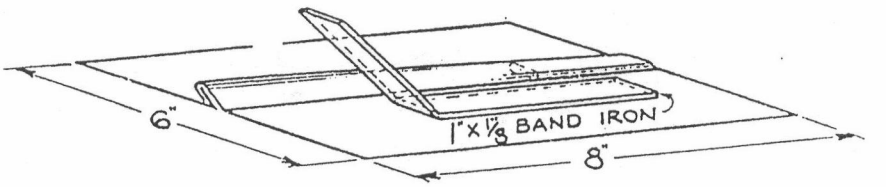


FIG.6 PERSPECTIVE VIEW—CLOSING DOWN THE SEAM

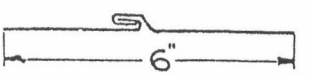


FIG.7 END VIEW OF SEAM

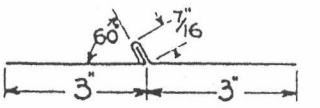


FIG. 5 ASSEMBLING PATTERNS

Plate 2, Hammer Grooved Lock Seam

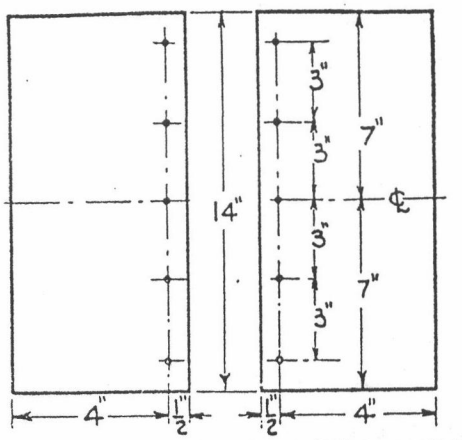


FIG.1. METHOD OF LAYING OUT HOLES

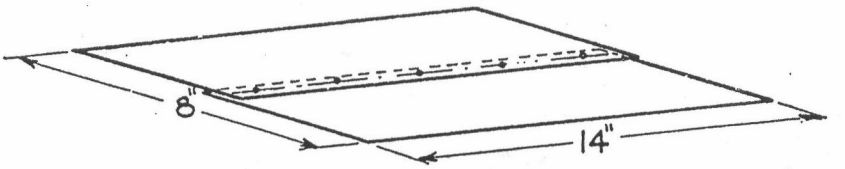


FIG. 2 PERSPECTIVE VIEW OF RIVETED LAP SEAM

FIG.3 END VIEW OF RIVETED SEAM

Plate 3, Riveted Lap Seam

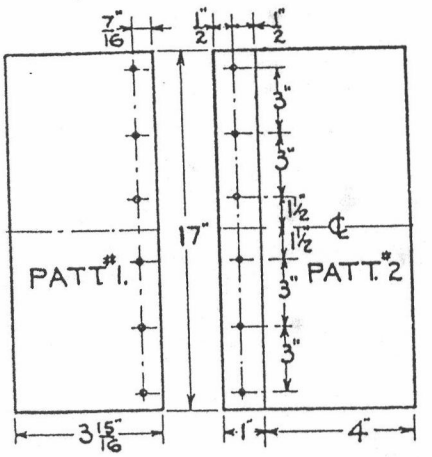


FIG.1 LAYING OUT PATTERNS

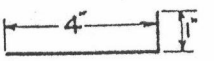


FIG. 2 FORMING PATT.#2.

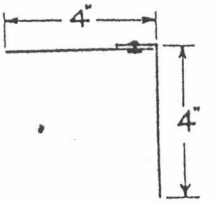


FIG. 4 END VIEW

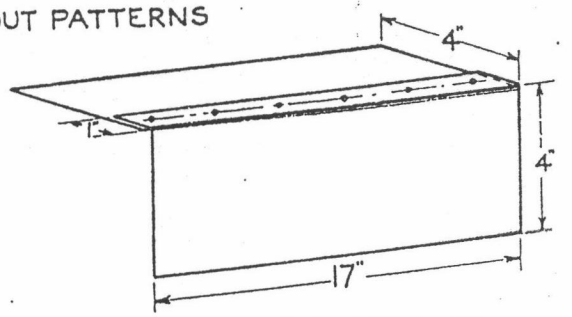


FIG.3 PERSPECTIVE VIEW OF CORNER SEAM

Plate 4, Riveted corner seam with the lap on the outside

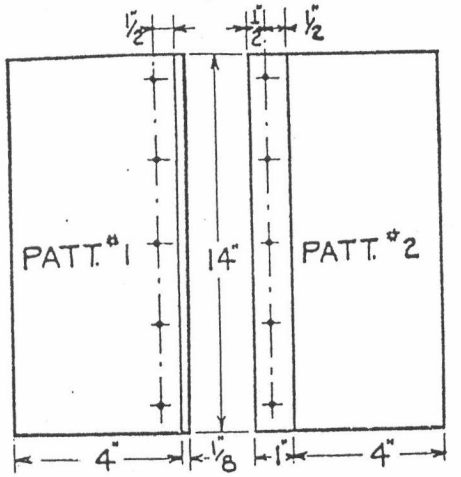


FIG. 1. LAYING OUT PATTERNS

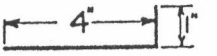


FIG. 2 FORMING PATT.#2.

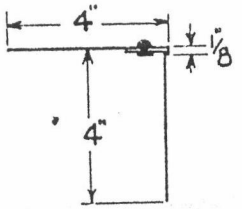


FIG. 4 END VIEW

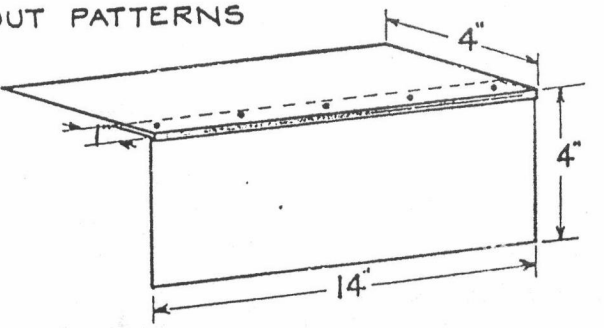


FIG. 3 PERSPECTIVE VIEW OF CORNER SEAM.

Plate 5, Riveted corner seam with the lap on the inside

10

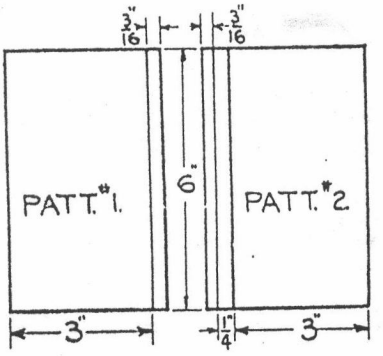


FIG. 1 LAYING OUT PATTERNS

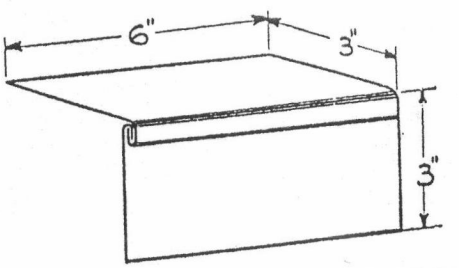


FIG. 2 PERSPECTIVE VIEW

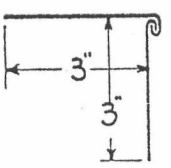


FIG. 6 END VIEW OF FINISHED DOUBLE SEAM

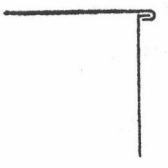


FIG. 5

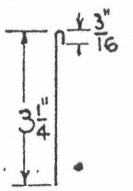


FIG. 4 PATT.#2.

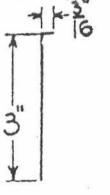


FIG. 3. PATT.#1.

Plate 6, Corner double seam lock

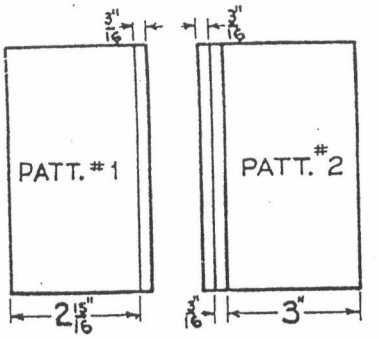


FIG. 1 LAYING OUT PATTERNS

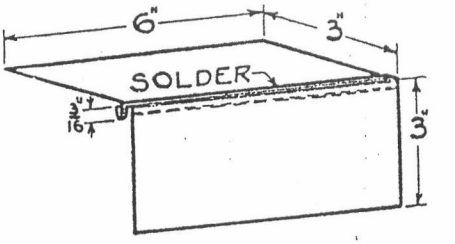


FIG. 2 PERSPECTIVE VIEW

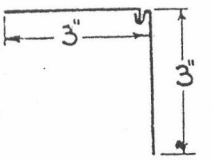


FIG. 5 END VIEW OF POCKET SOLDER LOCK

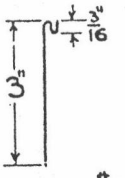


FIG. 4 PATT. #2

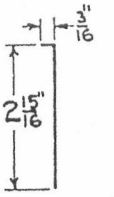


FIG. 3 PATT. #1

Plate 7, Pocket solder lock seam

12

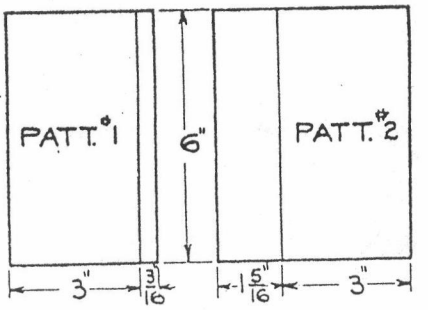


FIG. 1 LAYING OUT PATTERNS

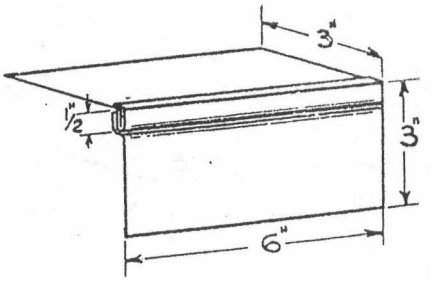


FIG. 2 PERSPECTIVE VIEW

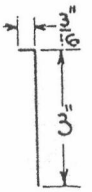


FIG. 3 FORMING PATT. #1.

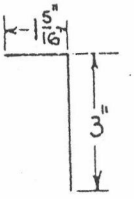


FIG. 4

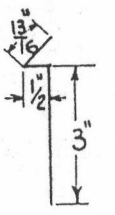


FIG. 5 FORMING PATT. #2.

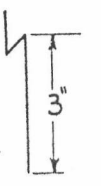


FIG. 6

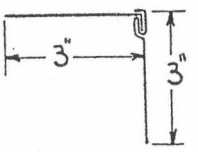


FIG. 10 END VIEW OF PITTSBURGH LOCK

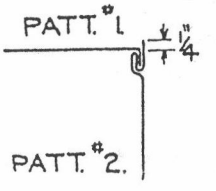


FIG. 9.

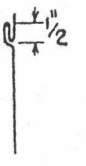


FIG. 8.

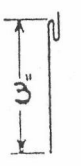


FIG. 7.

Plate 8, Pittsburgh corner lock seam

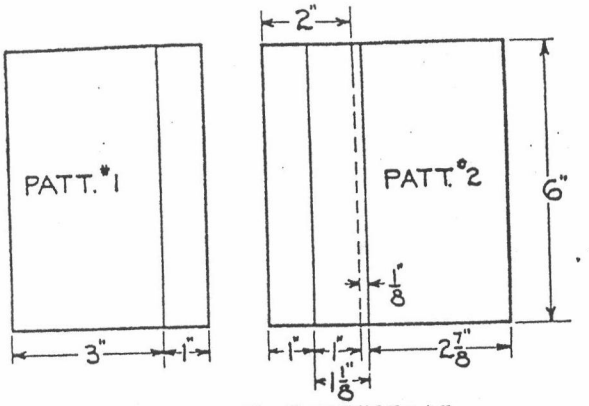


FIG.1 LAYING OUT PATTERNS

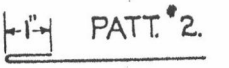


FIG. 2.

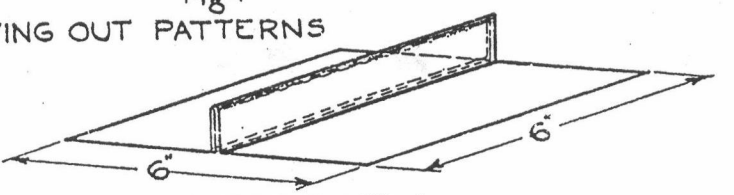


FIG. 2 PERSPECTIVE VIEW

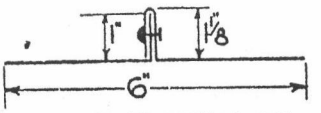


FIG. 4 END VIEW OF STANDING SEAM

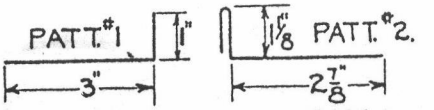


FIG. 3 FORMING THE SEAM

Plate 9, 1-in. standing seam

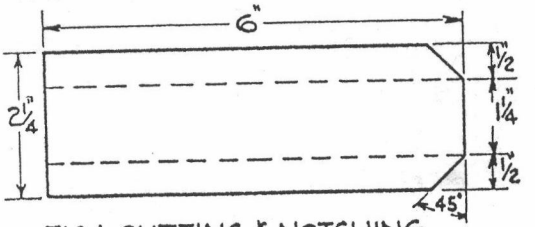


FIG. 1. CUTTING & NOTCHING DRIVE CLEATS

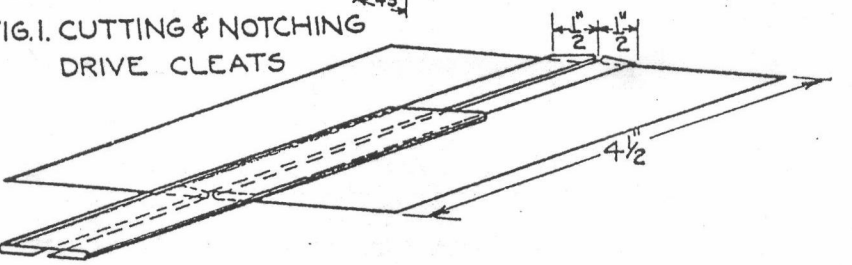


FIG. 6 PERSPECTIVE VIEW OF DRIVE CLEAT CONNECTION

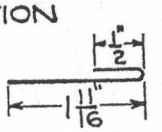


FIG. 2

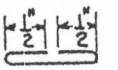


FIG. 3.

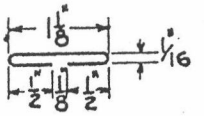


FIG. 5 END VIEW WITH FULL DIMENSIONS

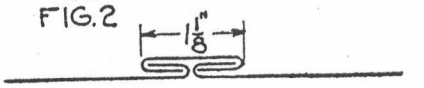


FIG. 4 END VIEW OF DRIVE CLEAT CONNECTION

Plate 10, 1-in. drive cleat

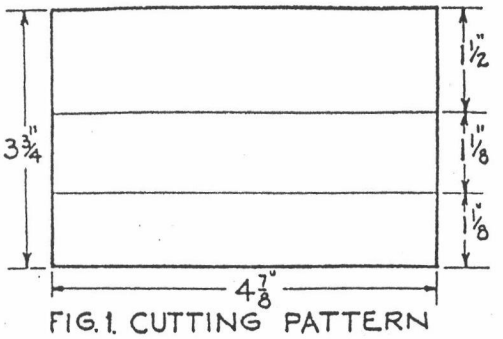


FIG. 1. CUTTING PATTERN

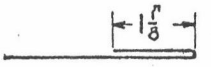


FIG. 2.

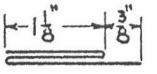


FIG. 3.

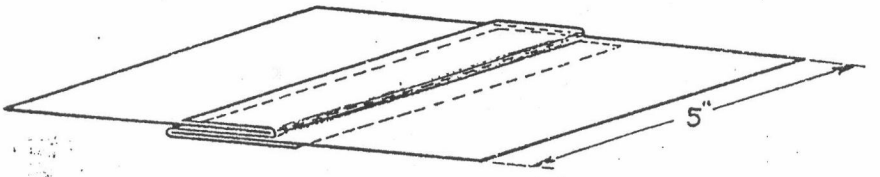


FIG. 4. PERSPECTIVE VIEW ~ SLIP "S" CLEAT CONNECTION

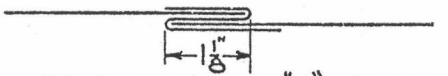


FIG. 5. END VIEW OF A SLIP "S" CLEAT CONNECTION

Plate 11, 1-in. flat slip S cleat

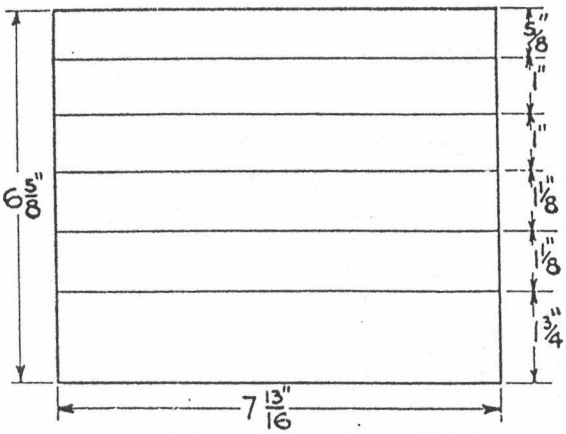


FIG. 1. LAYING OUT PATTERN

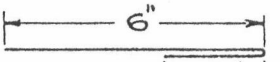


FIG. 2. FORMING

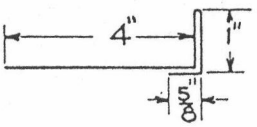


FIG. 3.

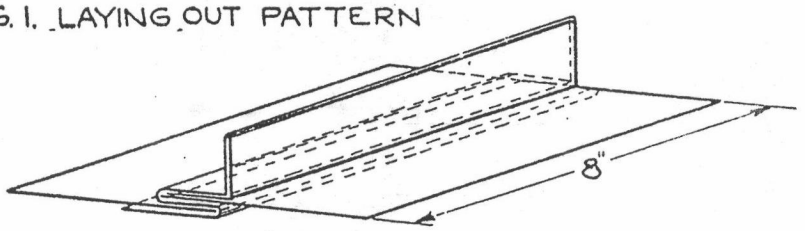


FIG. 7 PERSPECTIVE OF CONNECTION

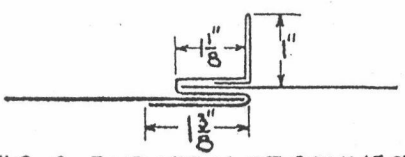


FIG. 6 END VIEW OF CONNECTION

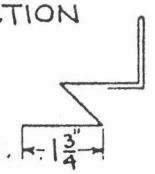


FIG. 5.

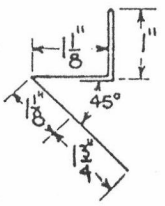


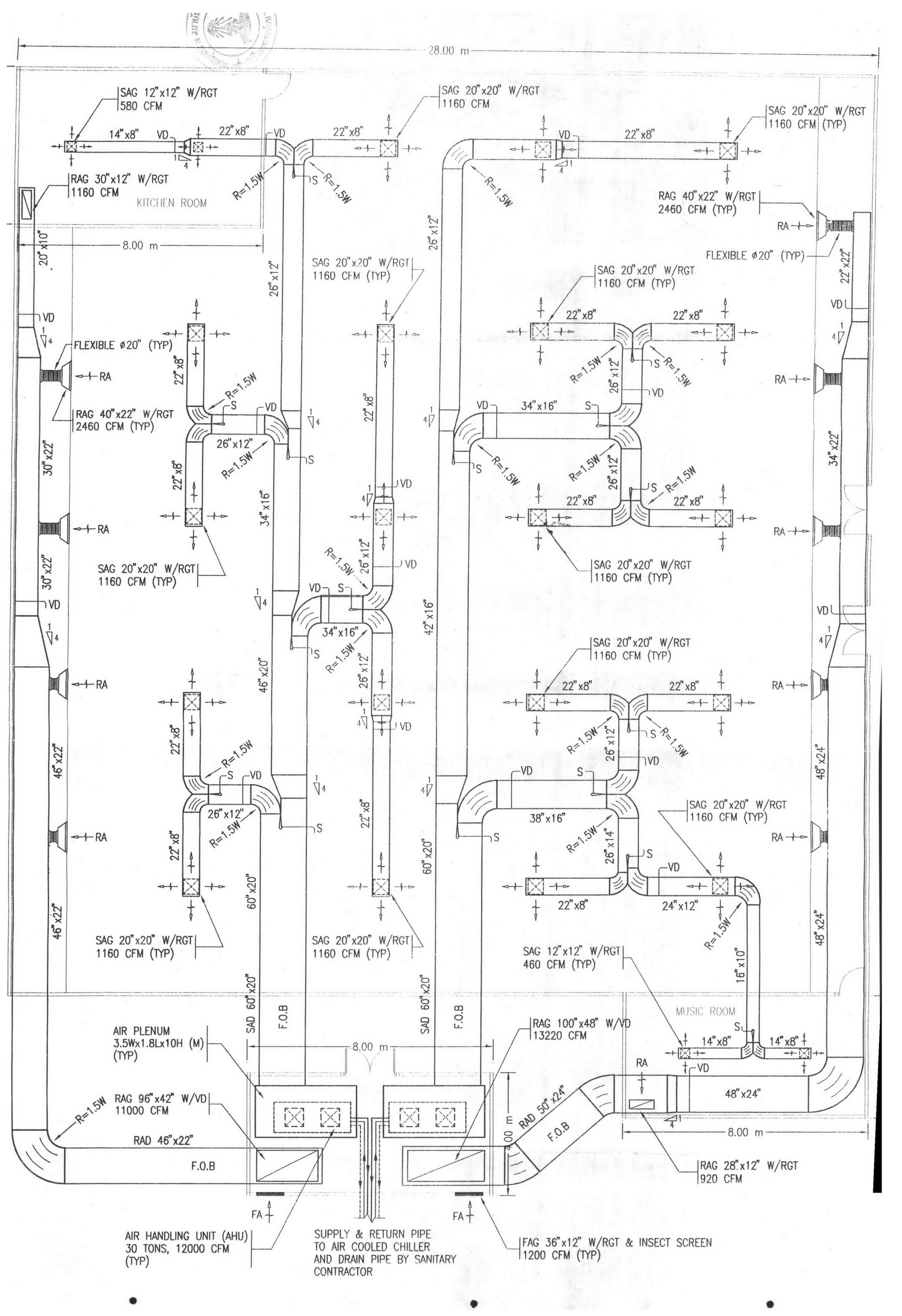
FIG. 4

Plate 12, Angle slip S cleat

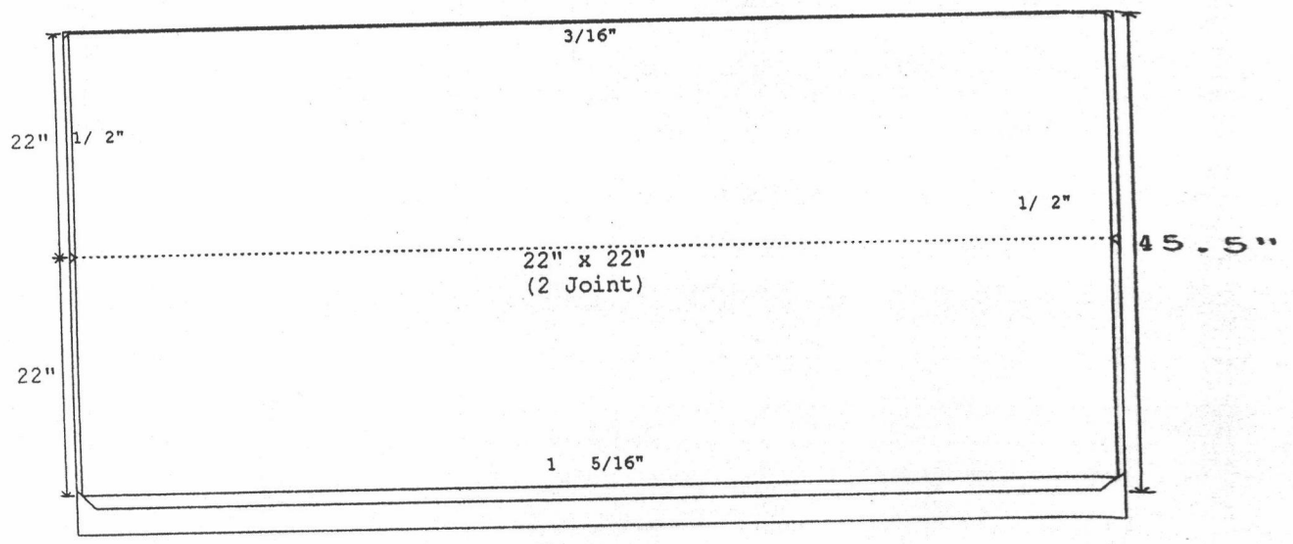
ภาคผนวก ง

แบบแปลนท่อลม และ รูปแบบแผ่นคลี่ท่อลมของตัวอย่างระบบท่อลมทั้ง 3 ตัวอย่าง

รูปที่ ง.1 แบบแปลนตัวอย่างระบบท่อลมที่ 1


28.00 m
SAG 12"x12" W/RGT
580 CFM
14"x8"
VD
22"x8"
RAG 30"x12" W/RGT
1160 CFM
KITCHEN ROOM
R=1.5W
S
8.00 m
20"x10"
26"x12"
SAG 20"x20" W/RGT
1160 CFM
SAG 20"x20" W/RGT
1160 CFM (TYP)
RAG 40"x22" W/RGT
2460 CFM (TYP)
FLEXIBLE ø20" (TYP)
RA
30"x22"
34"x16"
46"x20"
42"x16"
38"x16"
26"x14"
24"x12"
60"x20"
SAG 20"x20" W/RGT
1160 CFM (TYP)
SAG 12"x12" W/RGT
460 CFM (TYP)
16"x10"
MUSIC ROOM
48"x24"
48"x22"
AIR PLENUM
3.5Wx1.8Lx10H (M)
(TYP)
SAD 60"x20"
F.O.B
RAG 100"x48" W/VD
13220 CFM
RAG 96"x42" W/VD
11000 CFM
RAD 46"x22"
RAD 50"x24"
RAG 28"x12" W/RGT
920 CFM
FA
AIR HANDLING UNIT (AHU)
30 TONS, 12000 CFM
(TYP)
SUPPLY & RETURN PIPE
TO AIR COOLED CHILLER
AND DRAIN PIPE BY SANITARY
CONTRACTOR
FAG 36"x12" W/RGT & INSECT SCREEN
1200 CFM (TYP)

รูปที่ ง.2 รูปแบบแผ่นคลี่ที่เหมาะสมของแผ่นสังกะสีเบอร์ 26 สำหรับท่อลมตรง
ในตัวอย่างระบบท่อลมที่ 1



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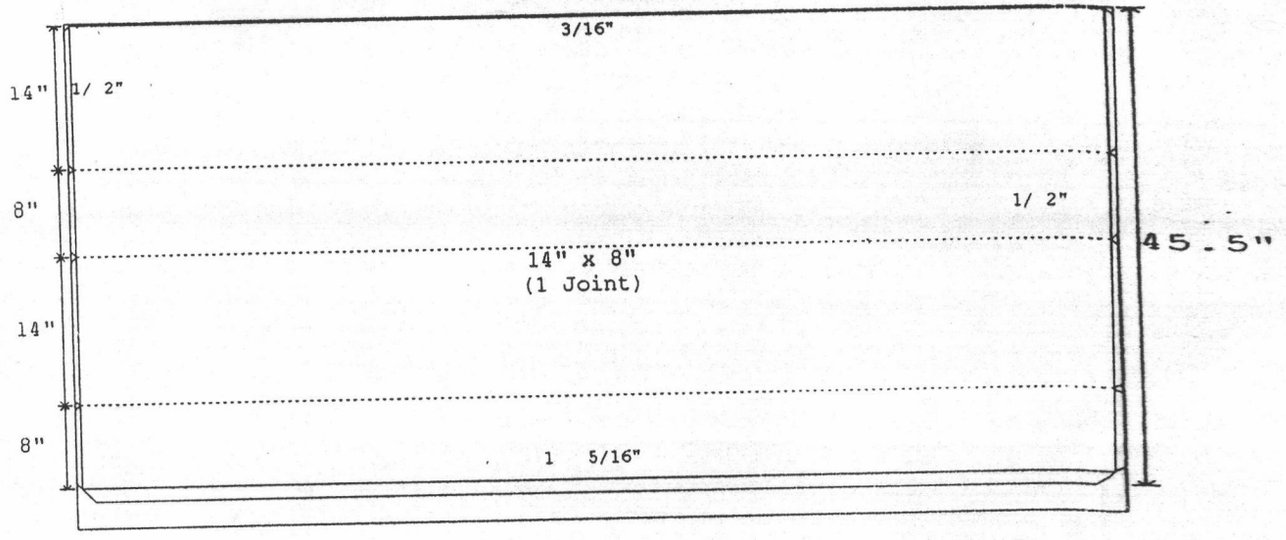
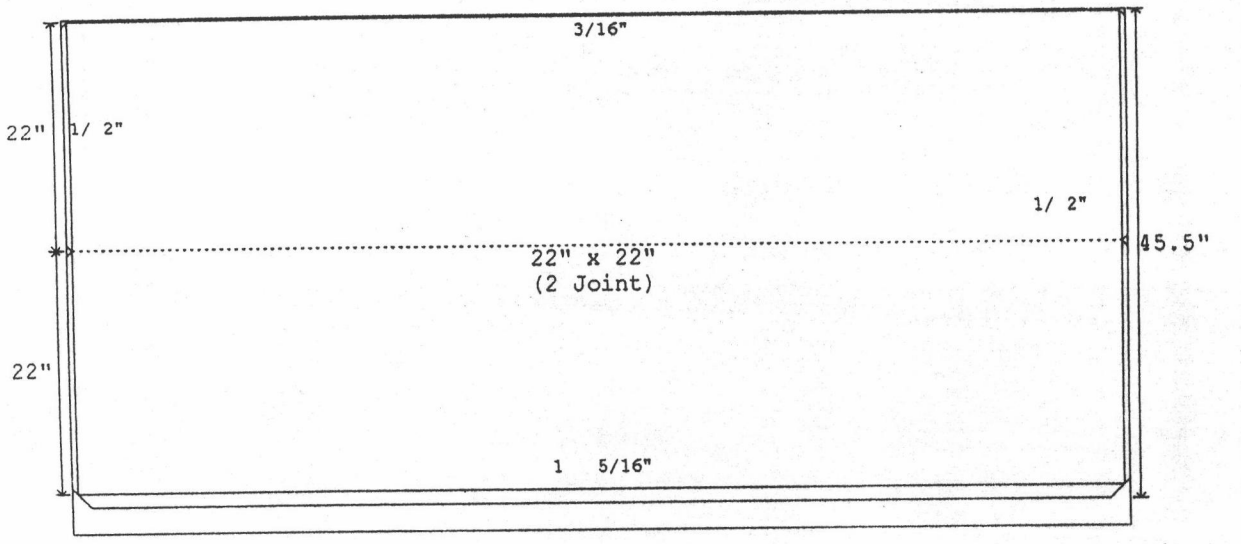


Gage #26 Amount - 1 sheet

รูปที่ ง.2 รูปแบบแผ่นคลี่ที่เหมาะสมของแผ่นสังกะสีเบอร์ 26 สำหรับท่อลมตรง ในตัวอย่างระบบท่อลมที่ 1



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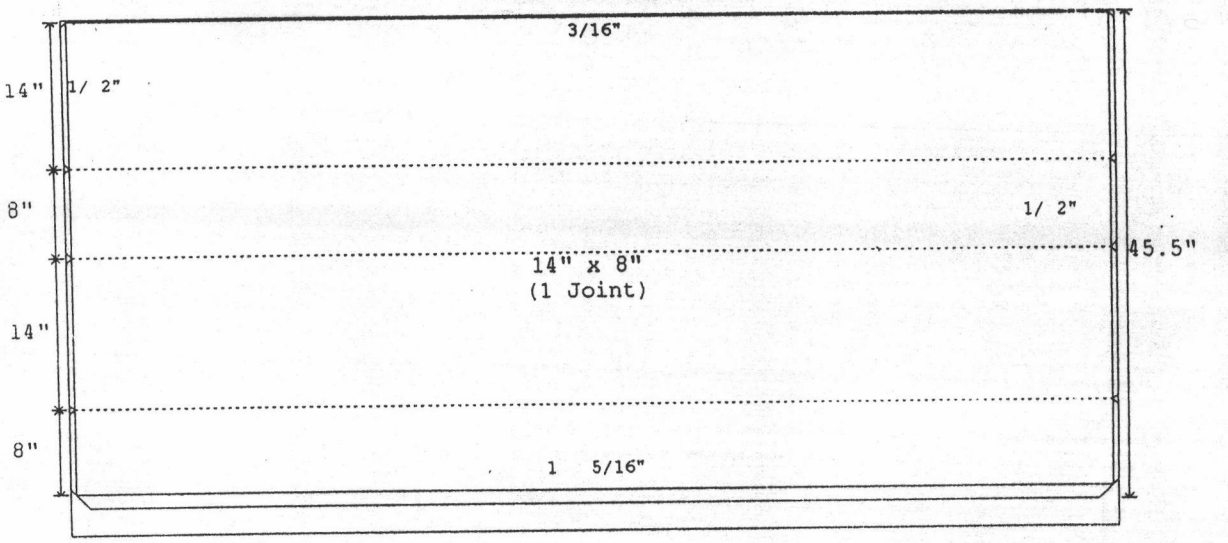

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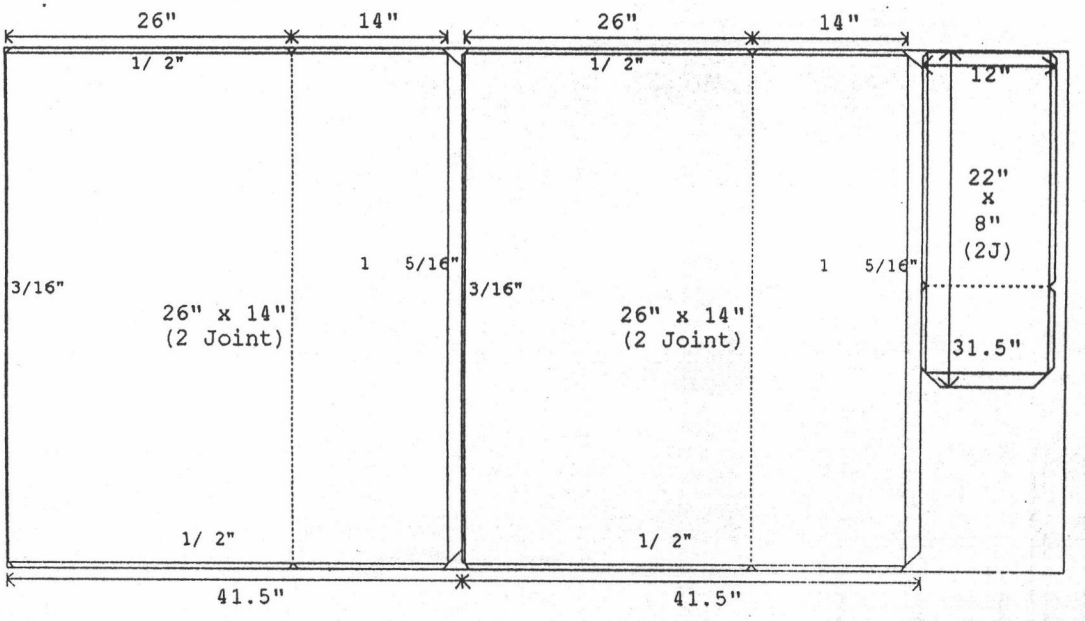
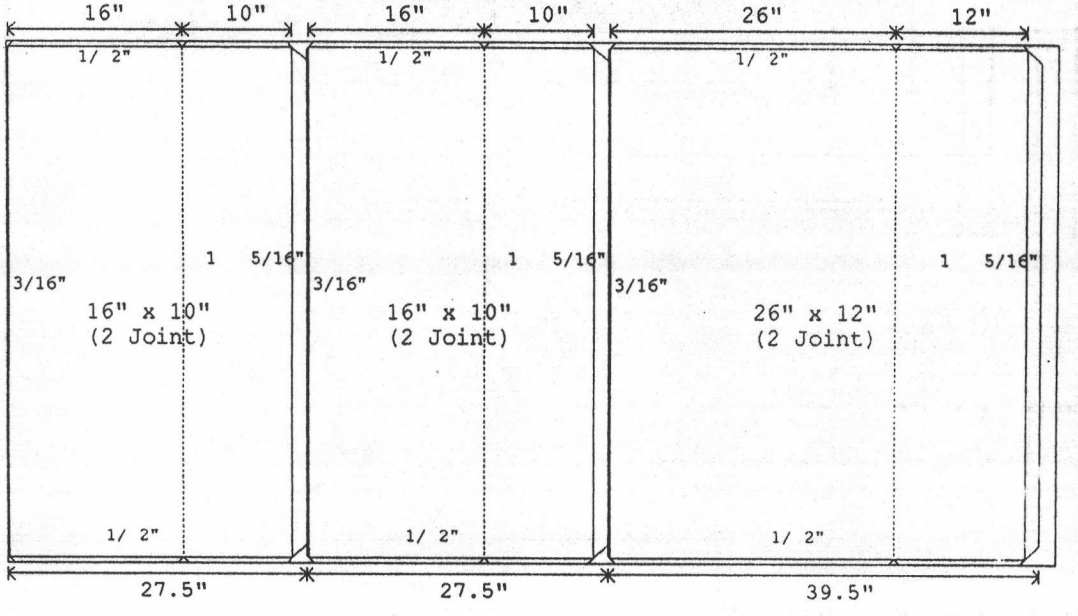
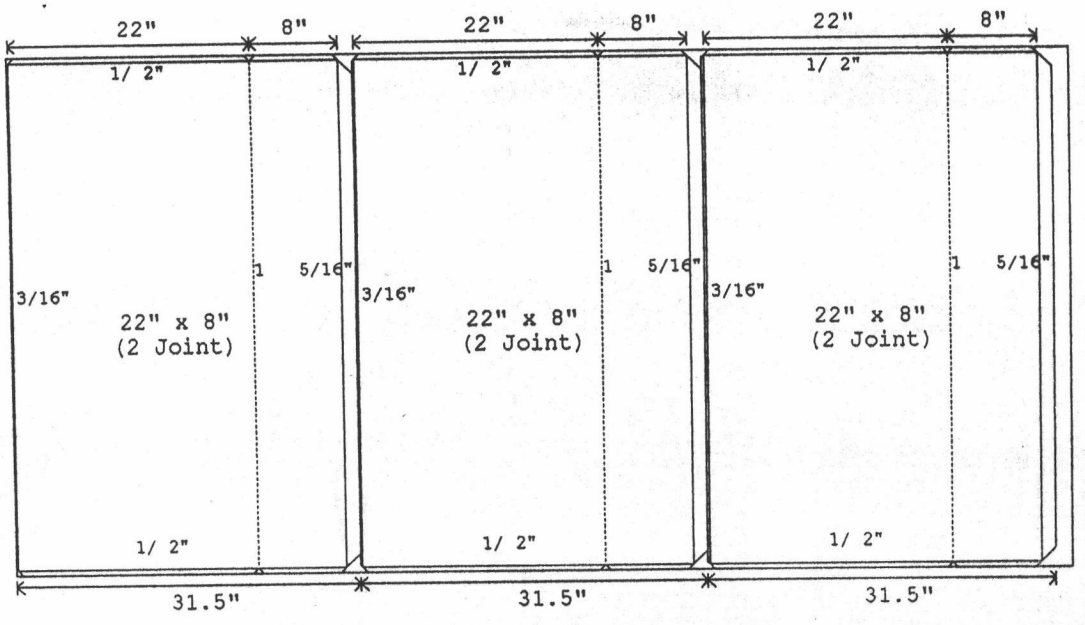


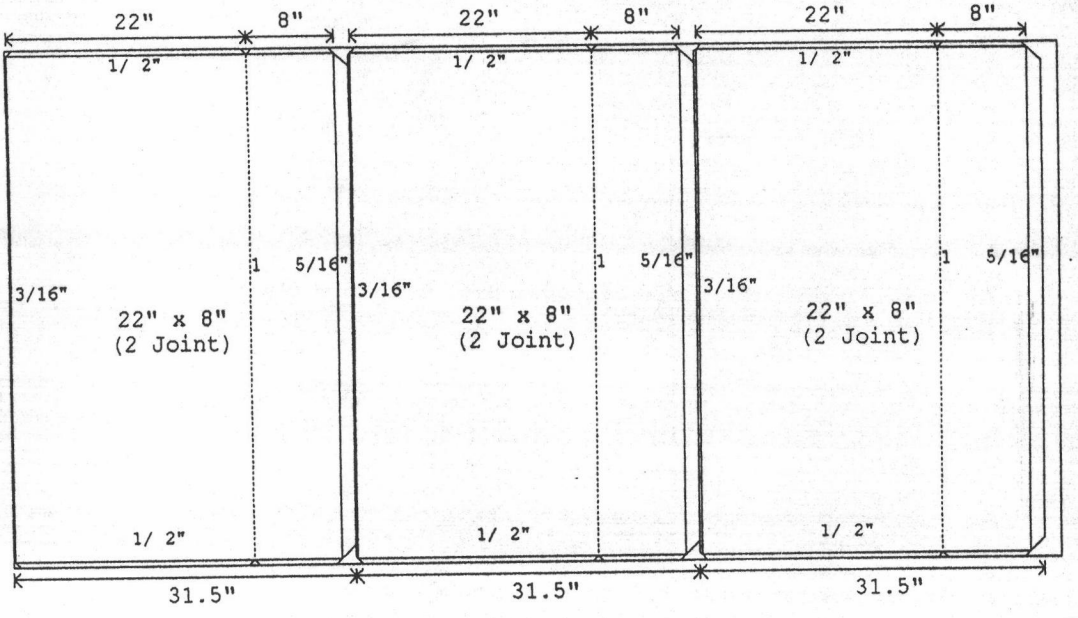
Gage #26 Amount - 1 sheet



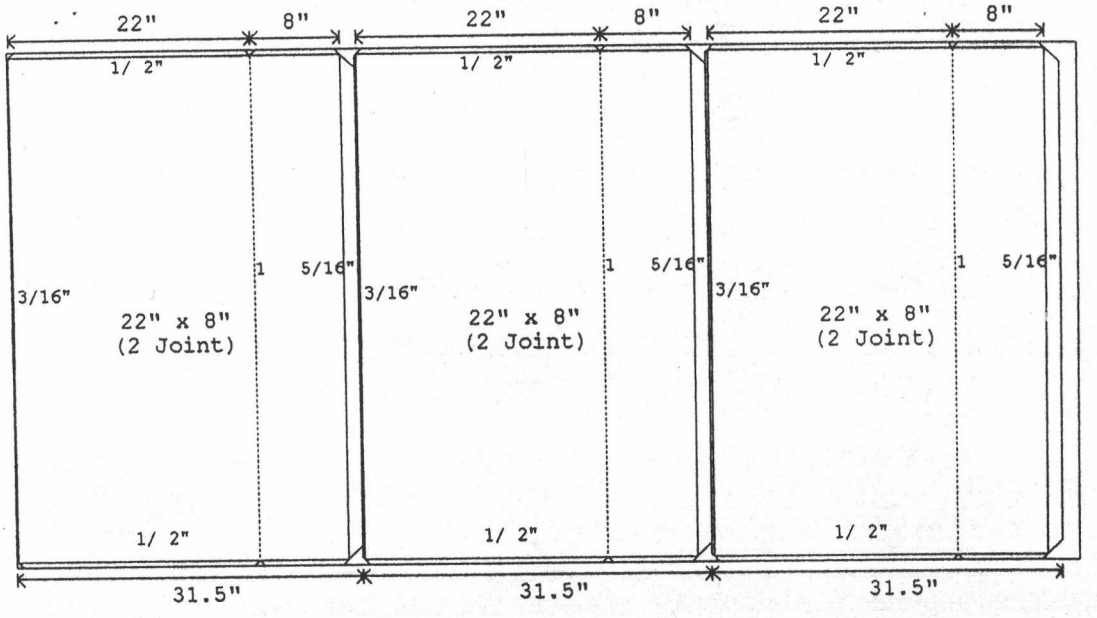
Gage #26 Amount - 3 sheets



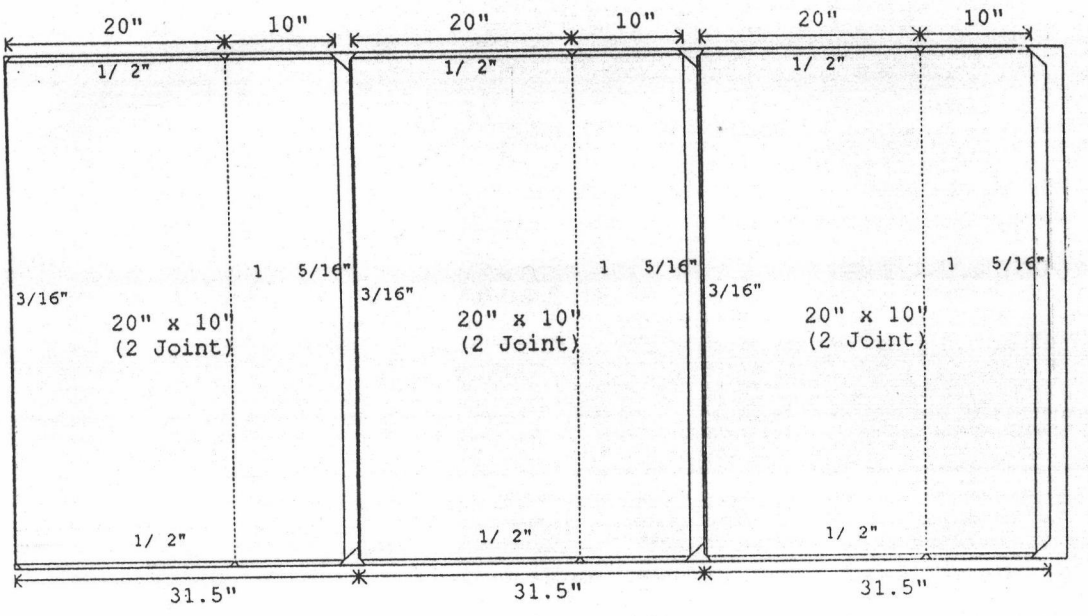
Gage #26 Amount - 8 sheets



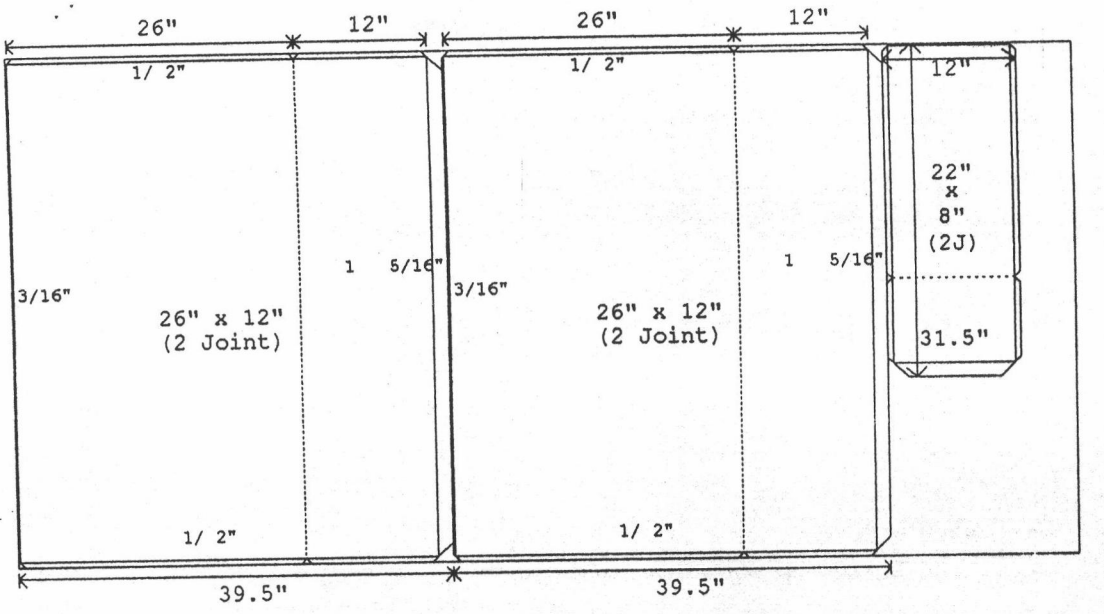
Gage #26 Amount - 8 sheets



Gage #26 Amount - 9 sheets



Gage #26 Amount - 2 sheets



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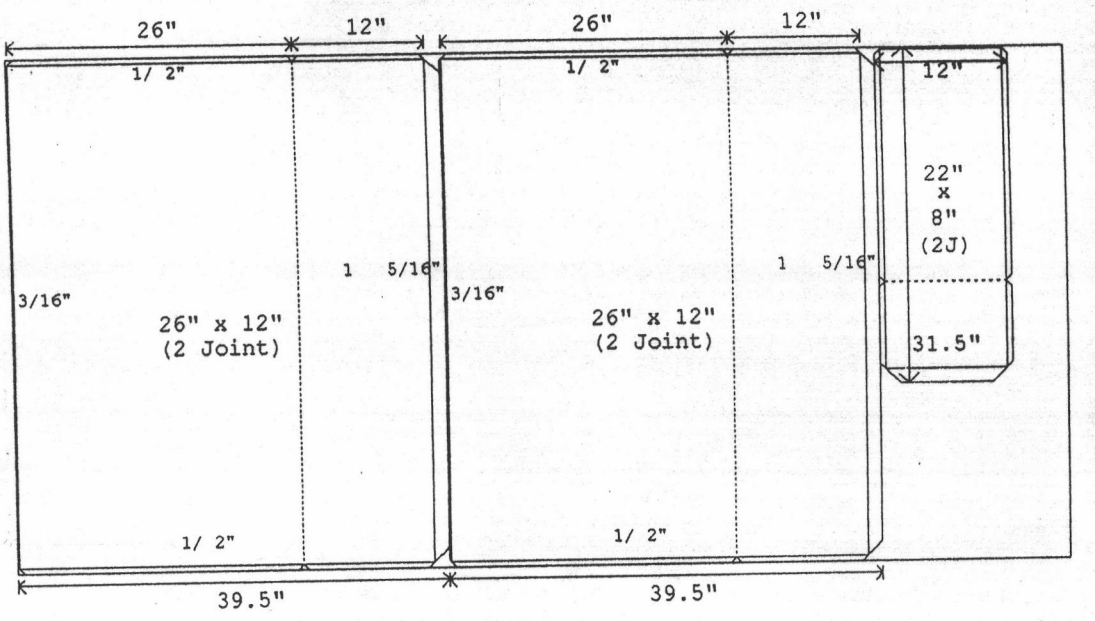

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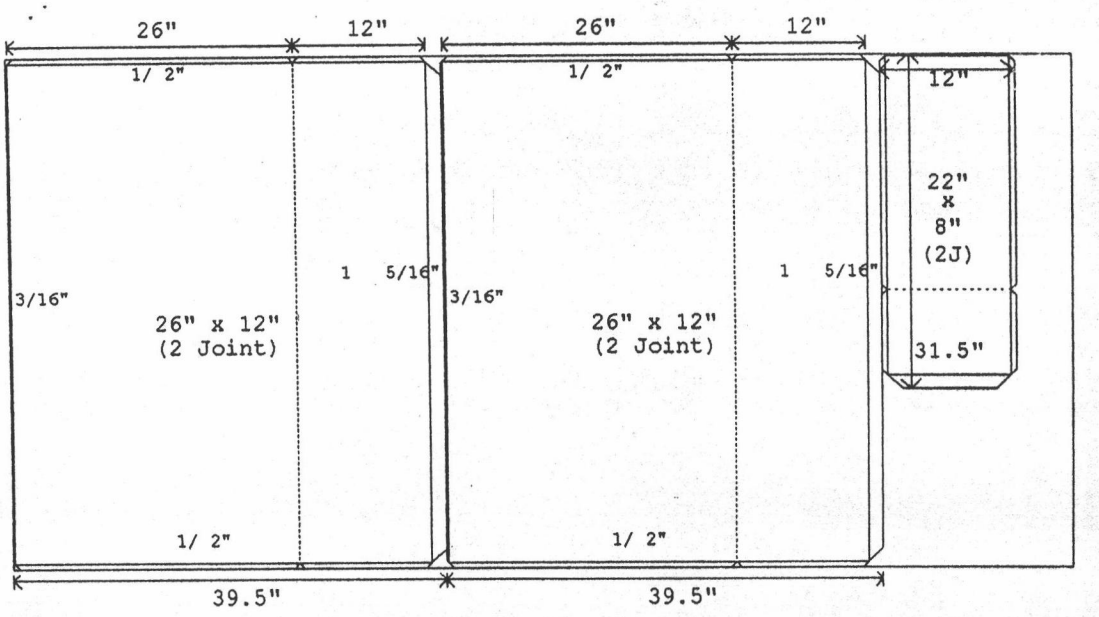

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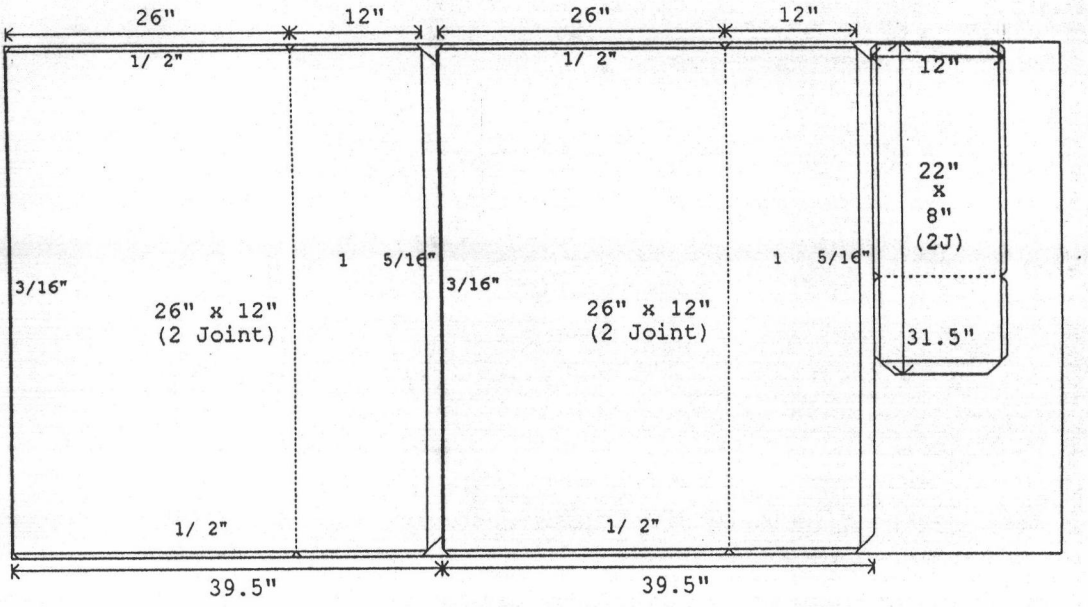

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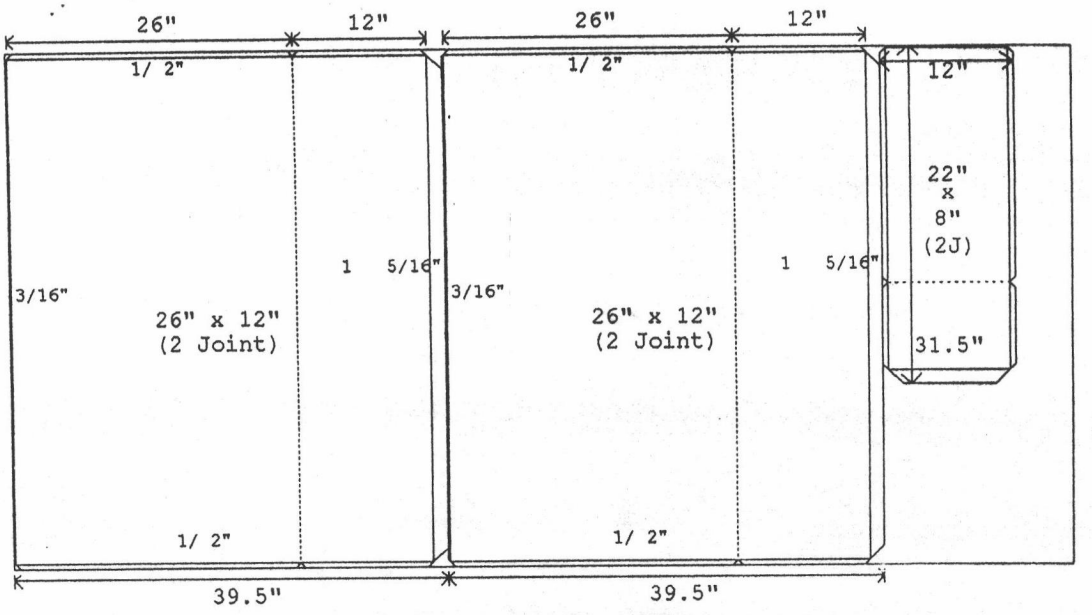

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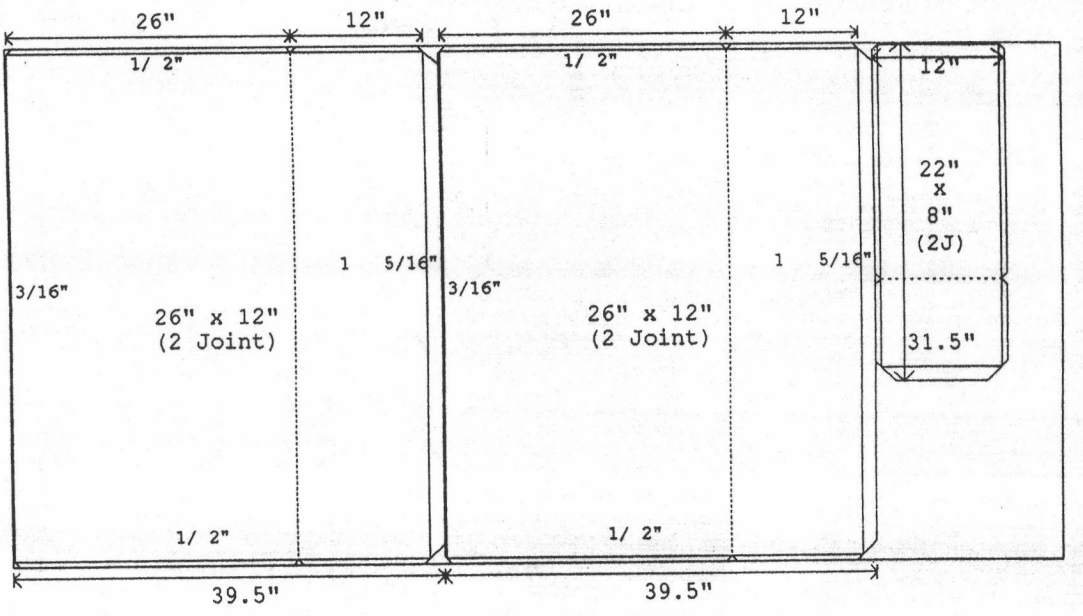

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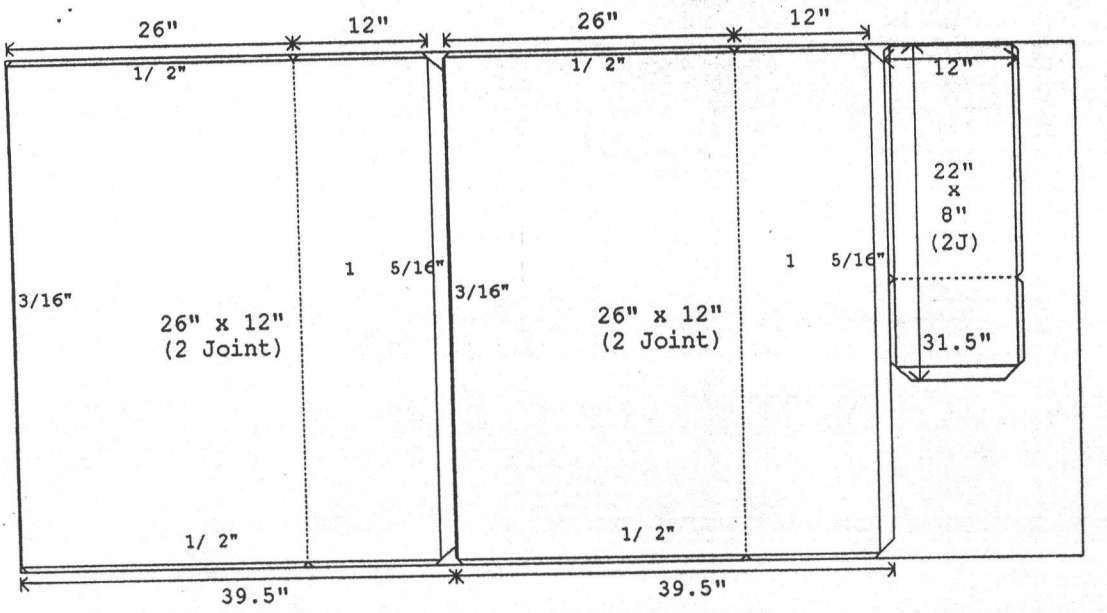

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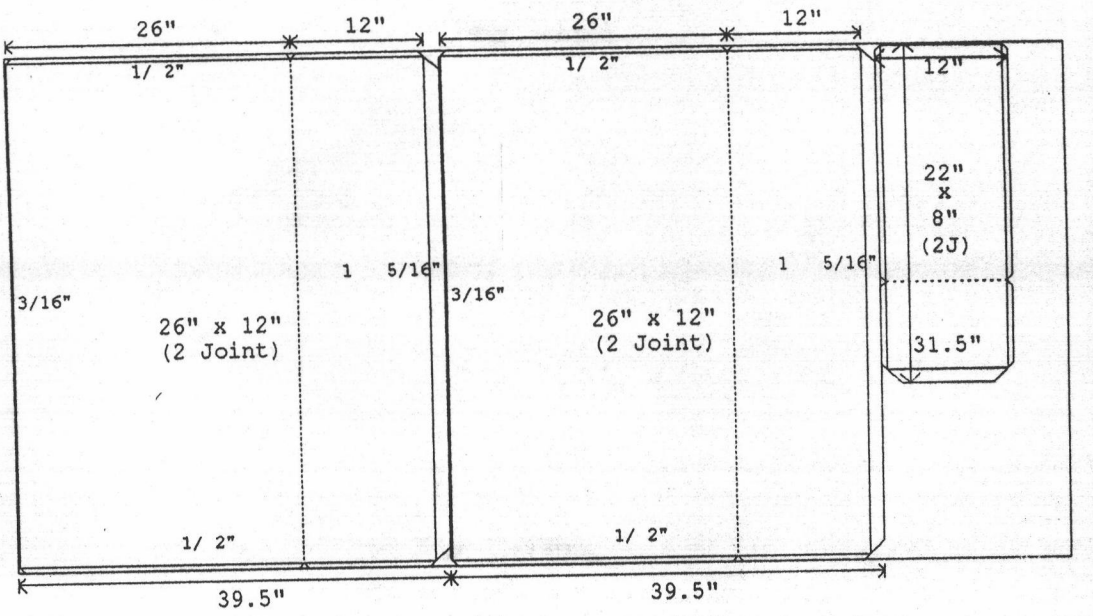

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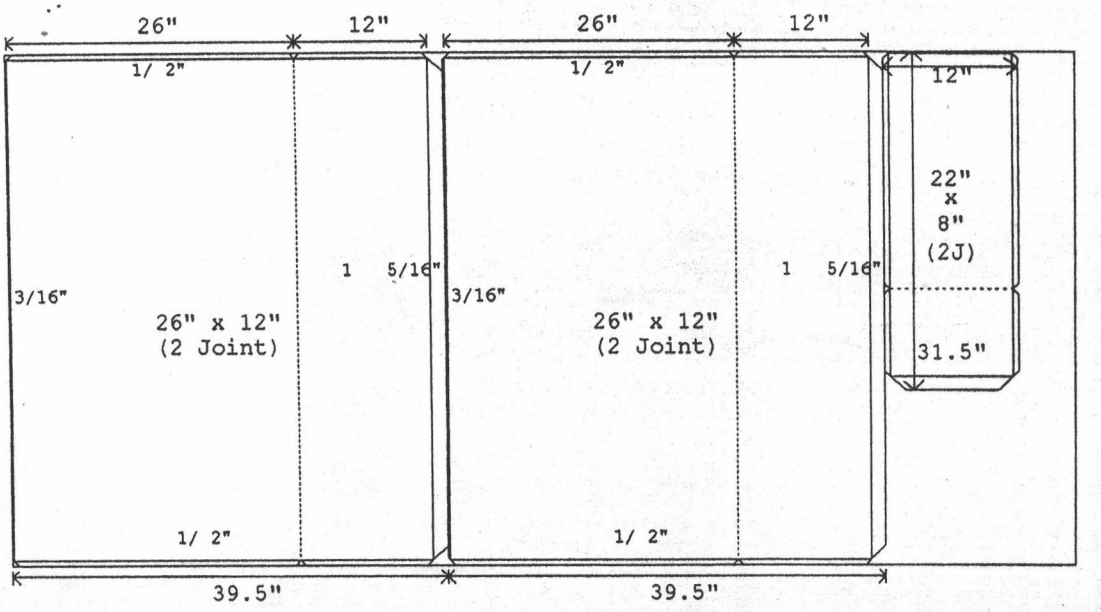

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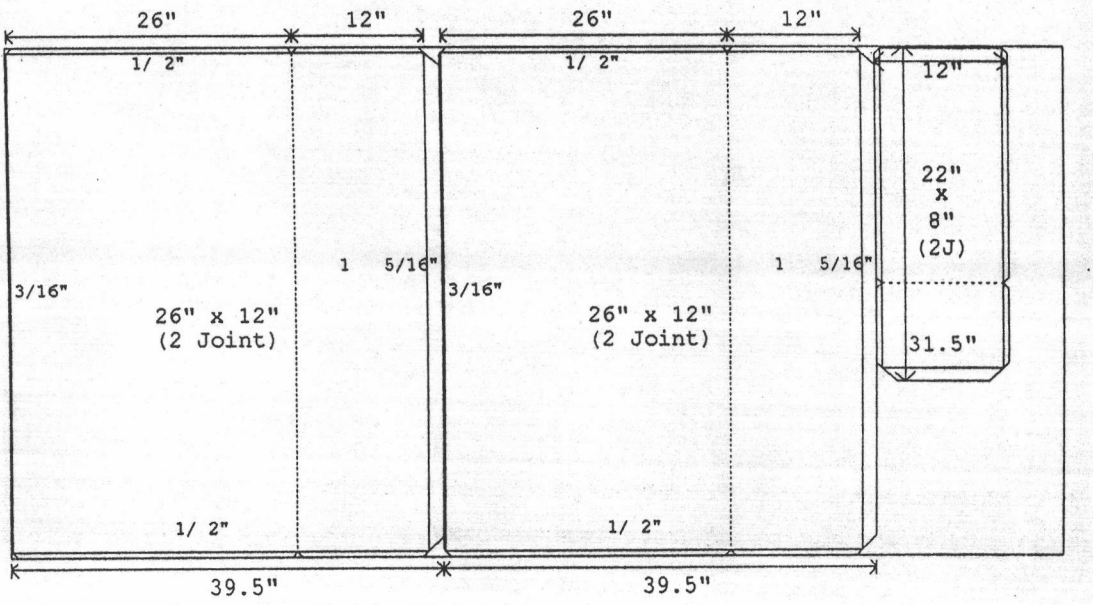

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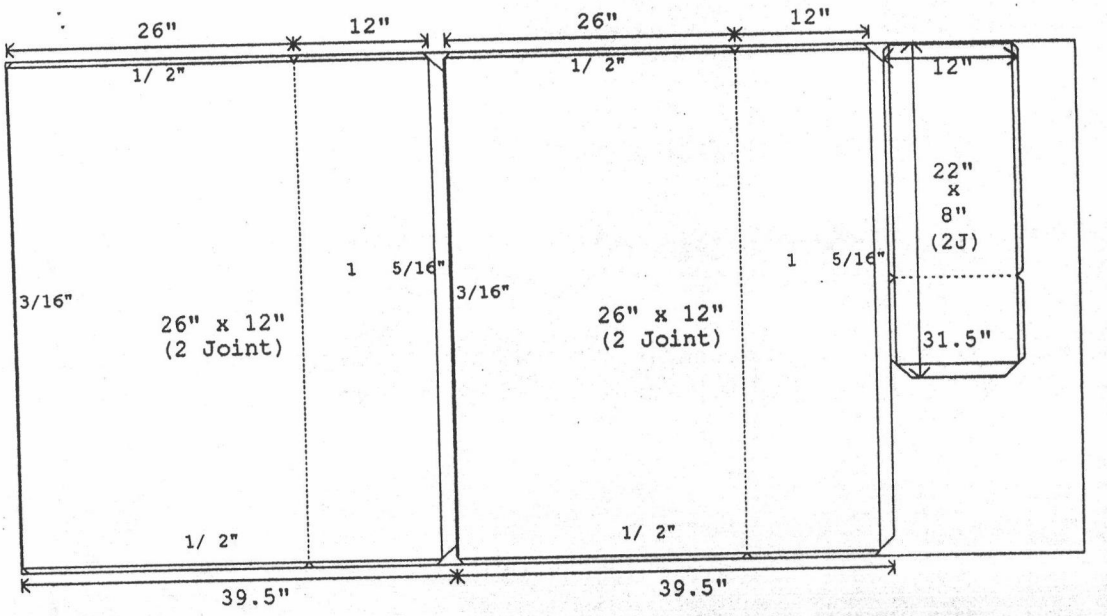

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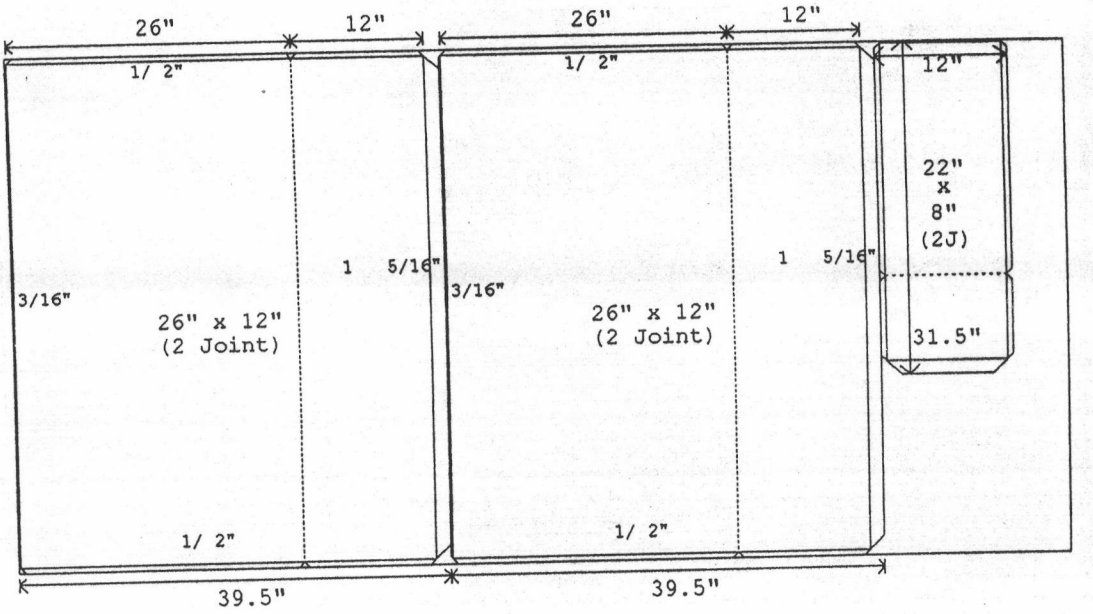

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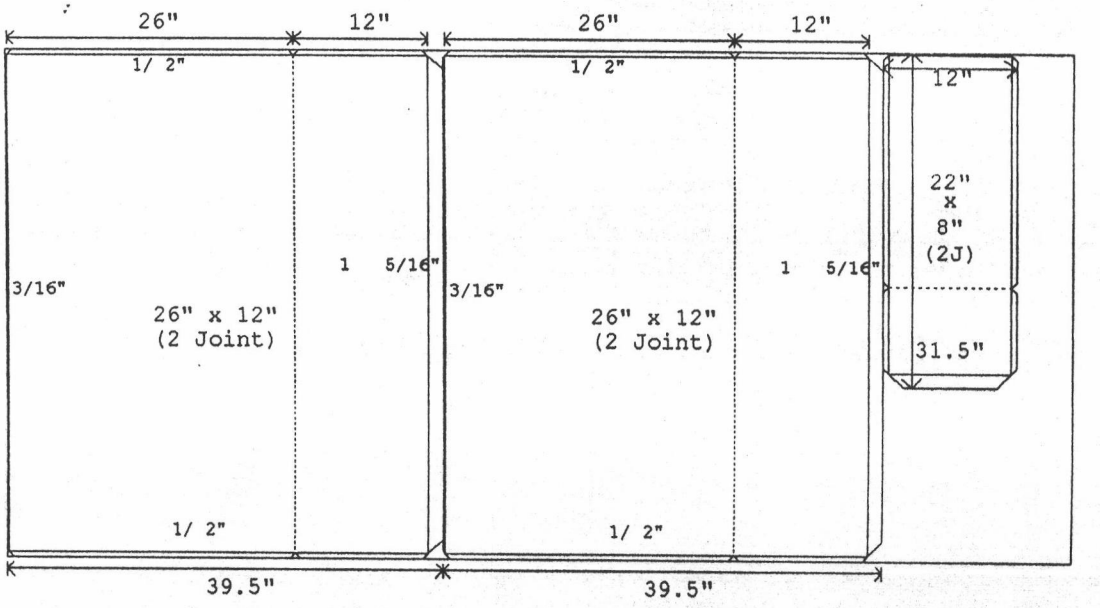

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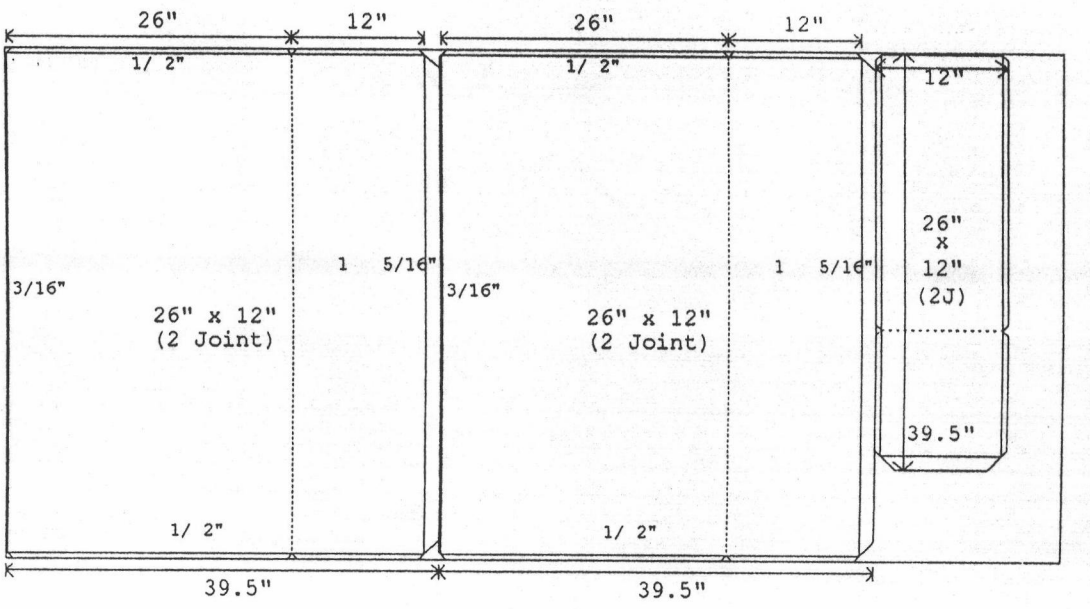

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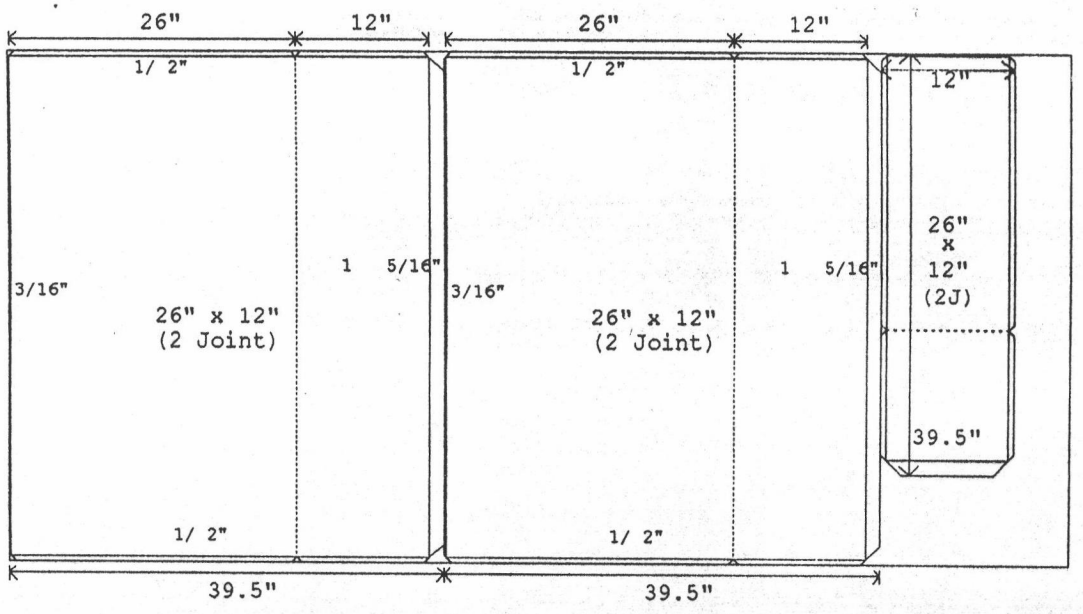

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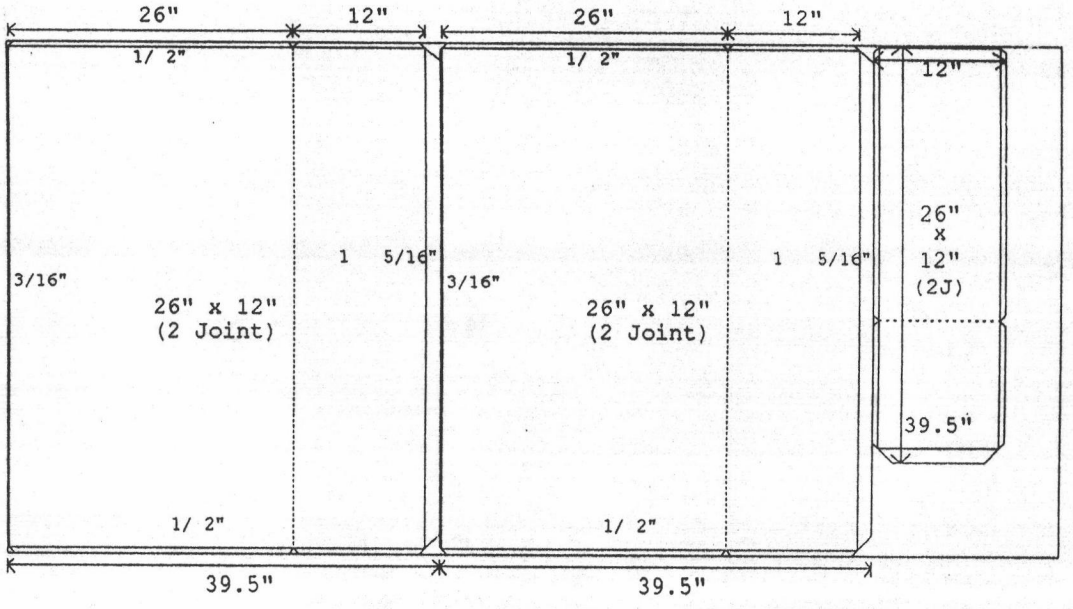

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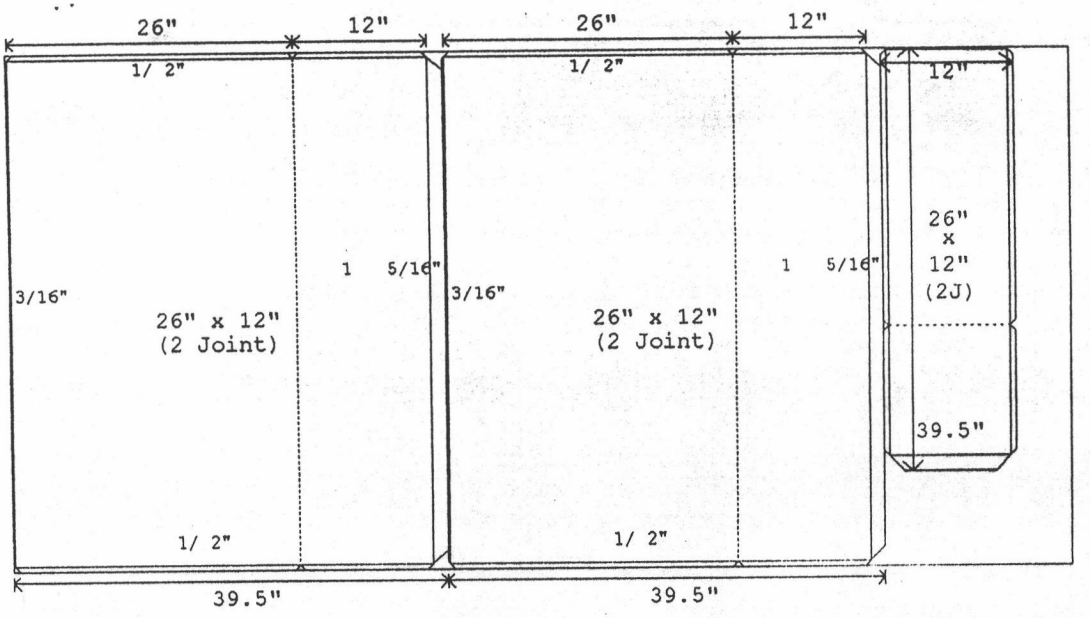

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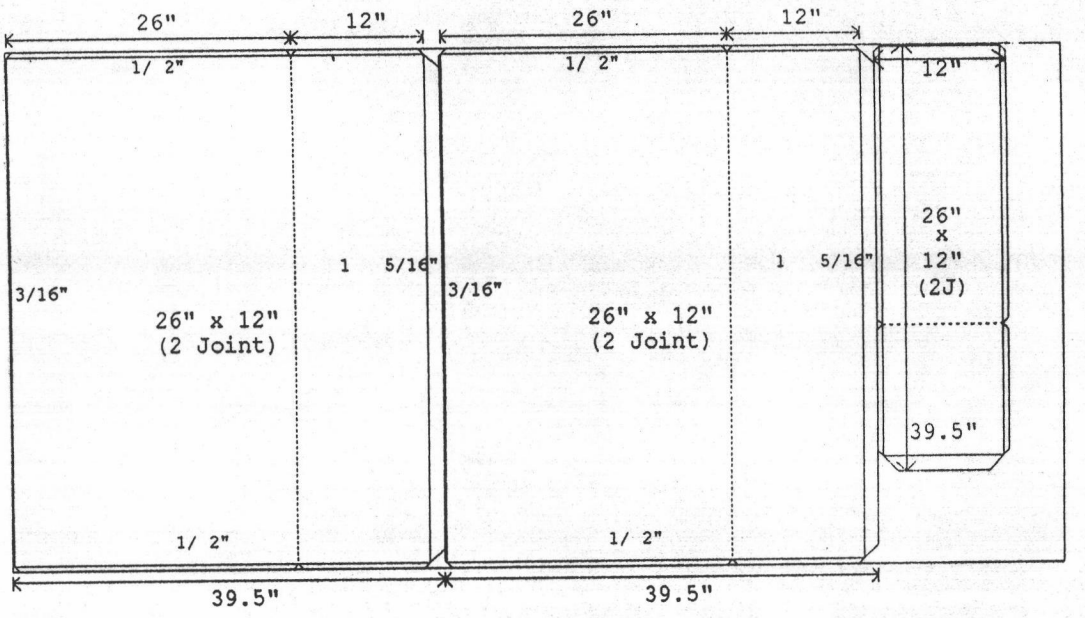

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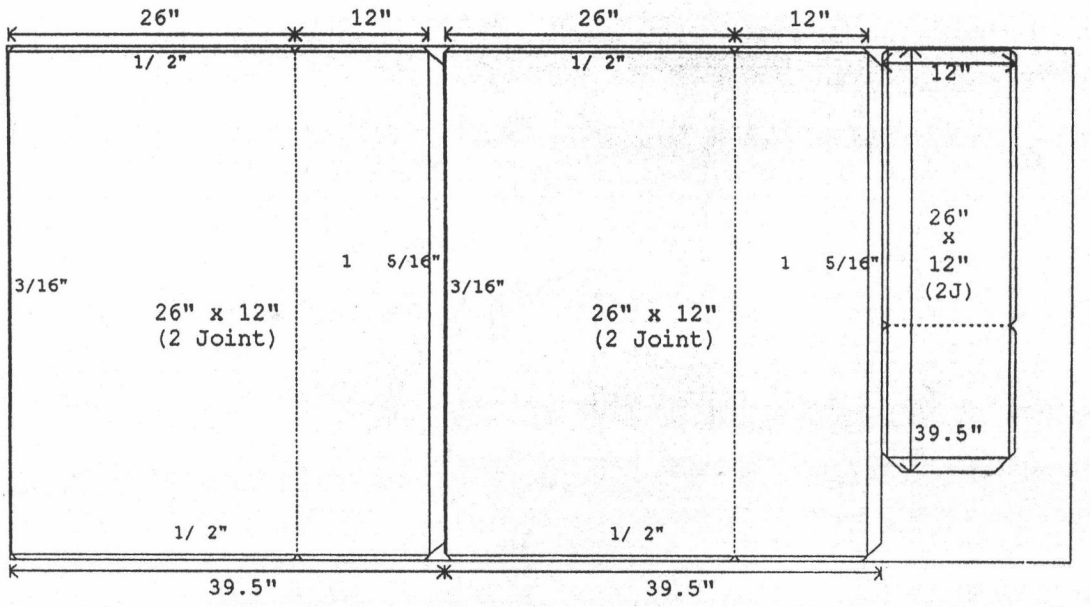

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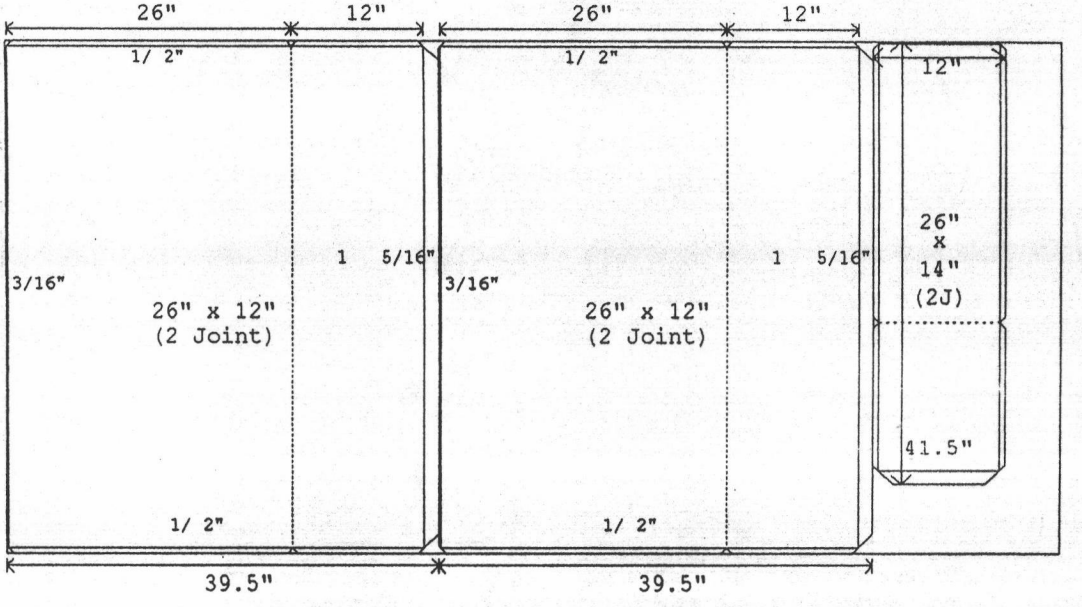

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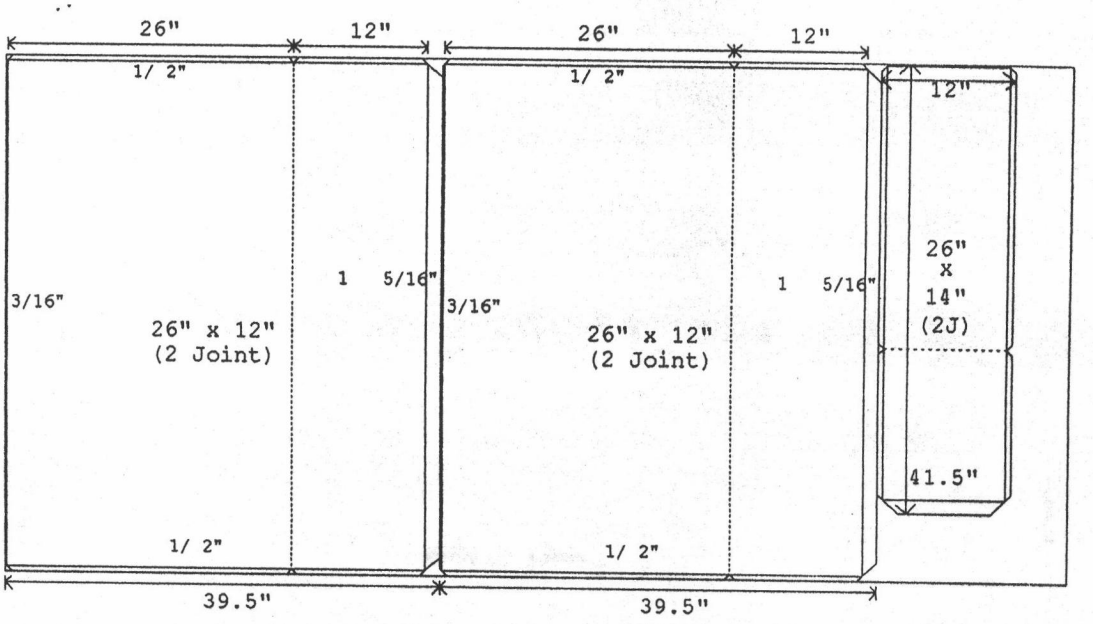

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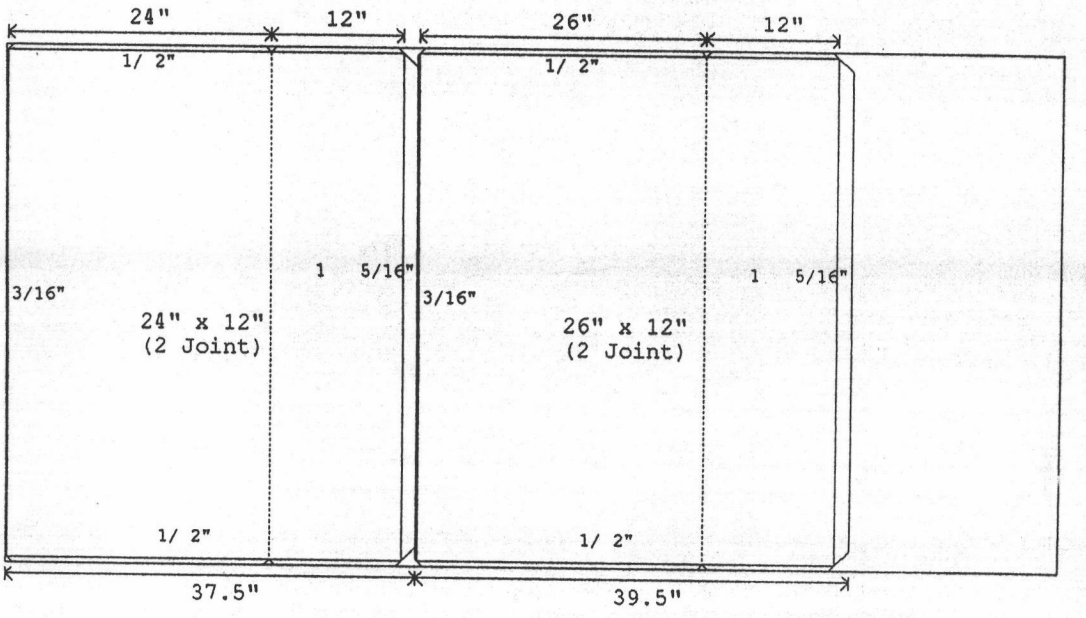

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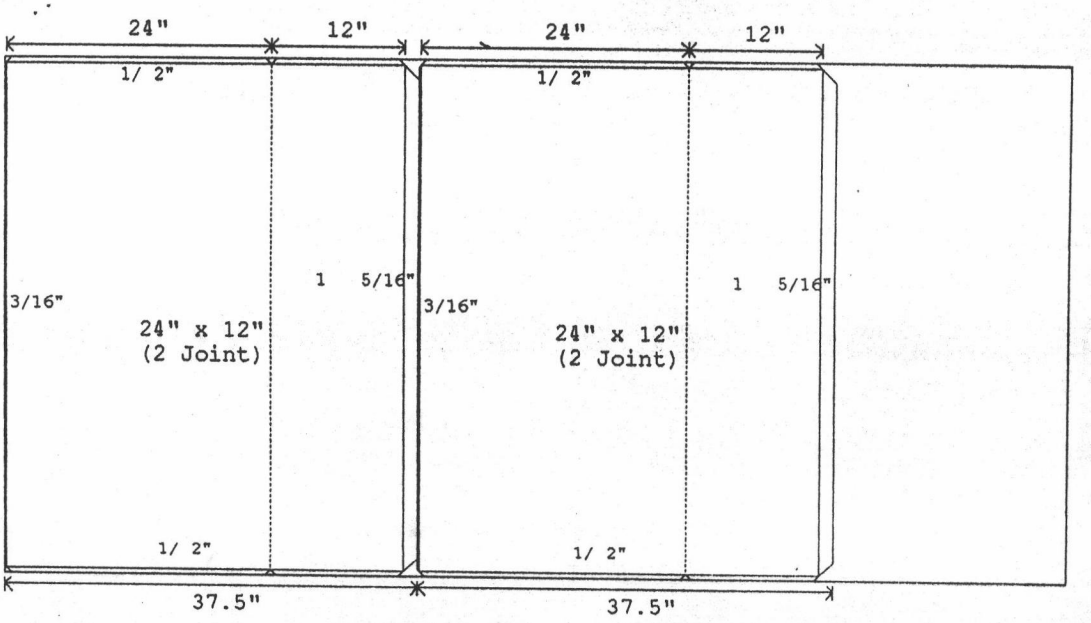

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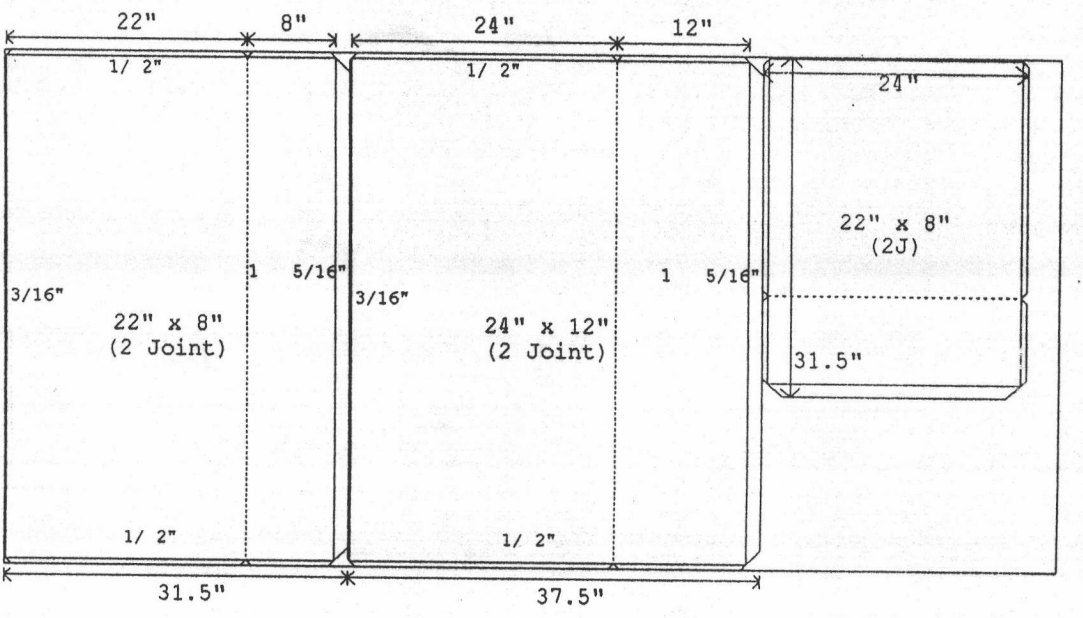

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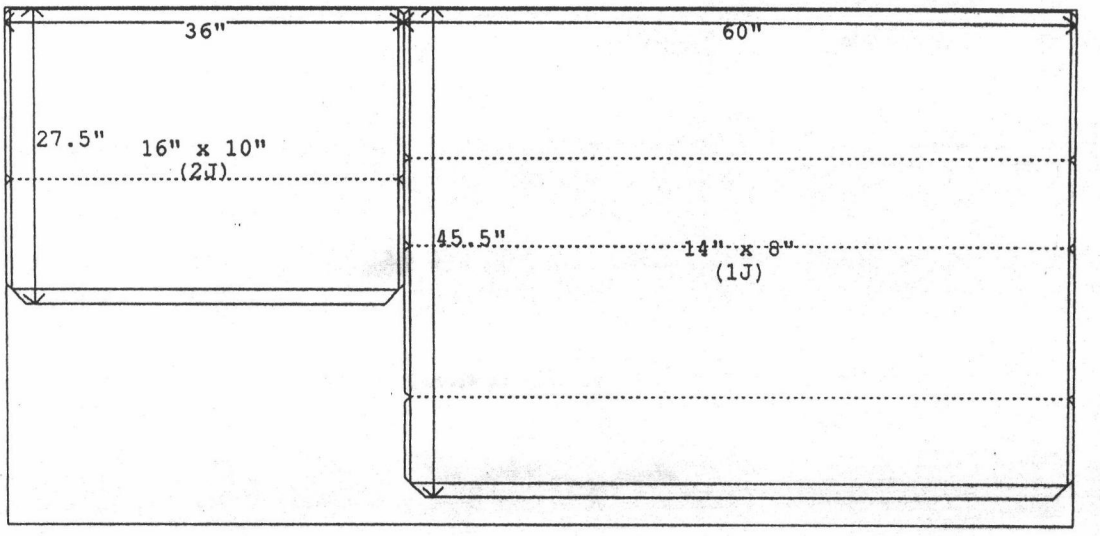

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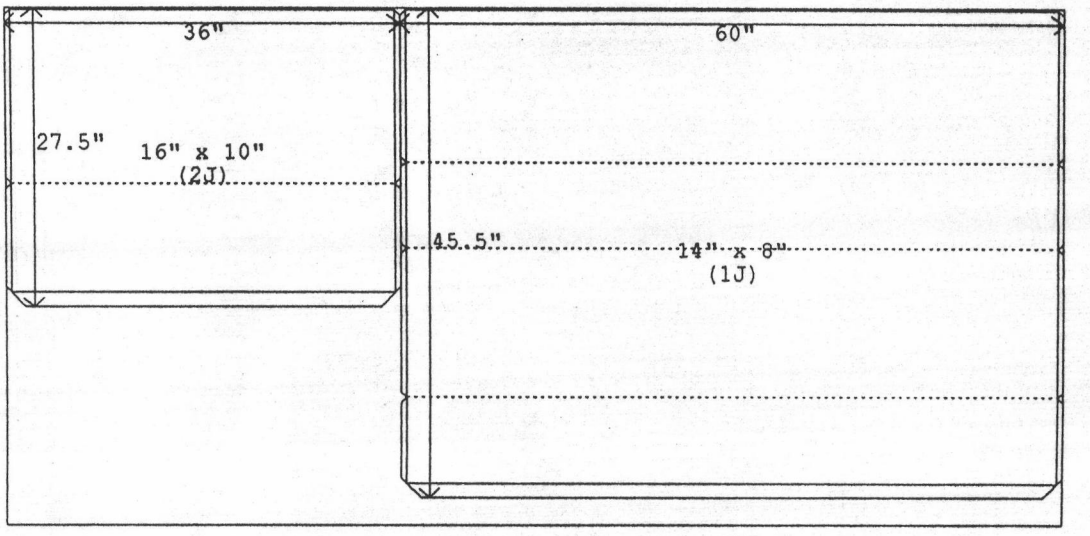

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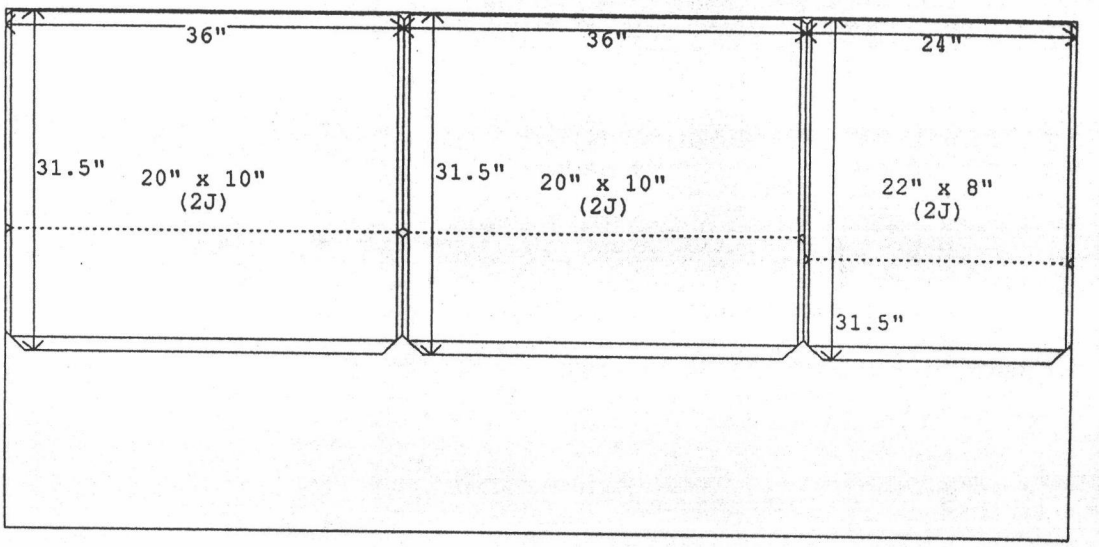

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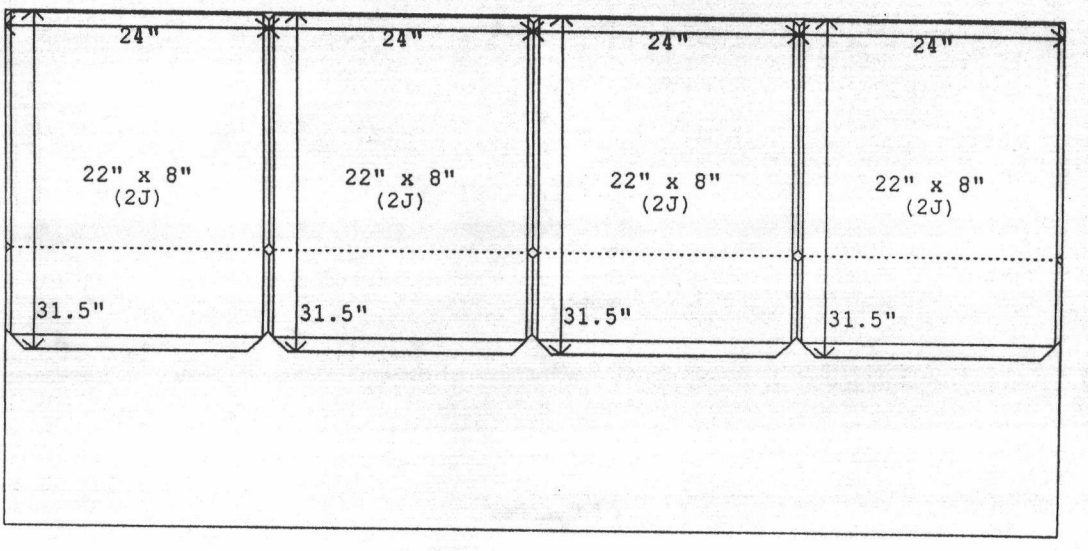

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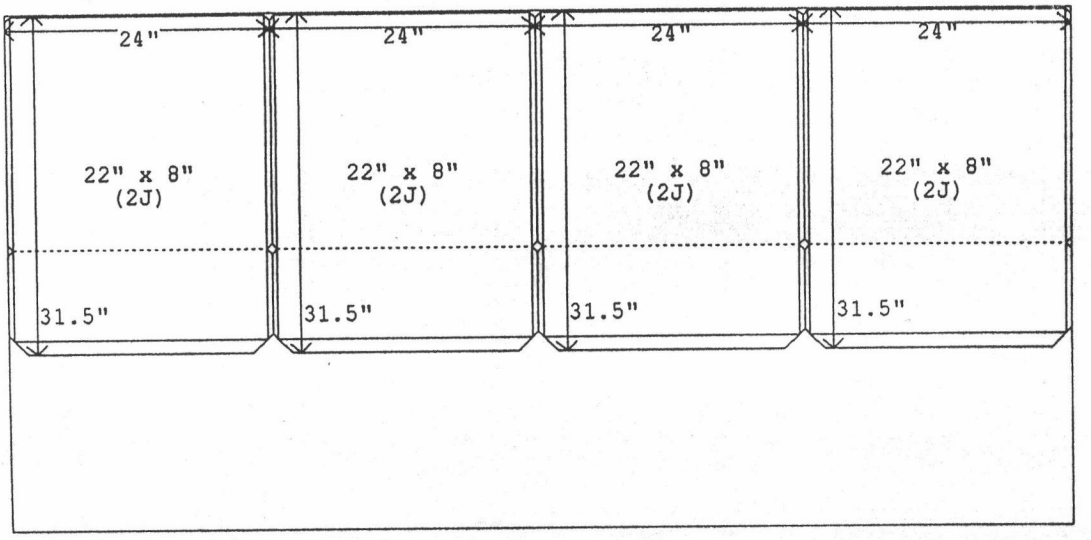
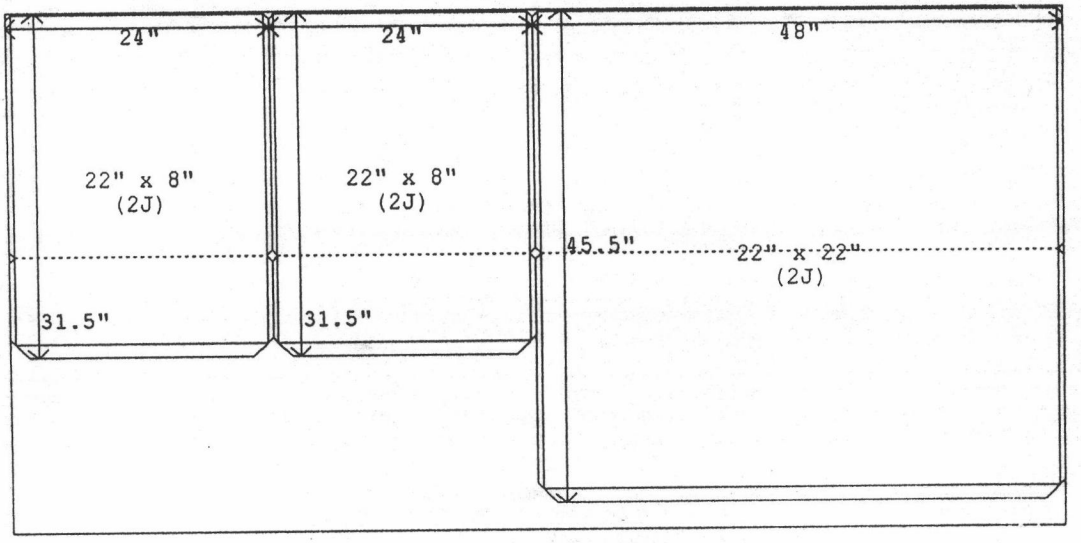
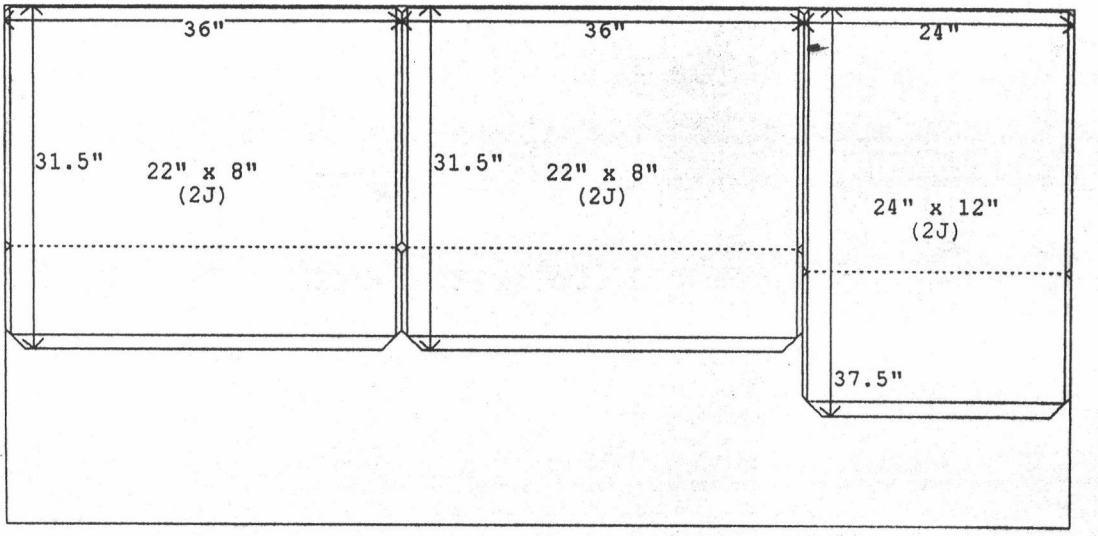


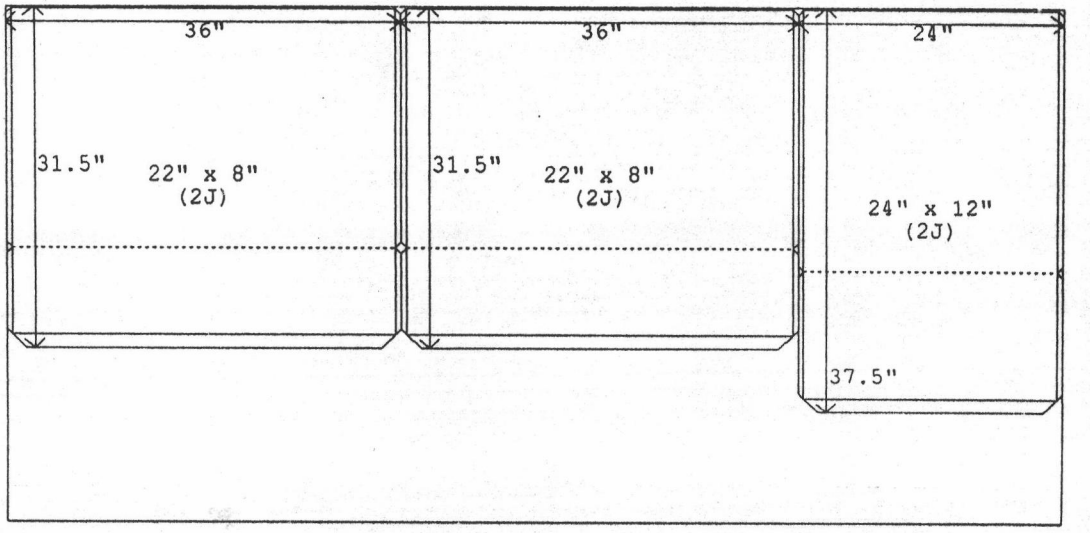
Gage #26 Amount - 1 sheet



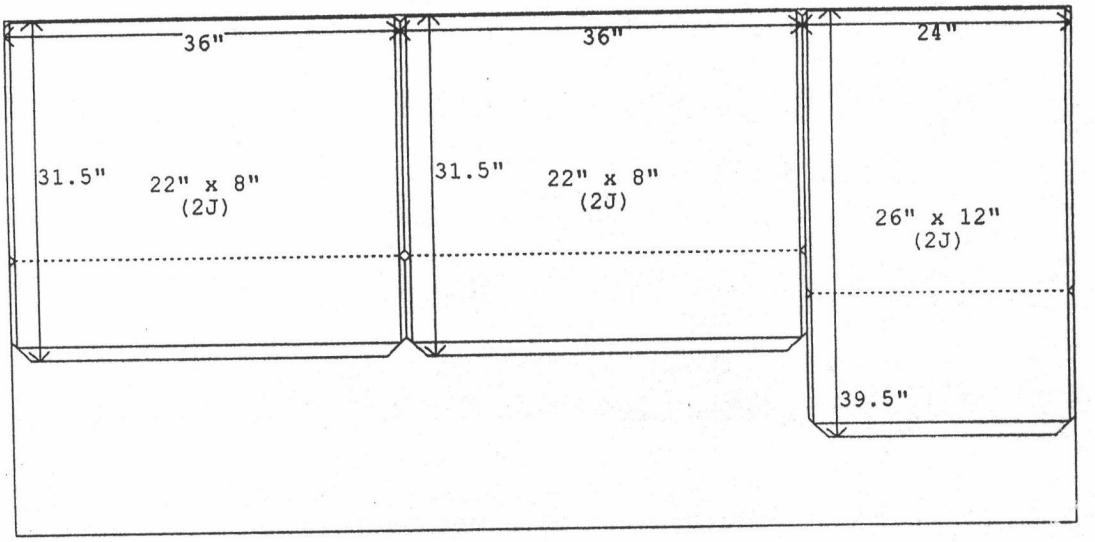
Gage #26 Amount - 1 sheet



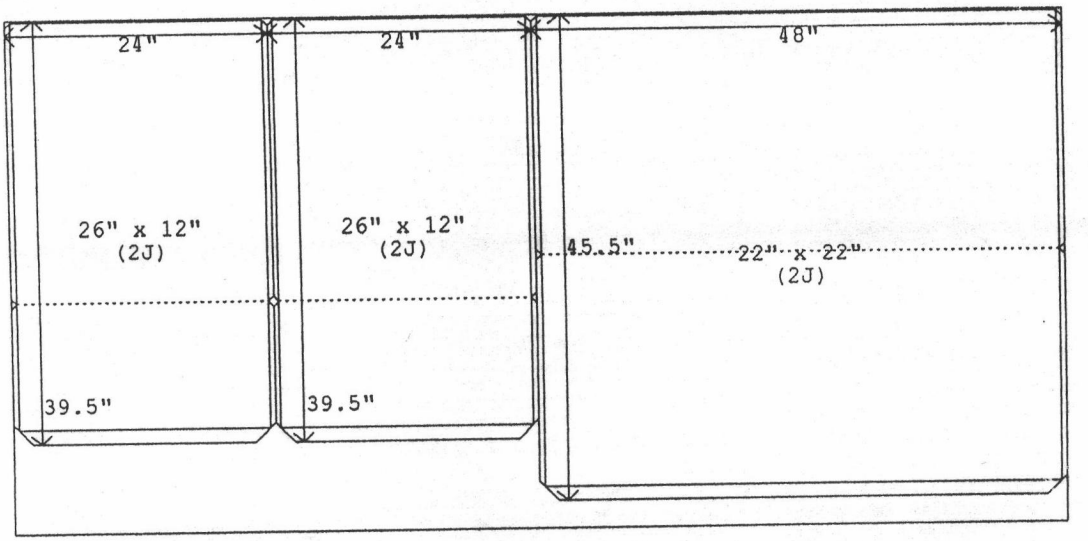
Gage #26 Amount - 1 sheet



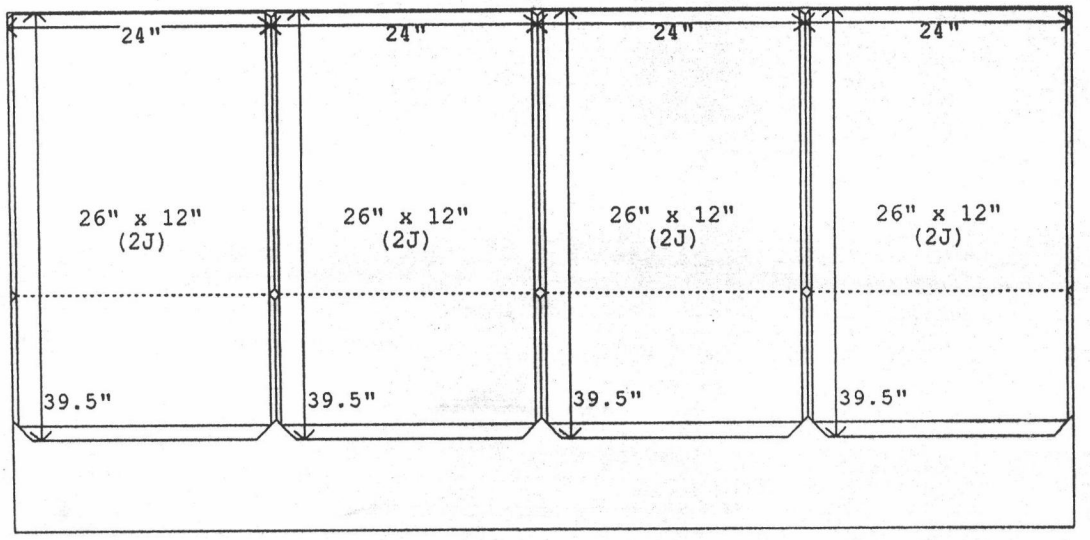
Gage #26 Amount - 1 sheet



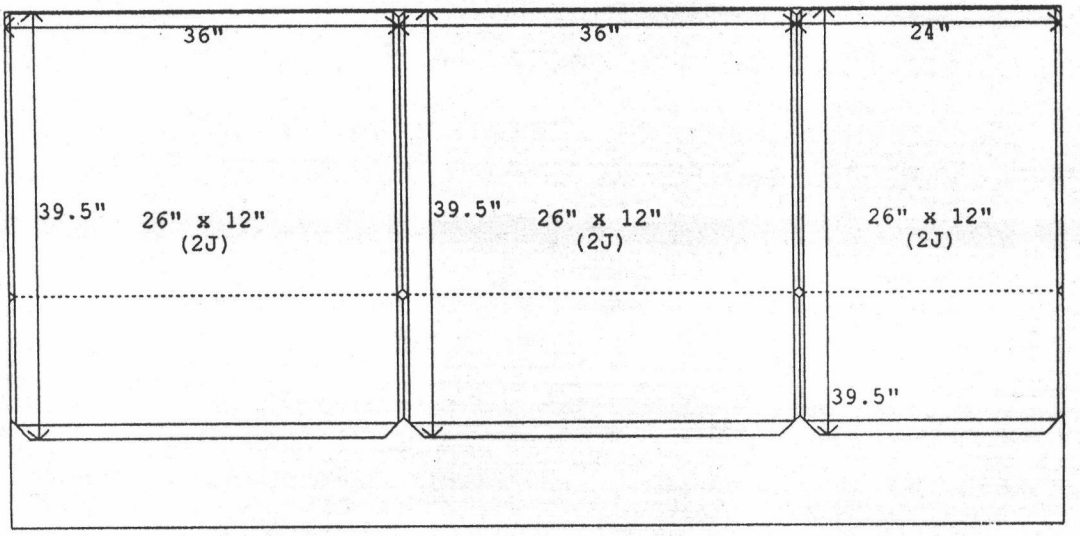
Gage #26 Amount - 1 sheet



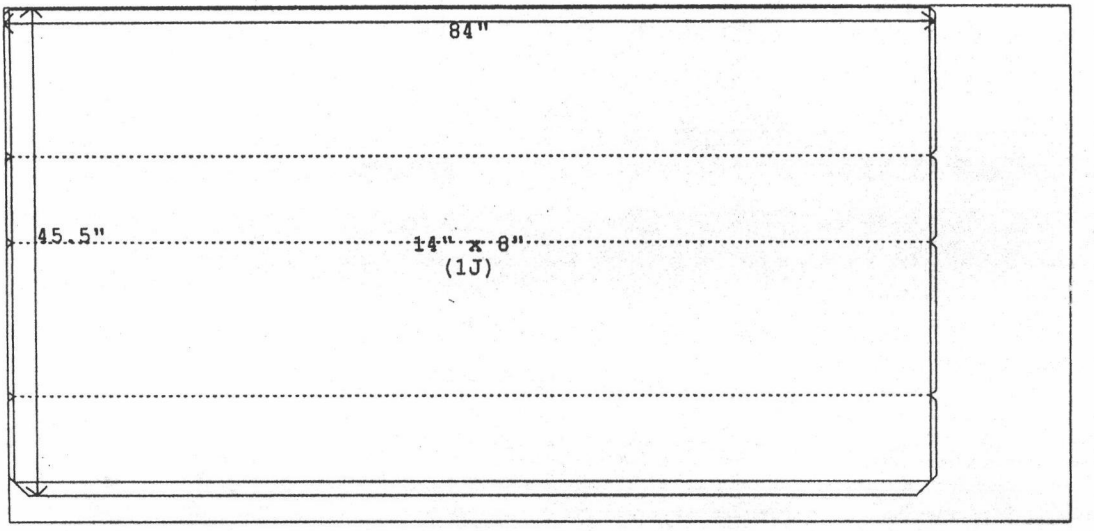
Gage #26 Amount - 1 sheet



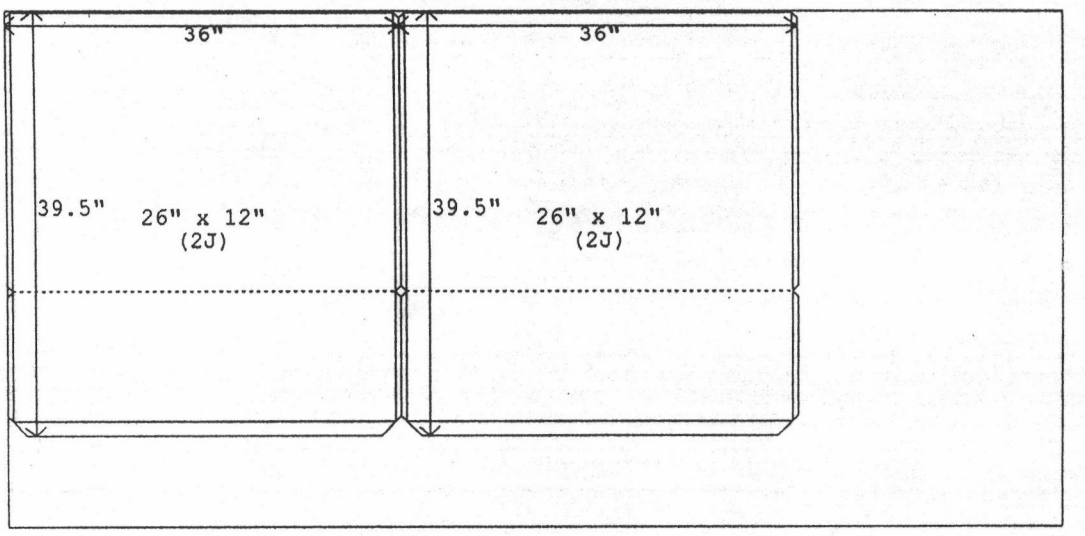
Gage #26 Amount - 1 sheet



Gage #26 Amount - 1 sheet

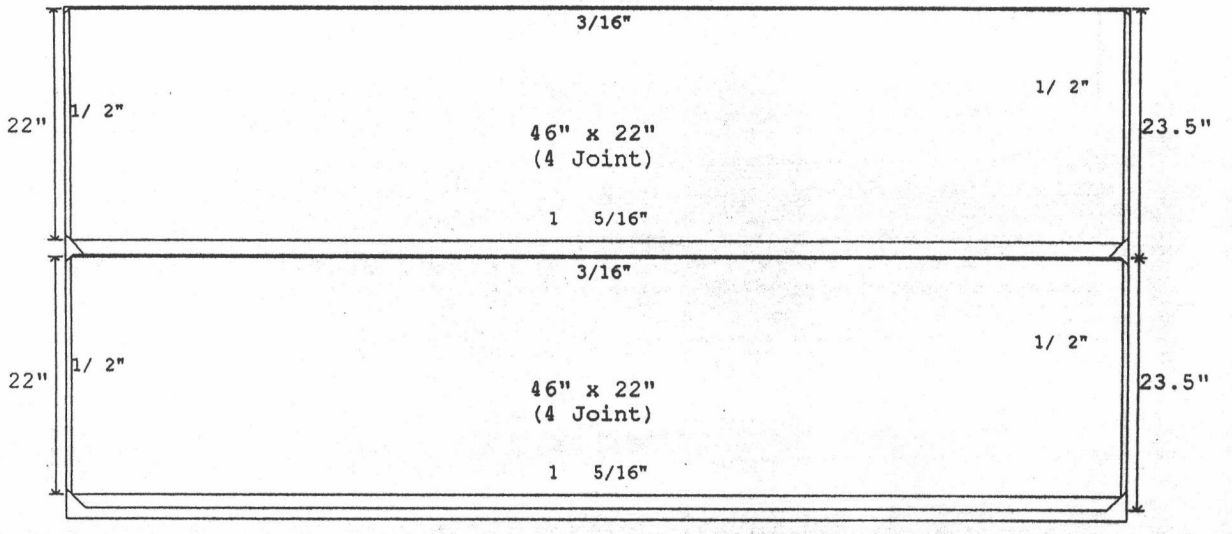


Gage #26 Amount - 1 sheet

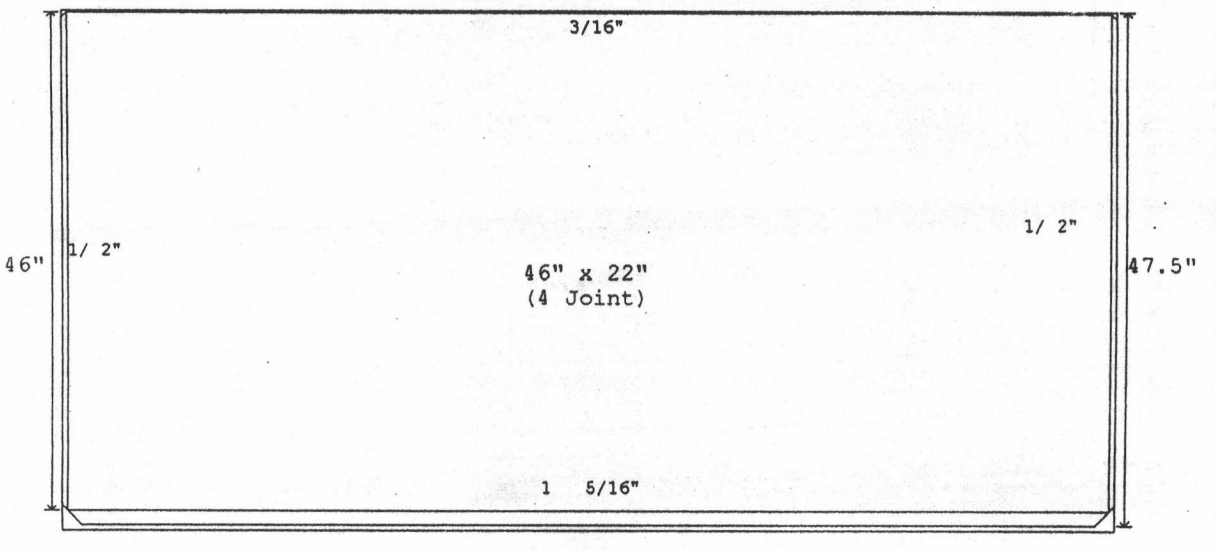


Gage #26 Amount - 1 sheet **Total Gage#26 - 72 sheets**

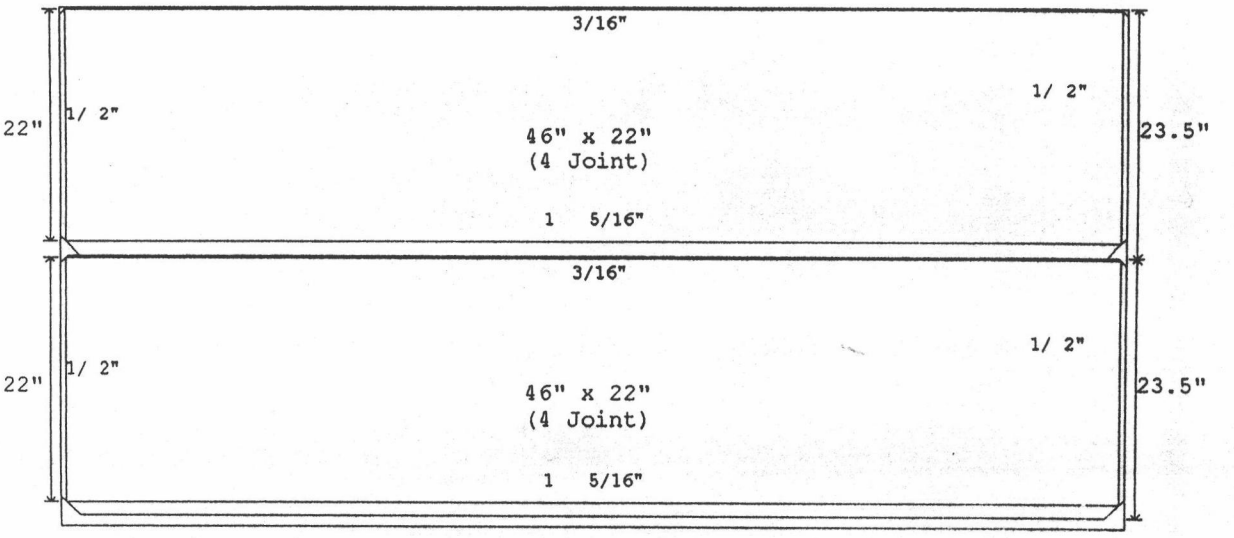
รูปที่ ง.3 รูปแบบแผ่นคลี่ที่เหมาะสมของแผ่นสังกะสีเบอร์ 24 สำหรับท่อลมตรง ในตัวอย่างระบบท่อลมที่ 1



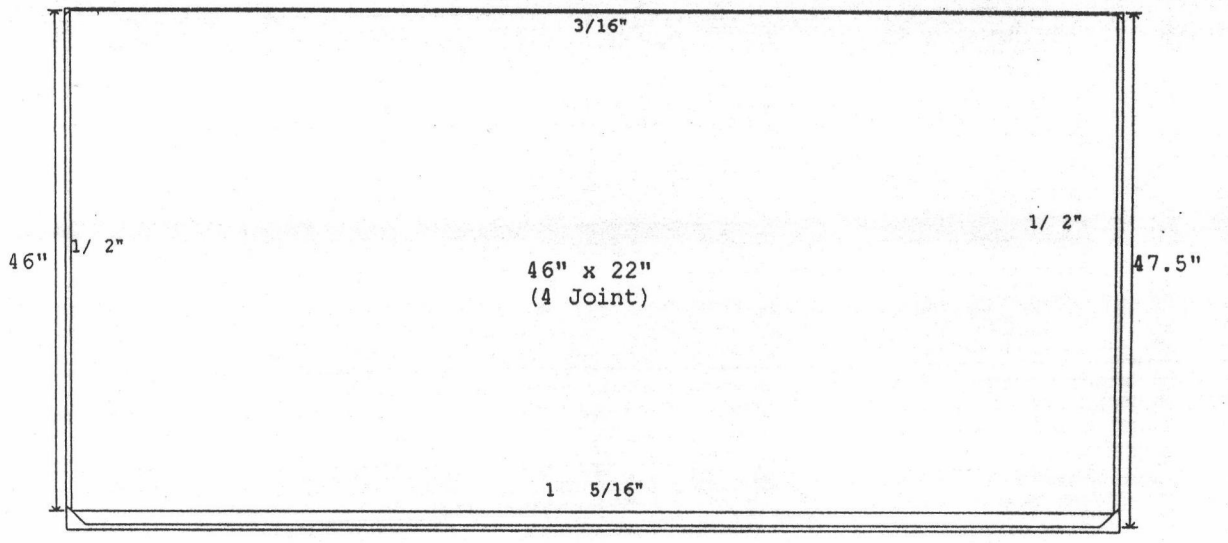
Gage #24 Amount - 6 sheets



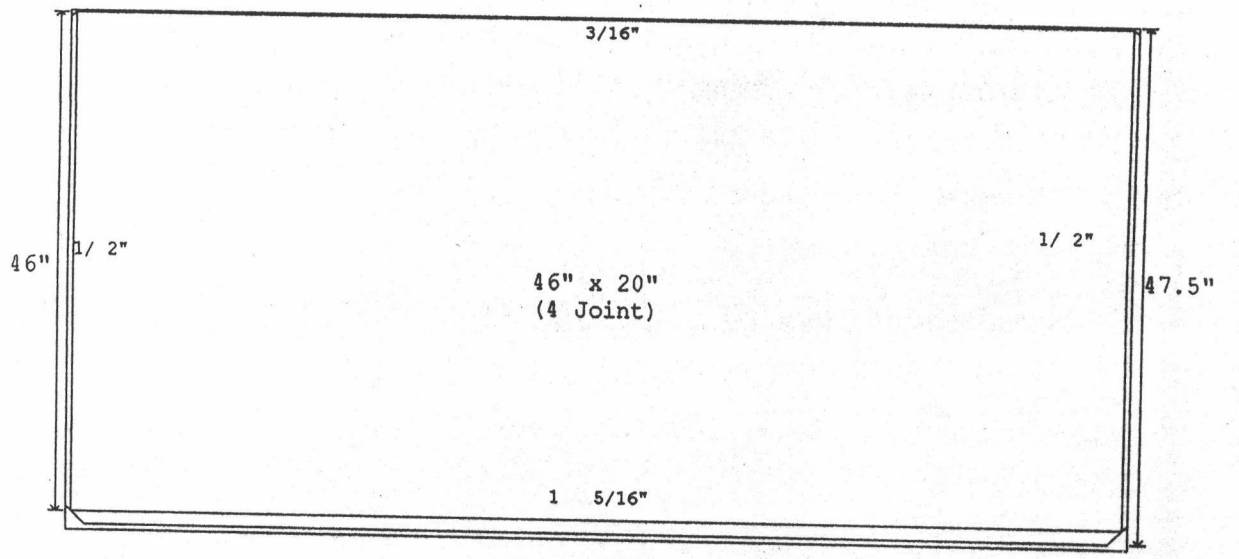
Gage #24 Amount - 12 sheets



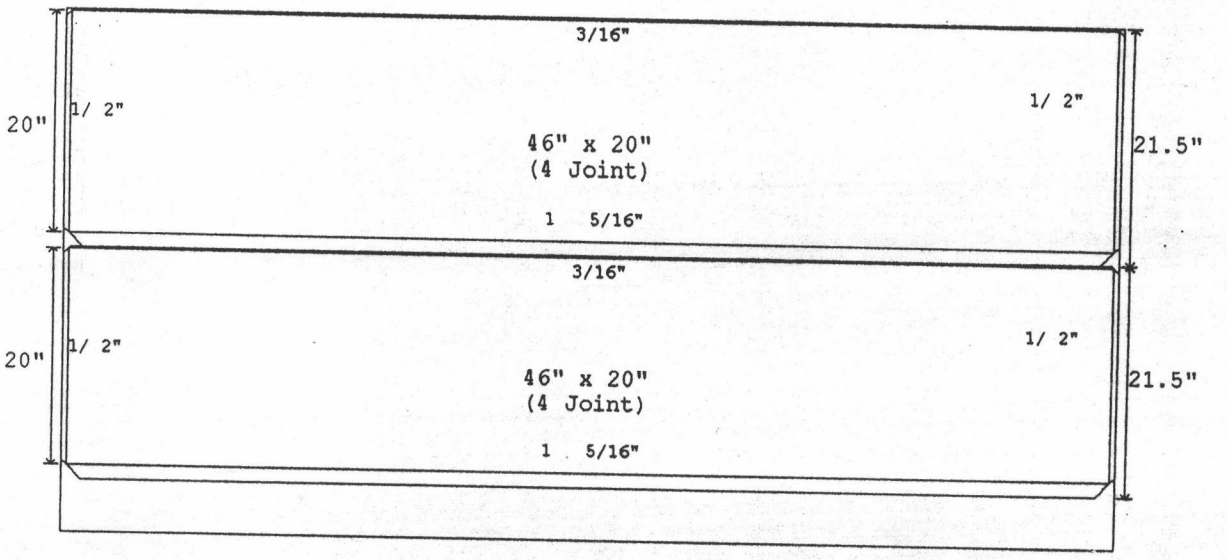
Gage #24 Amount - 3 sheets



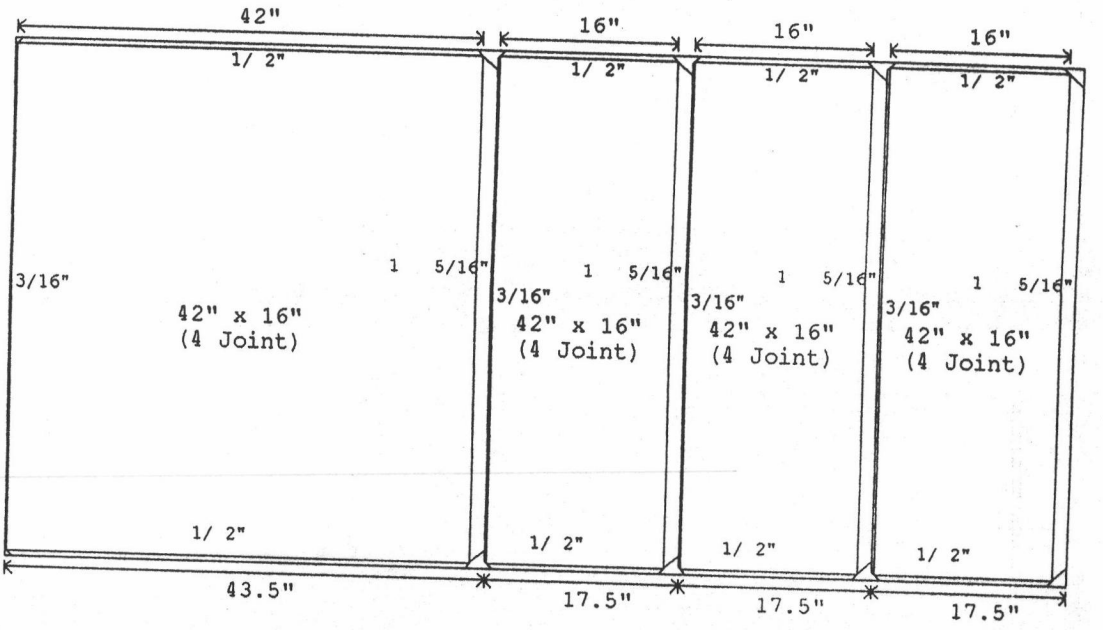
Gage #24 Amount - 6 sheets



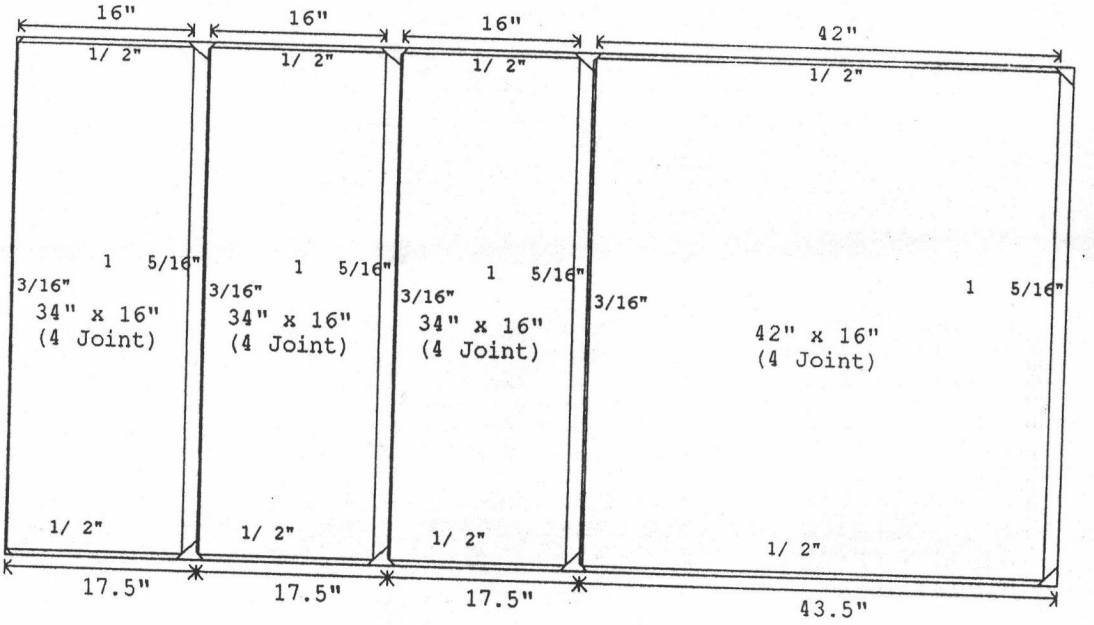
Gage #24 Amount - 2 sheets



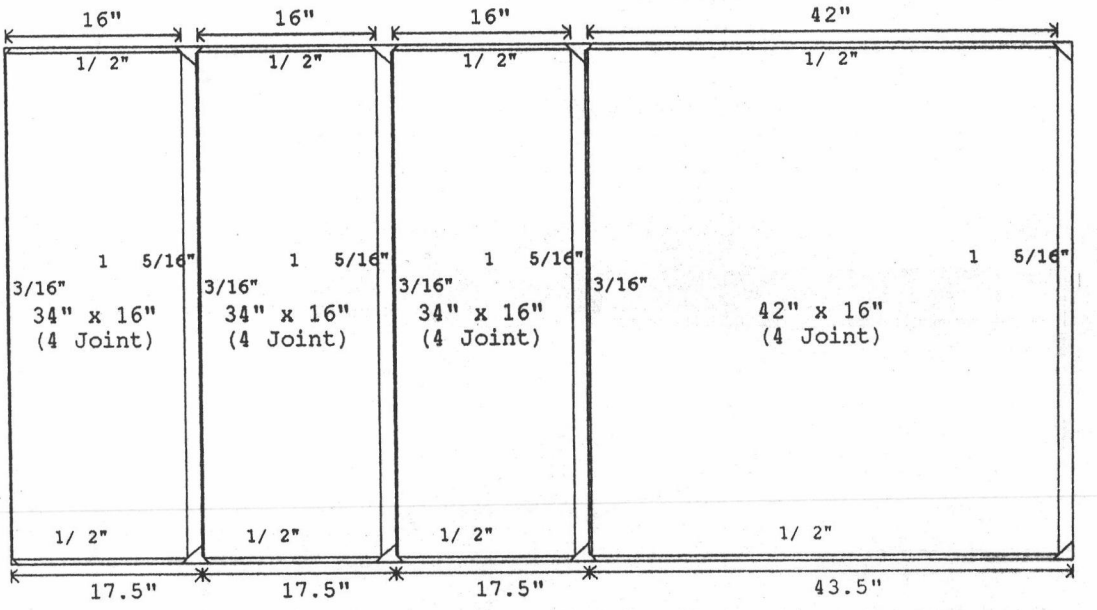
Gage #24 Amount - 1 sheet



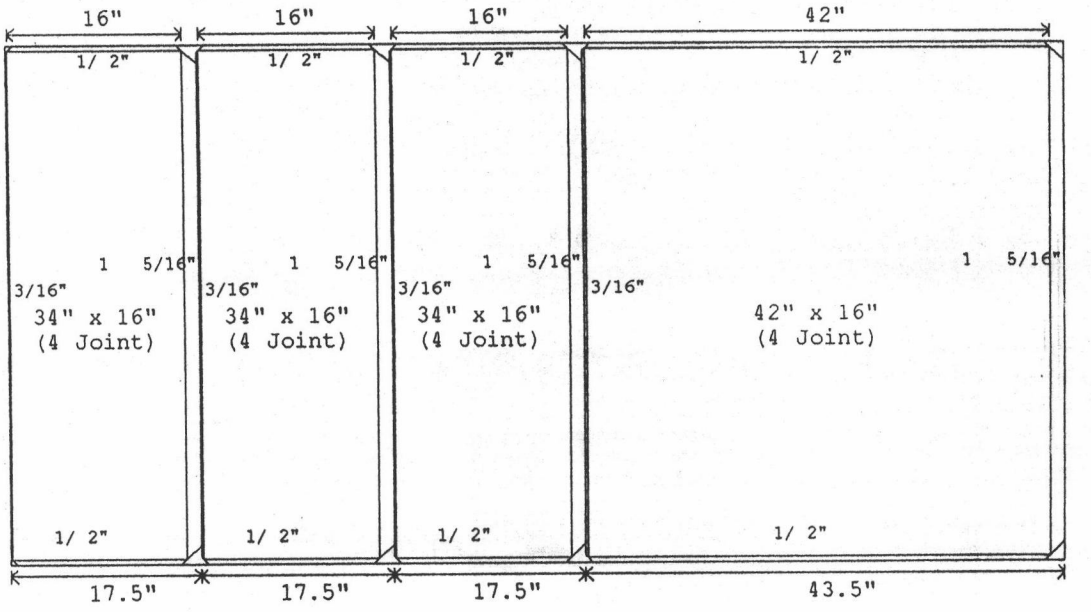
Gage #24 Amount - 5 sheets



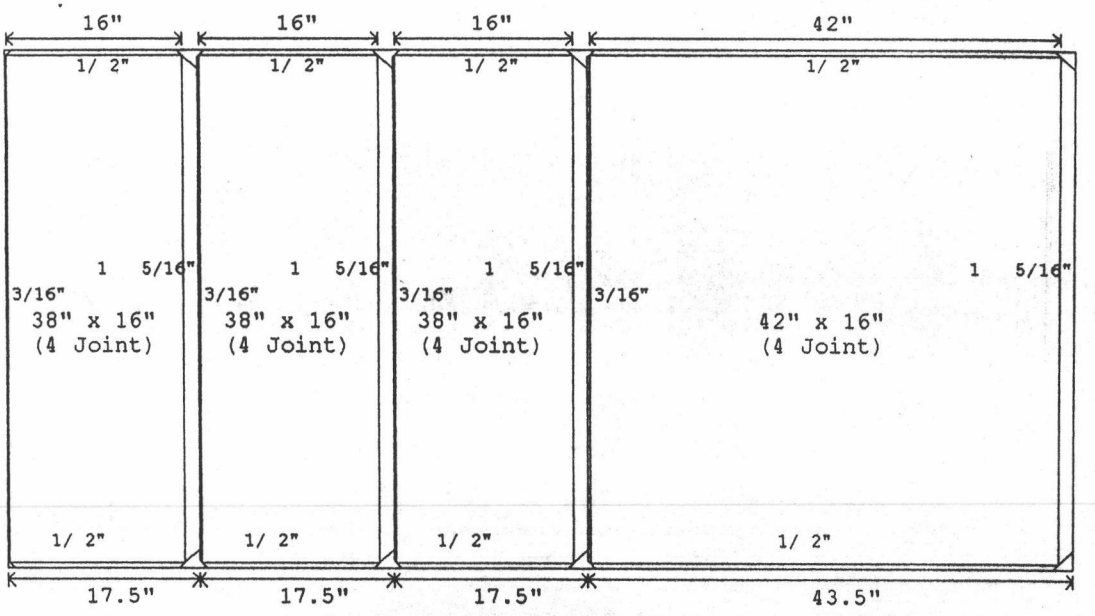
Gage #24 Amount - 1 sheet



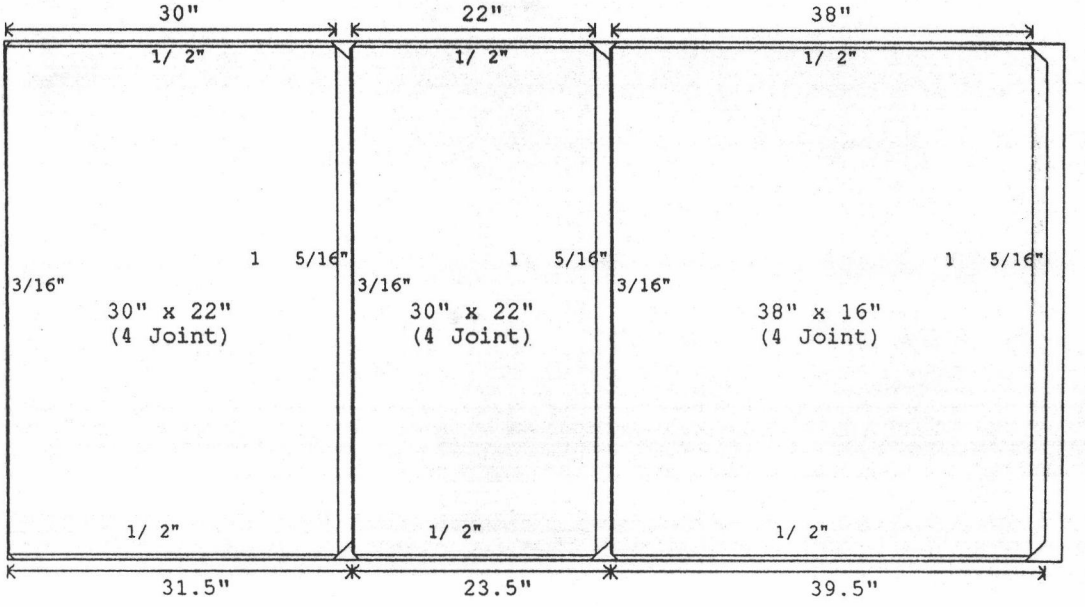
Gage #24 Amount - 1 sheet



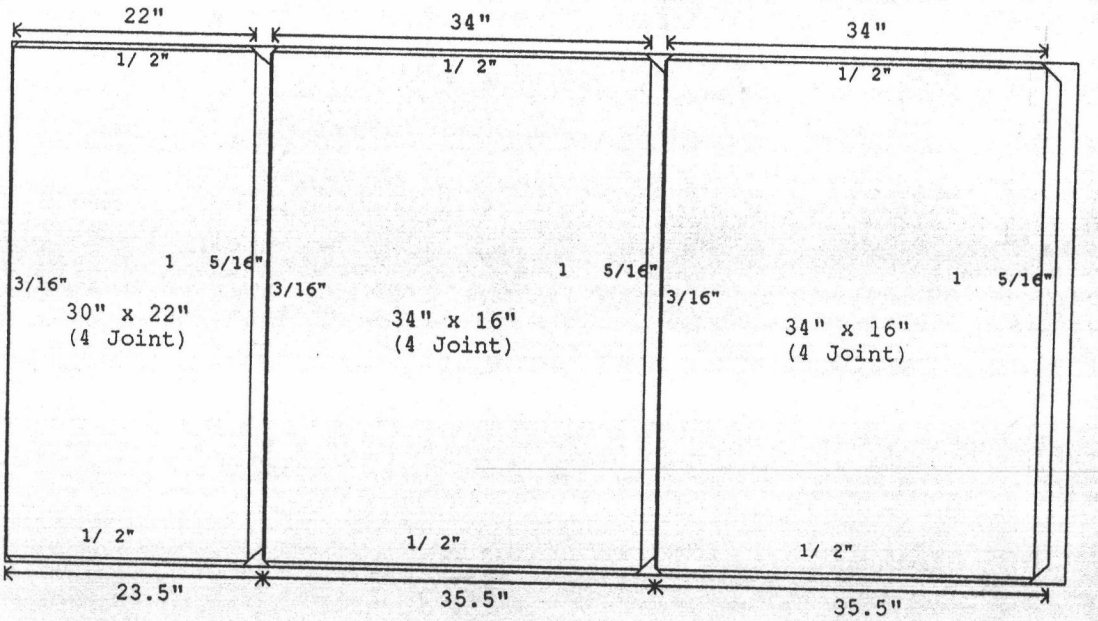
Gage #24 Amount - 2 sheets



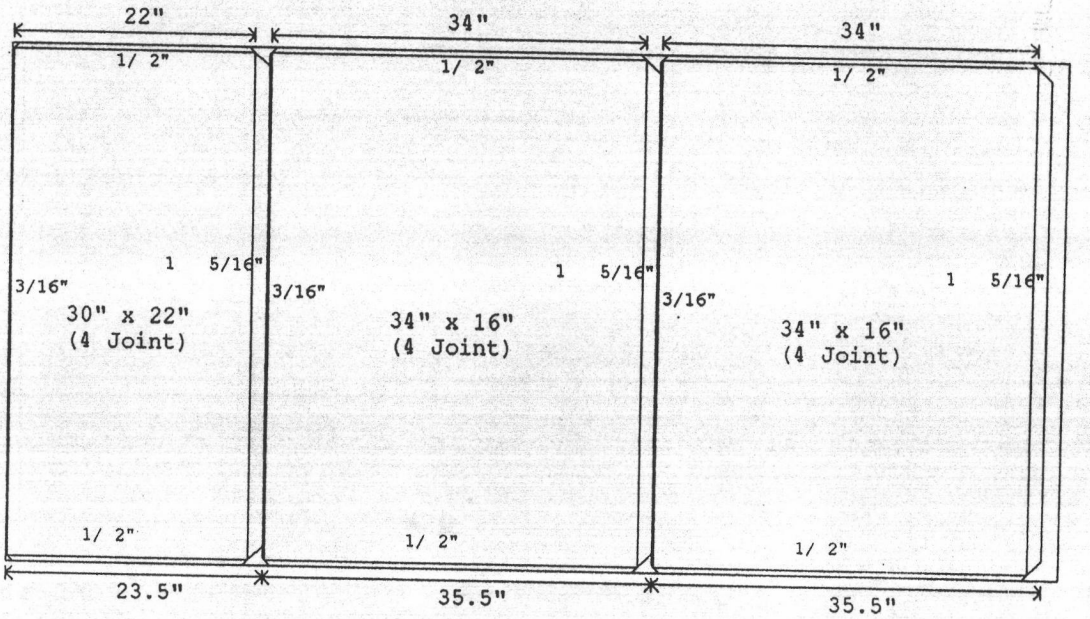
Gage #24 Amount - 2 sheets



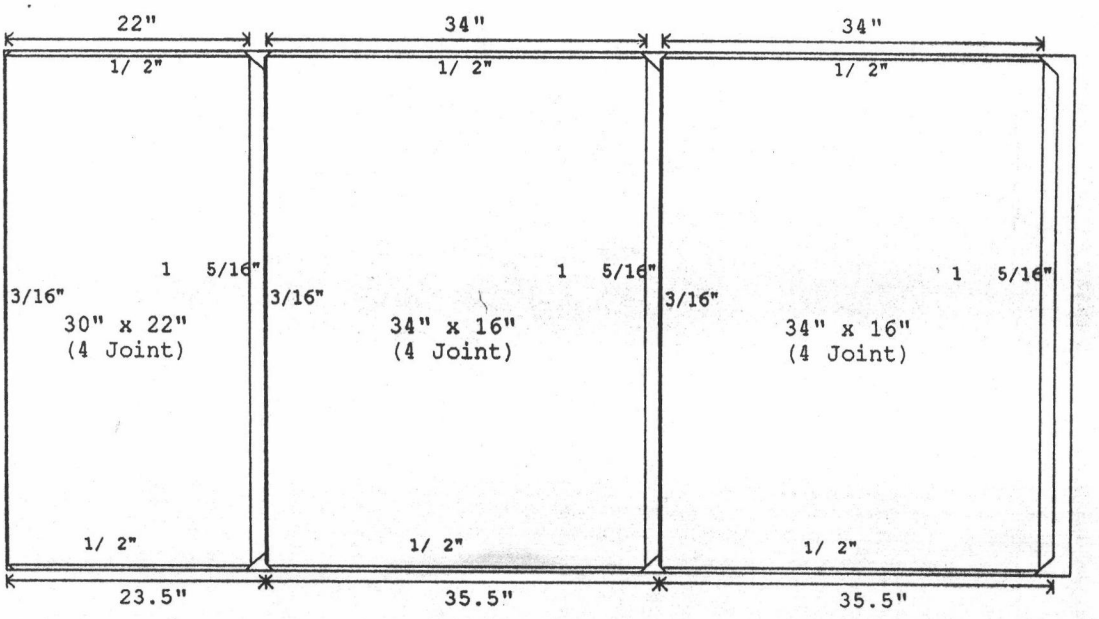
Gage #24 Amount - 6 sheets



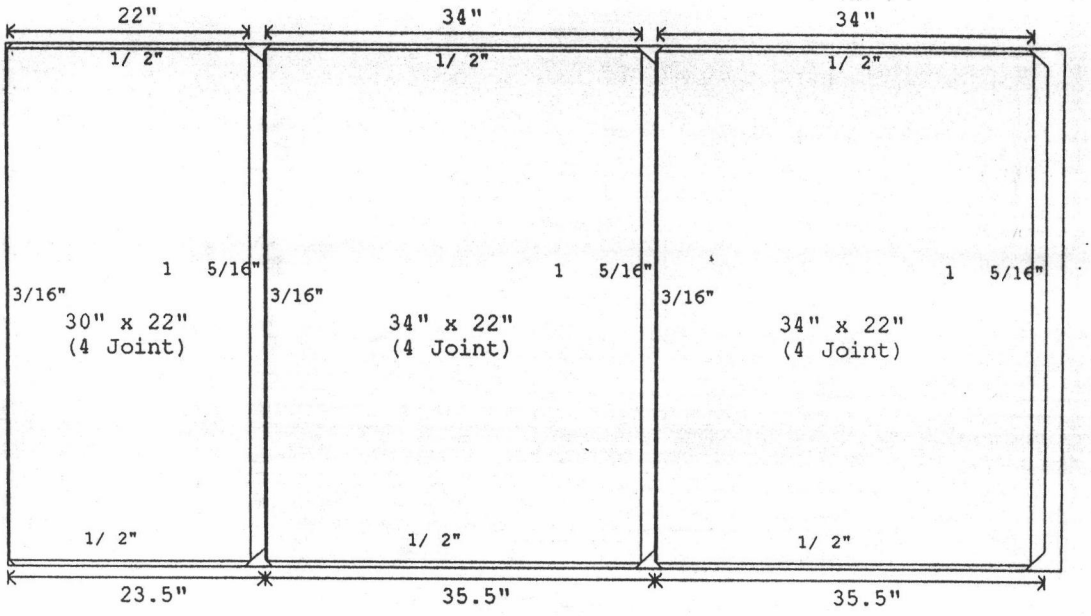
Gage #24 Amount - 1 sheet



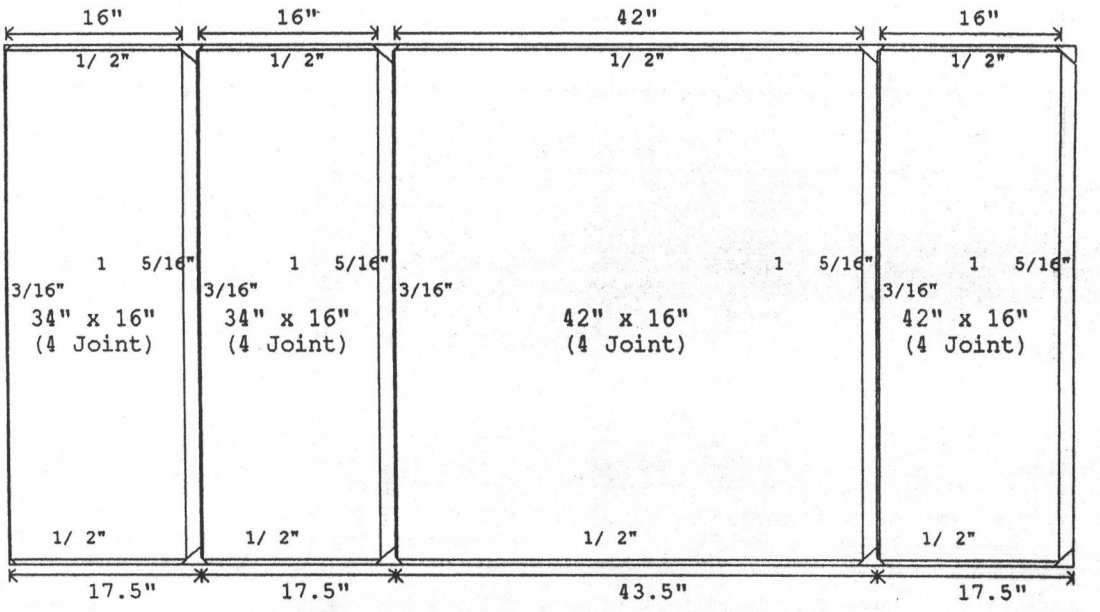
Gage #24 Amount - 3 sheets



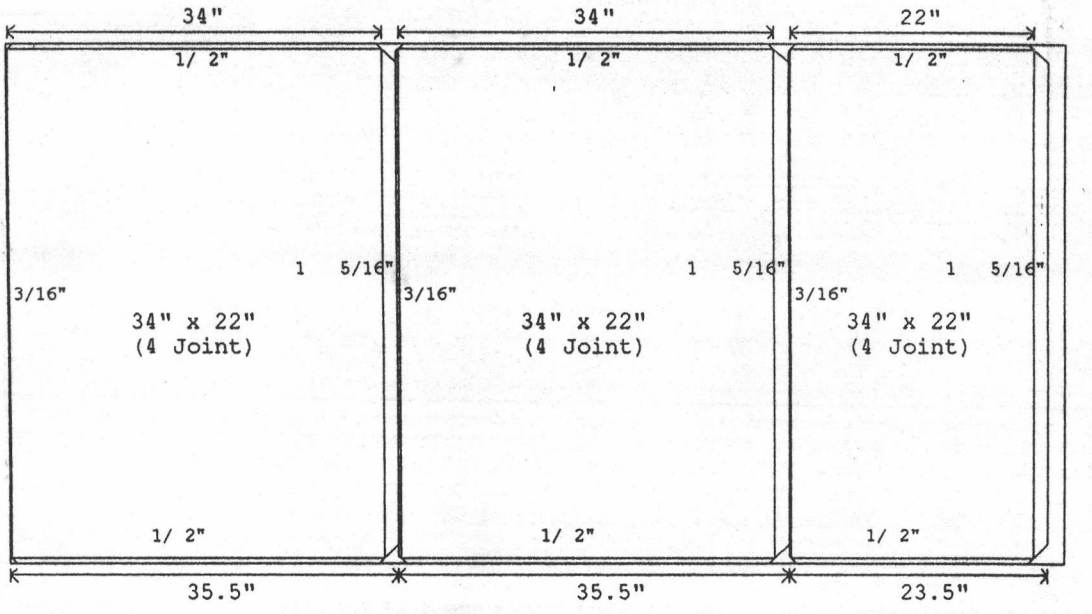
Gage #24 Amount - 3 sheets



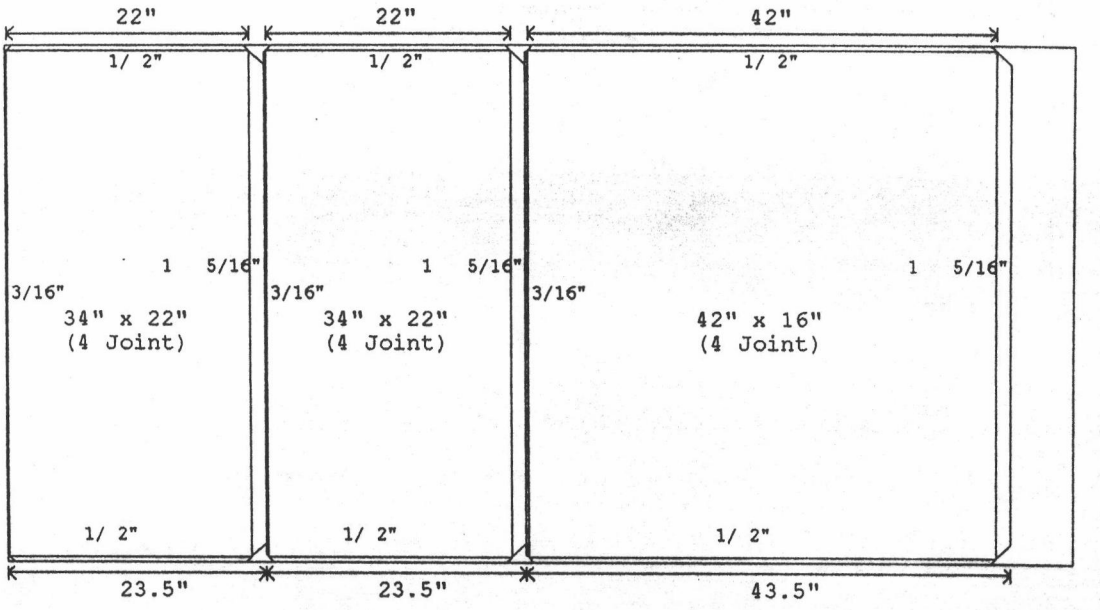
Gage #24 Amount - 1 sheet



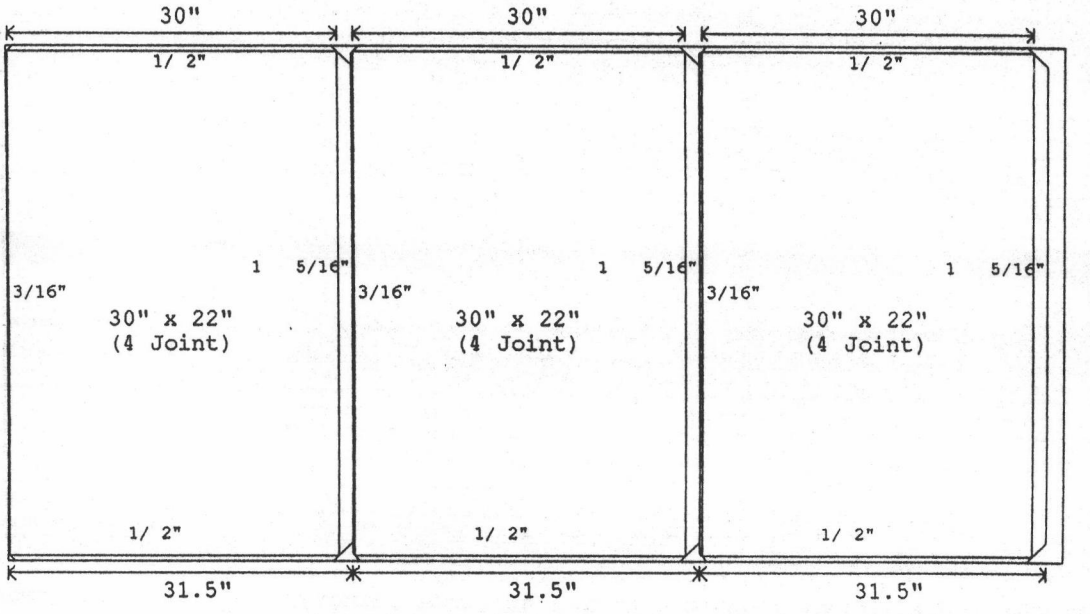
Gage #24 Amount - 1 sheet



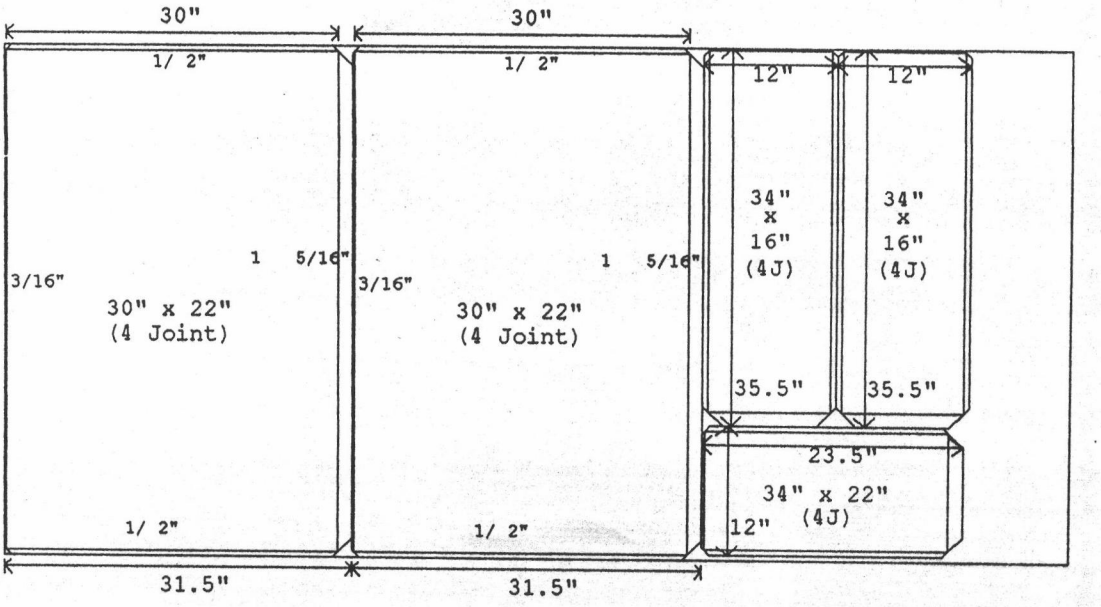
Gage #24 Amount - 6 sheets



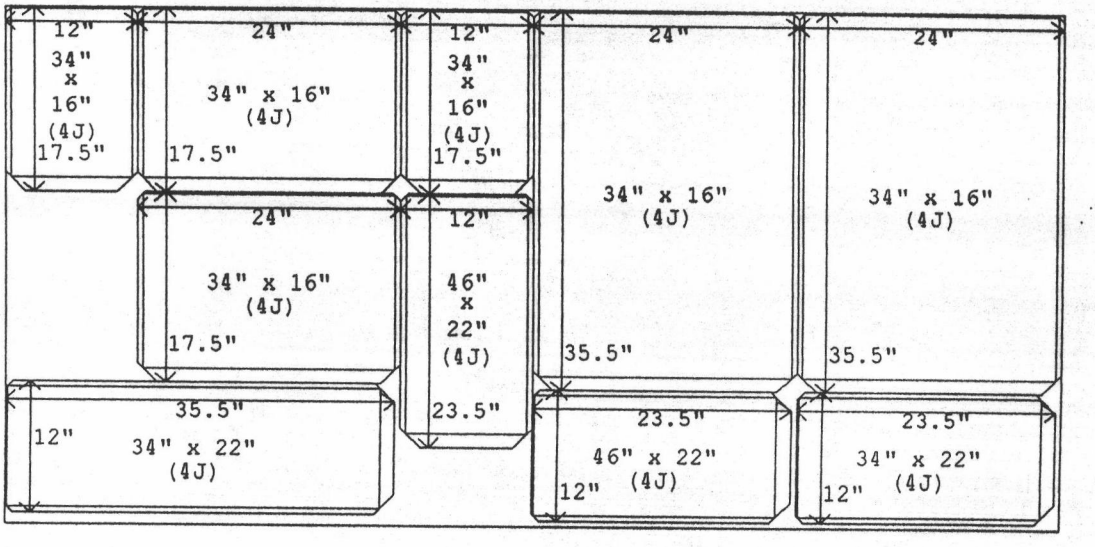
Gage #24 Amount - 4 sheets



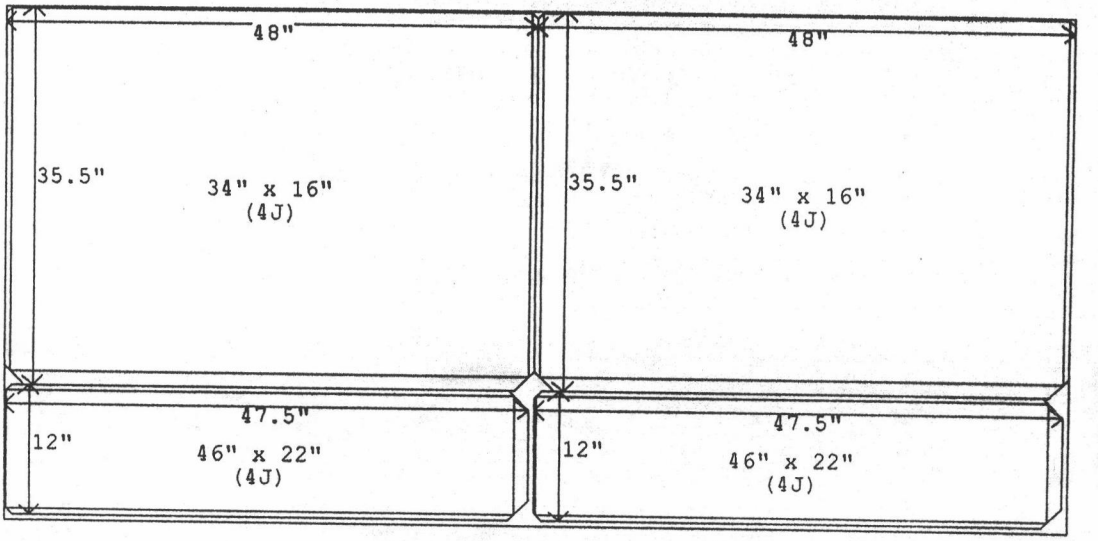
Gage #24 Amount - 2 sheets



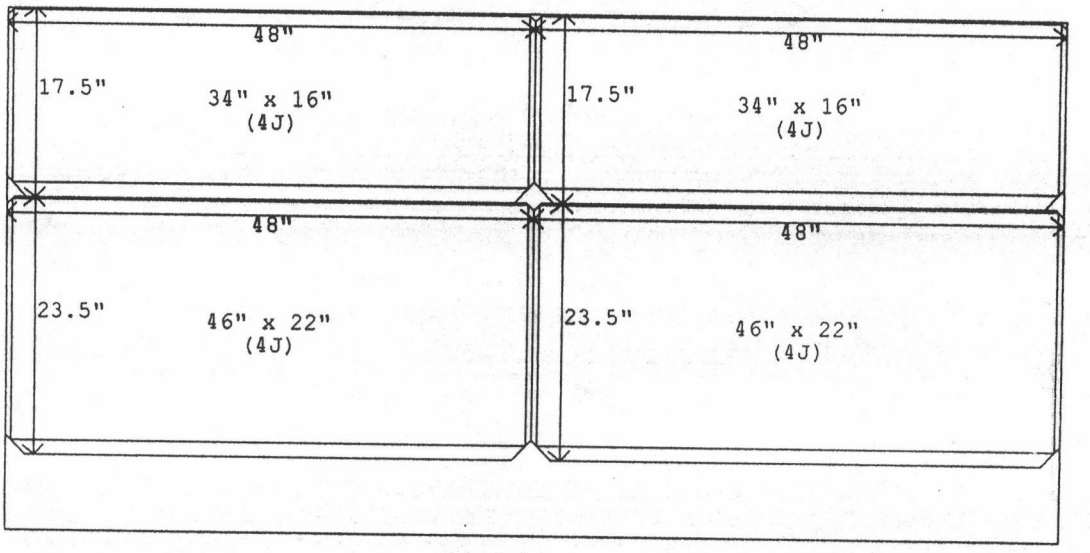
Gage #24 Amount - 1 sheet



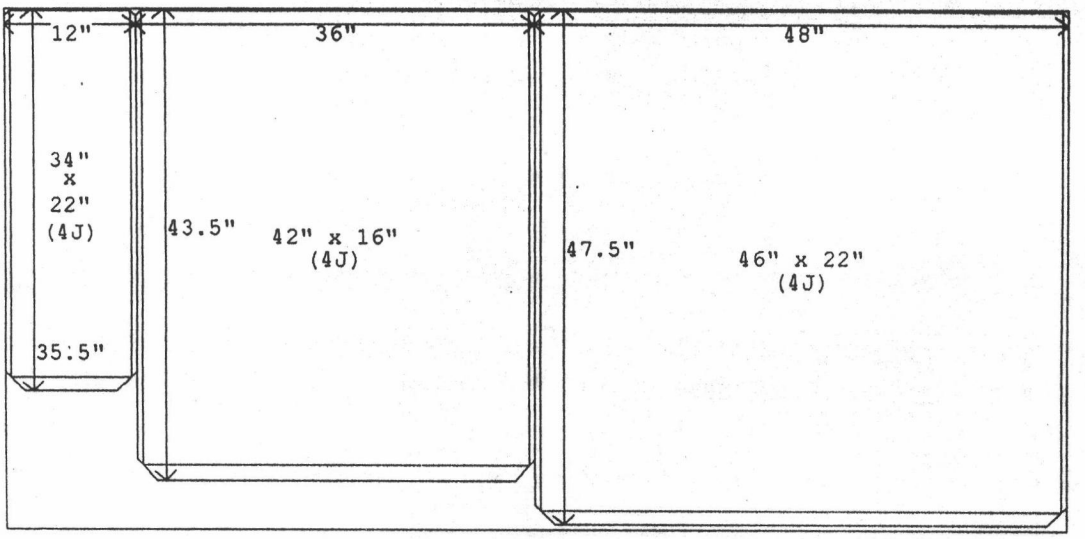
Gage #24 Amount - 1 sheet



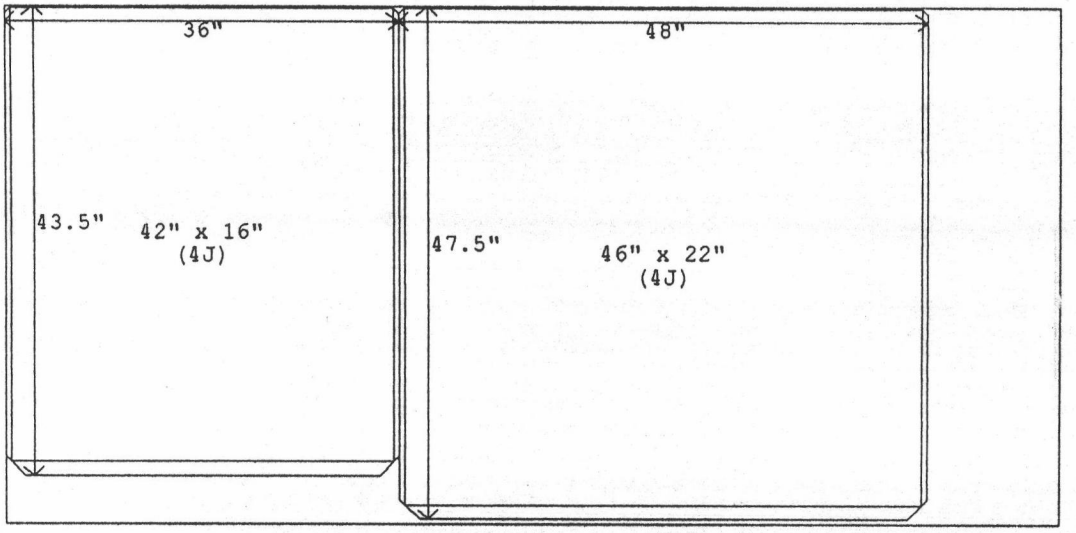
Gage #24 Amount - 1 sheet



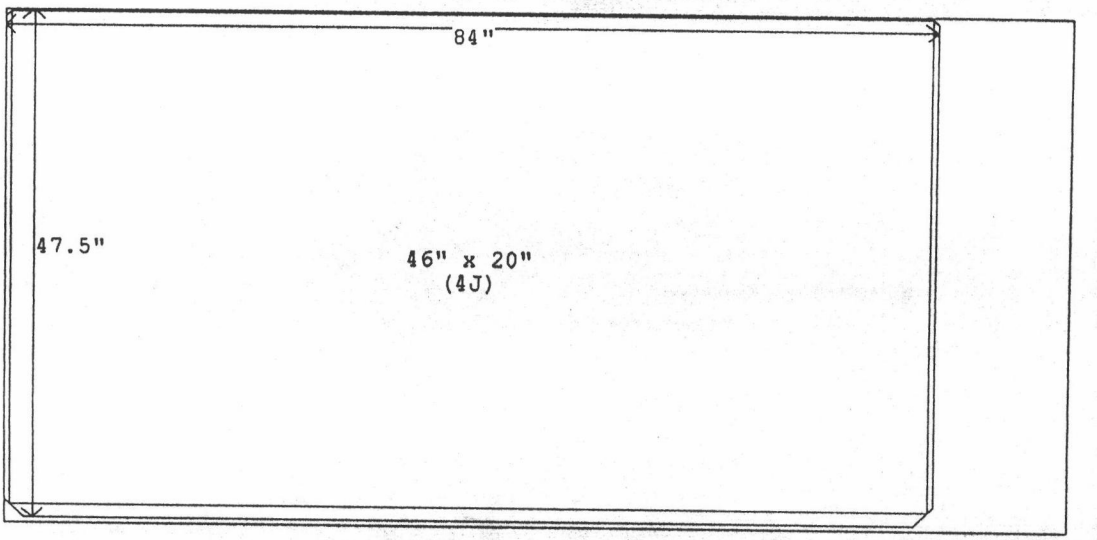
Gage #24 Amount - 1 sheet



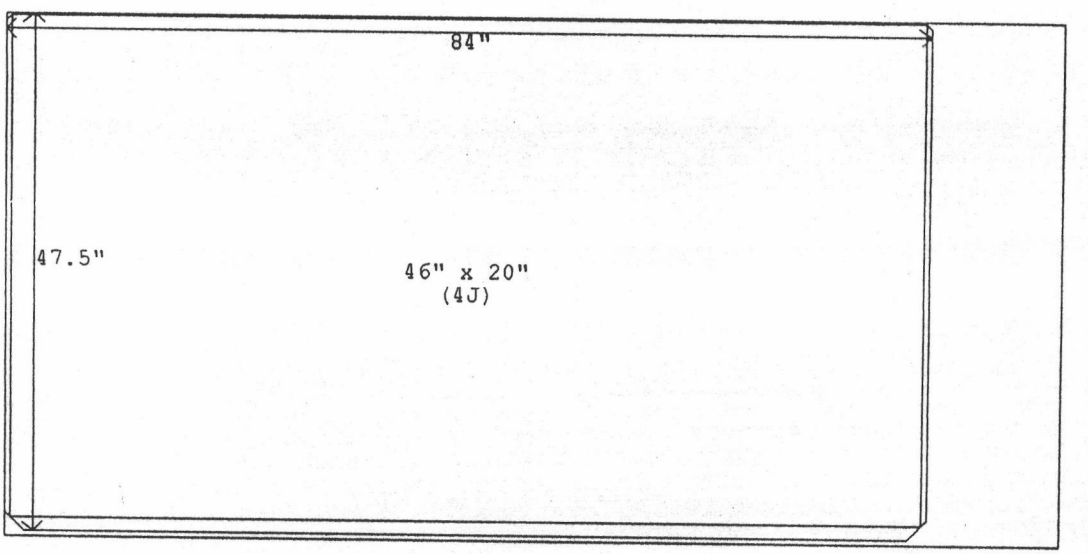
Gage #24 Amount - 1 sheet



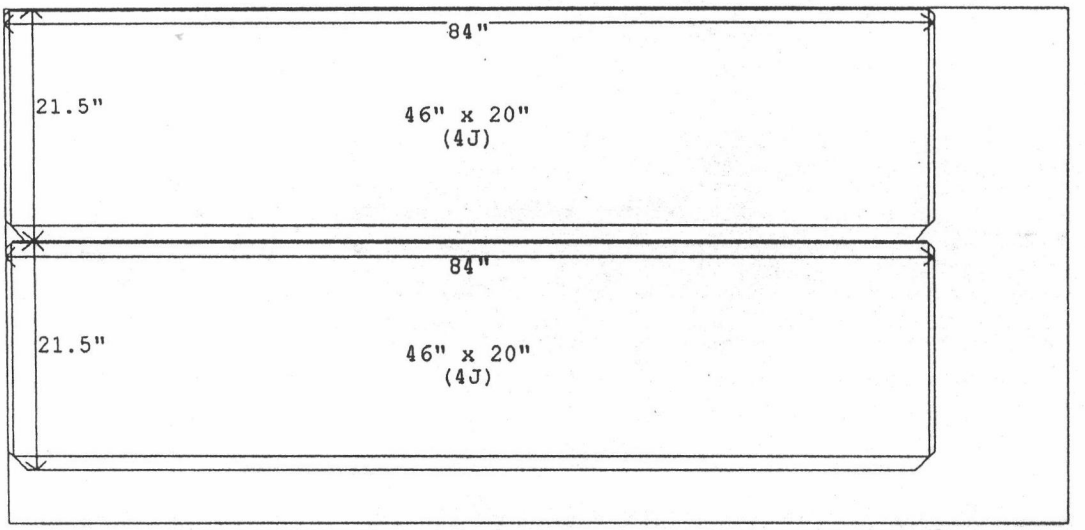
Gage #24 Amount - 1 sheet



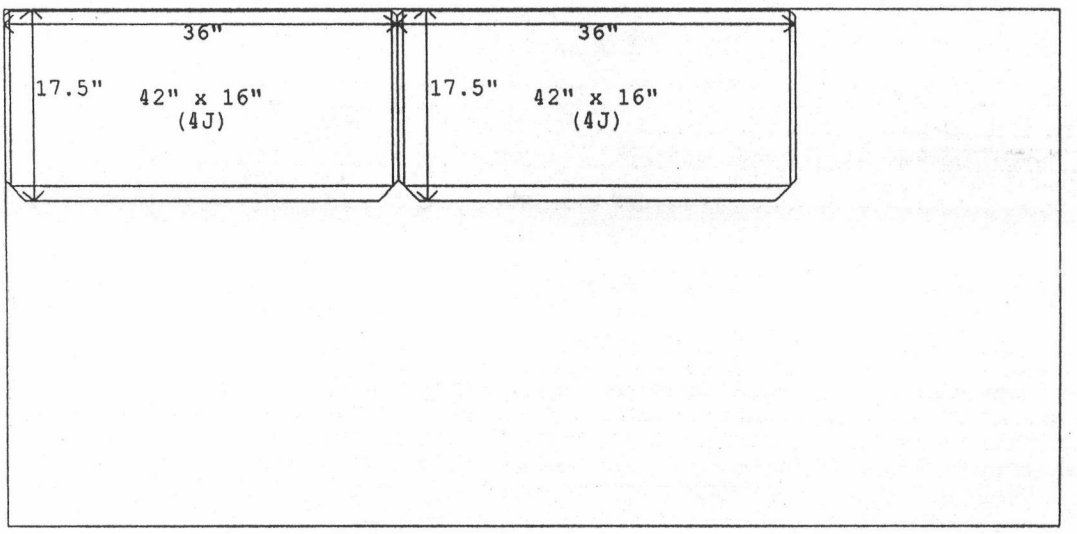
Gage #24 Amount - 1 sheet



Gage #24 Amount - 1 sheet

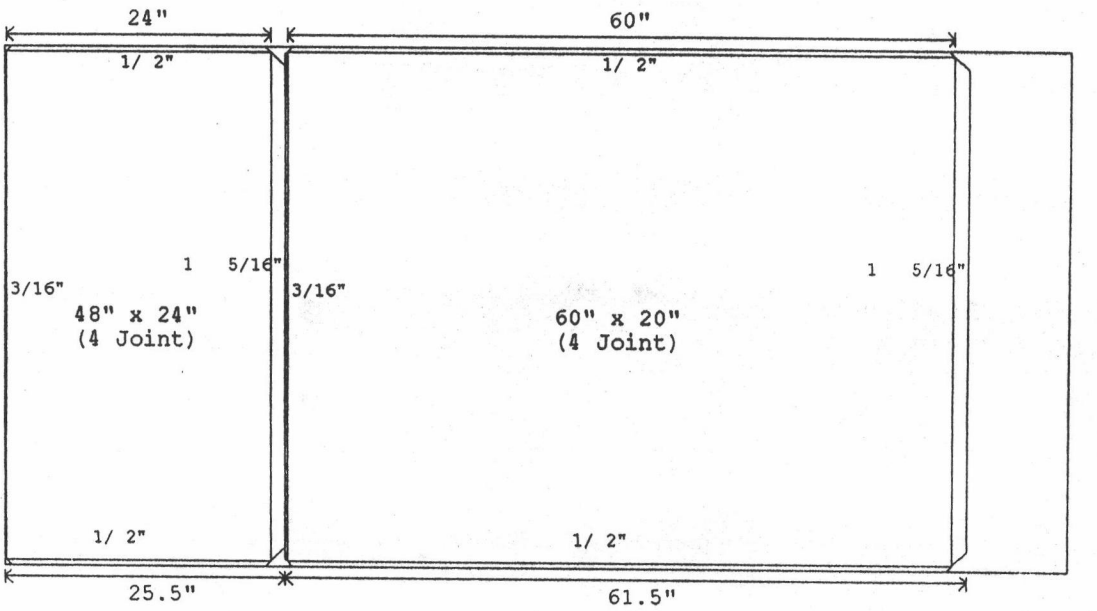


Gage #24 Amount - 1 sheet

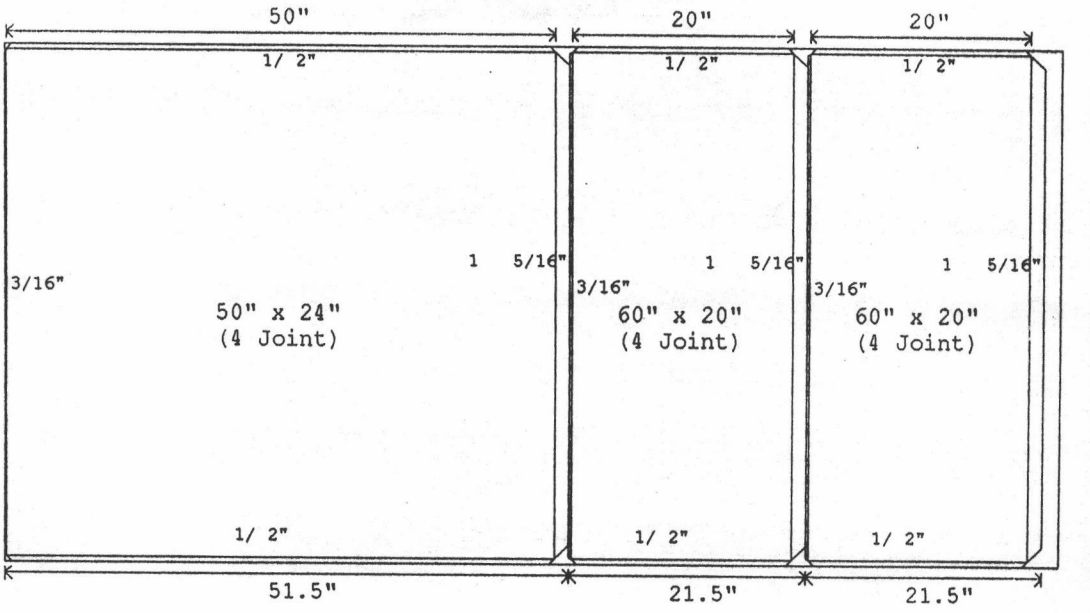


Gage #24 Amount - 1 sheet **Total Gage#24 - 78 sheets**

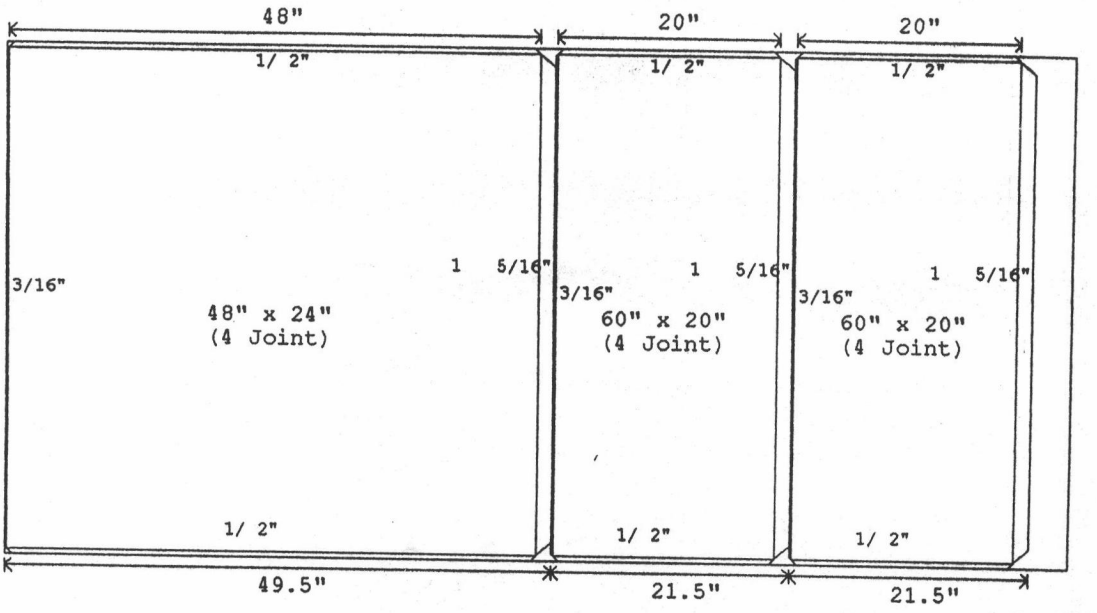
รูปที่ ง.4 รูปแบบแผ่นคลี่ที่เหมาะสมของแผ่นสังกะสีเบอร์ 22 สำหรับท่อลมตรง ในตัวอย่างระบบท่อลมที่ 1



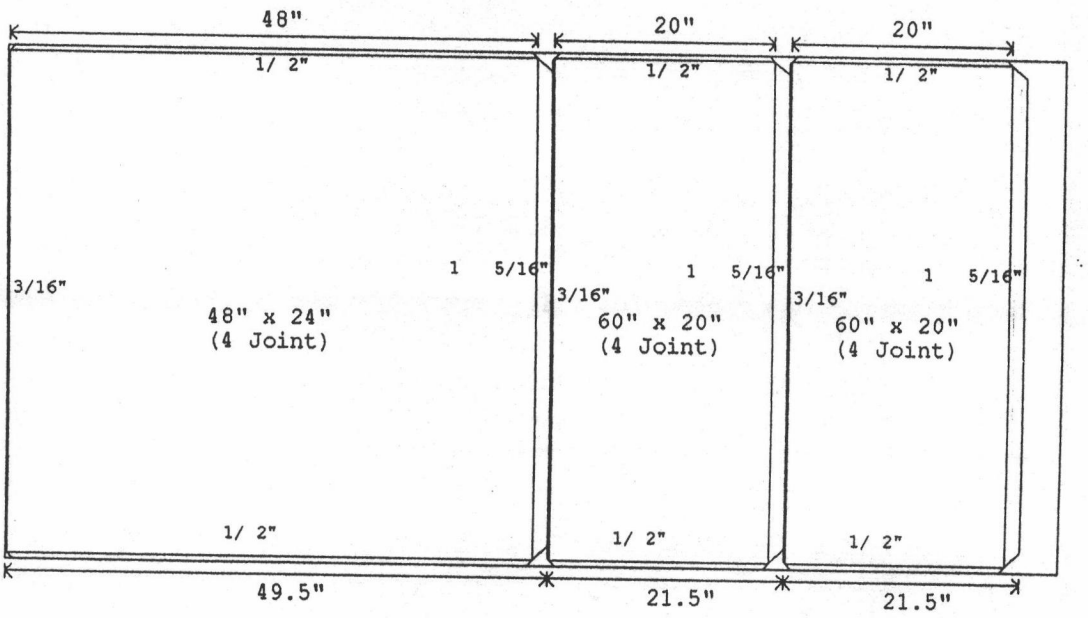
Gage #22 Amount - 6 sheets



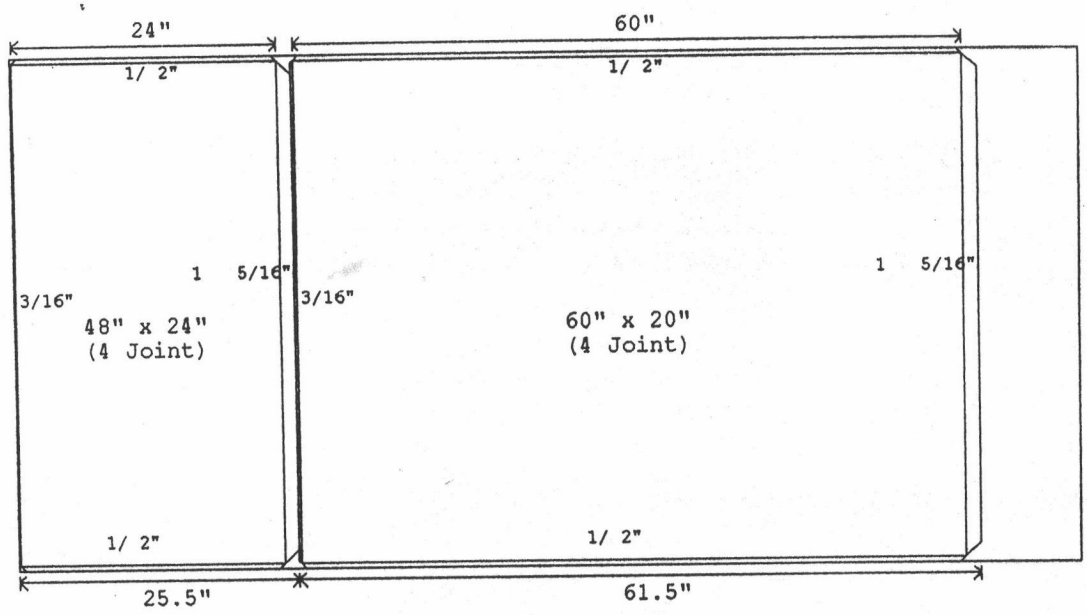
Gage #22 Amount - 2 sheets



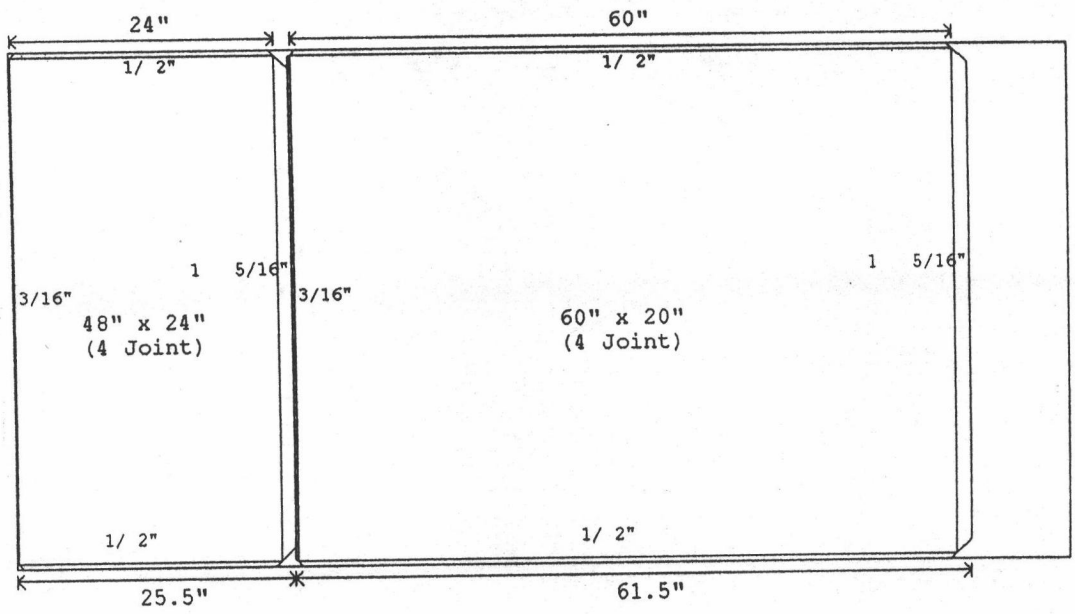
Gage #22 Amount - 4 sheets



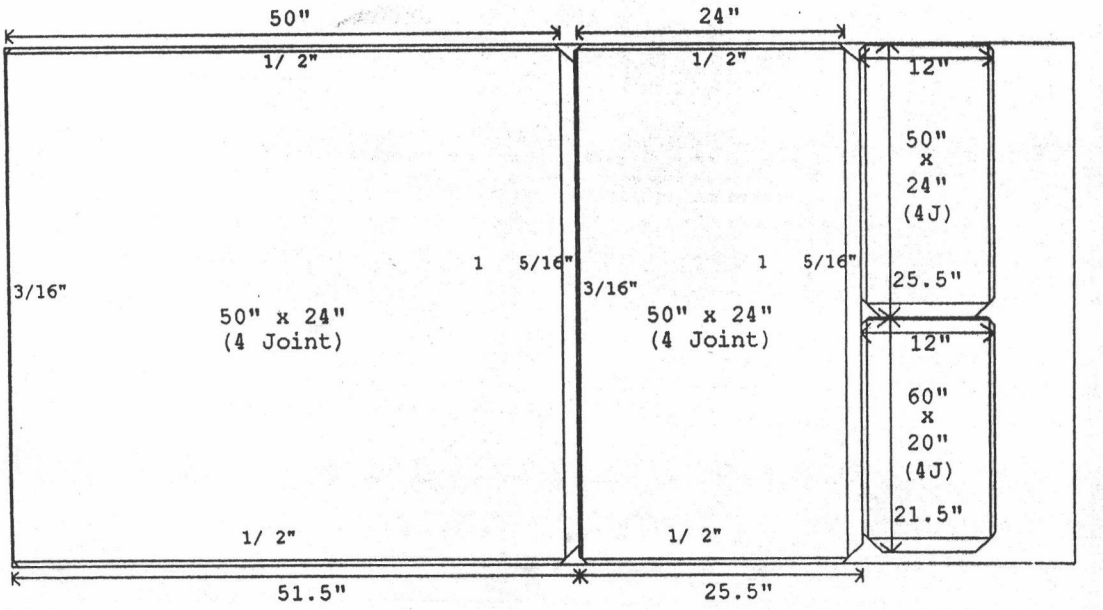
Gage #22 Amount - 7 sheets



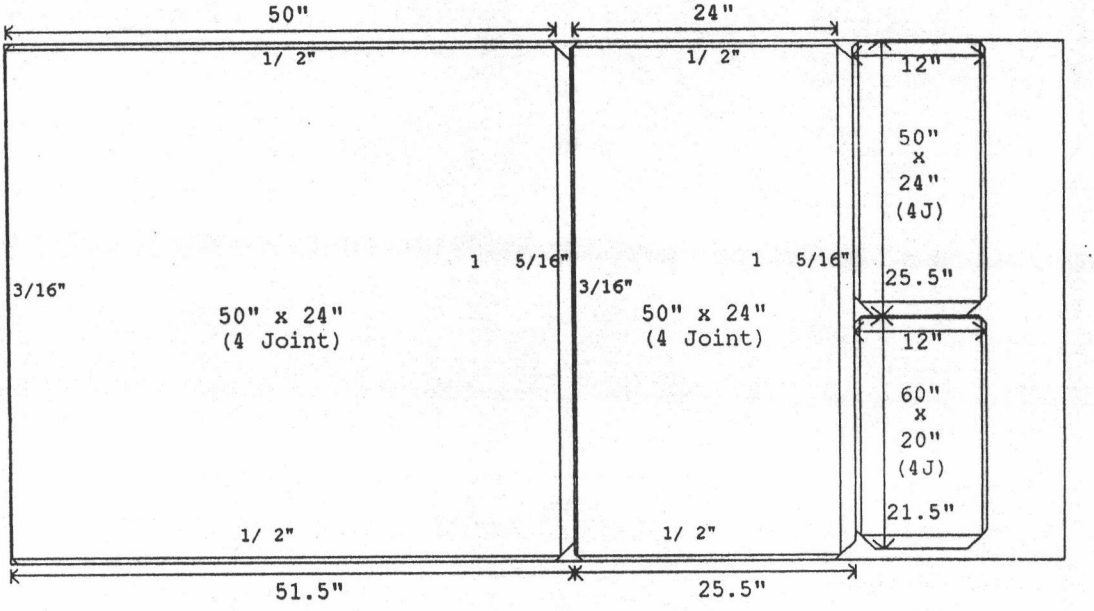
Gage #22 Amount - 8 sheets



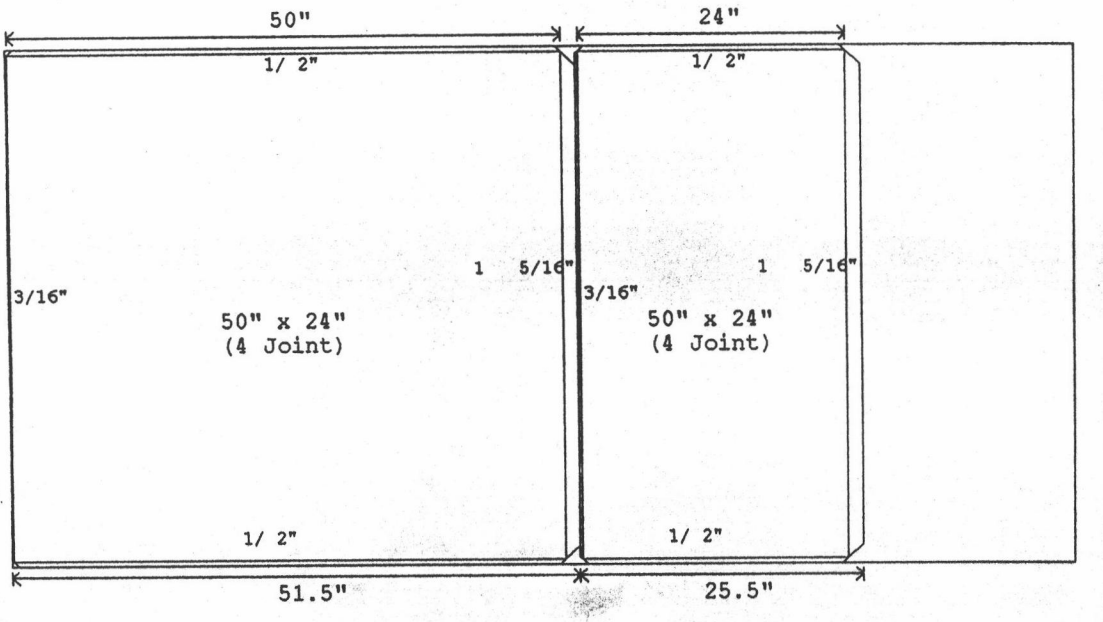
Gage #22 Amount - 12 sheets



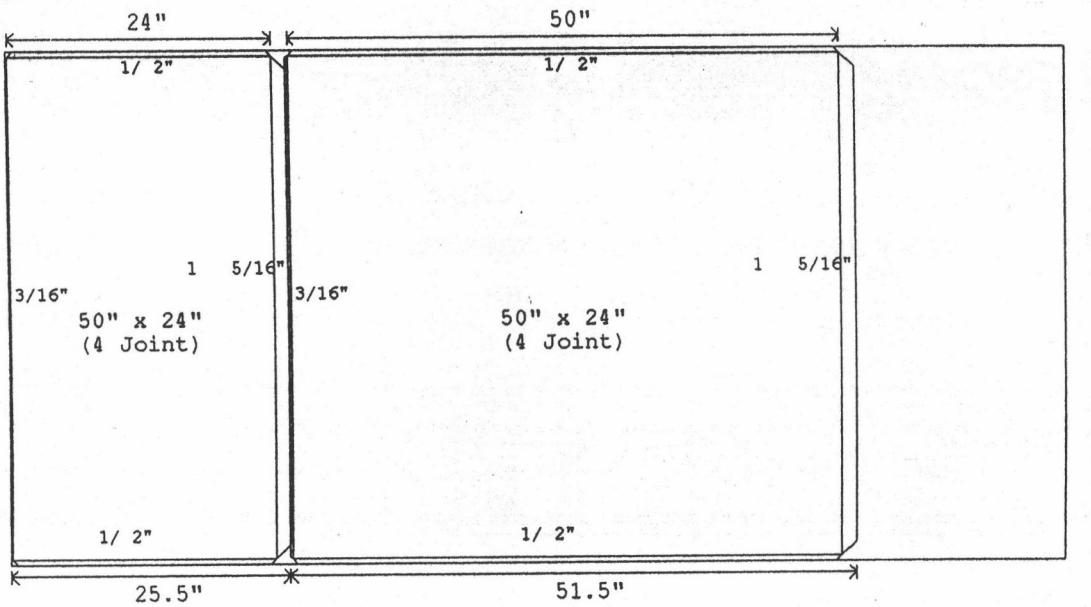
Gage #22 Amount - 1 sheet



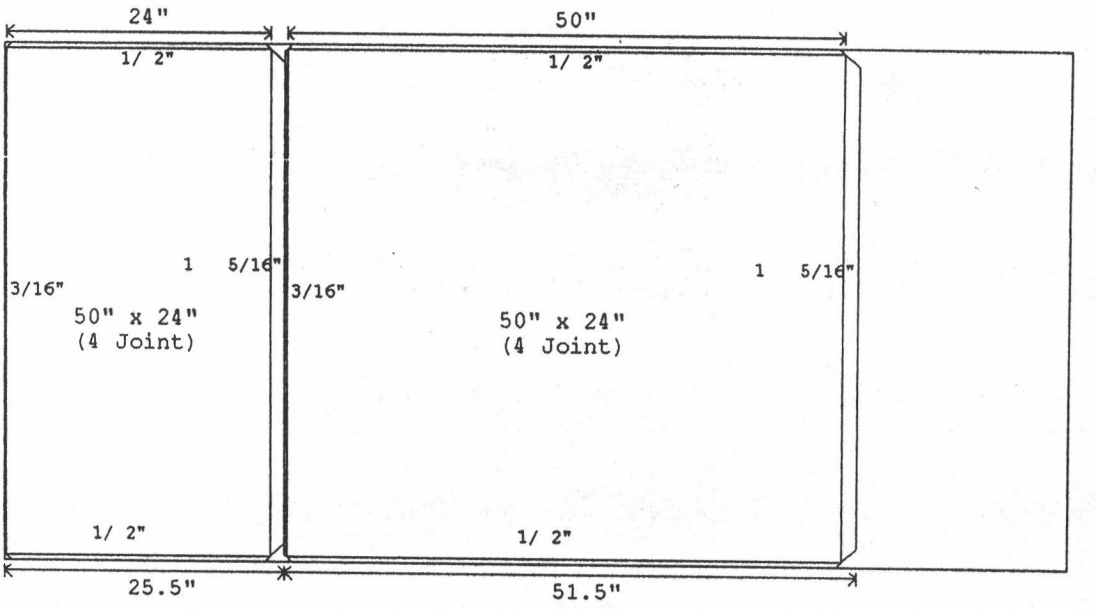
Gage #22 Amount - 1 sheet



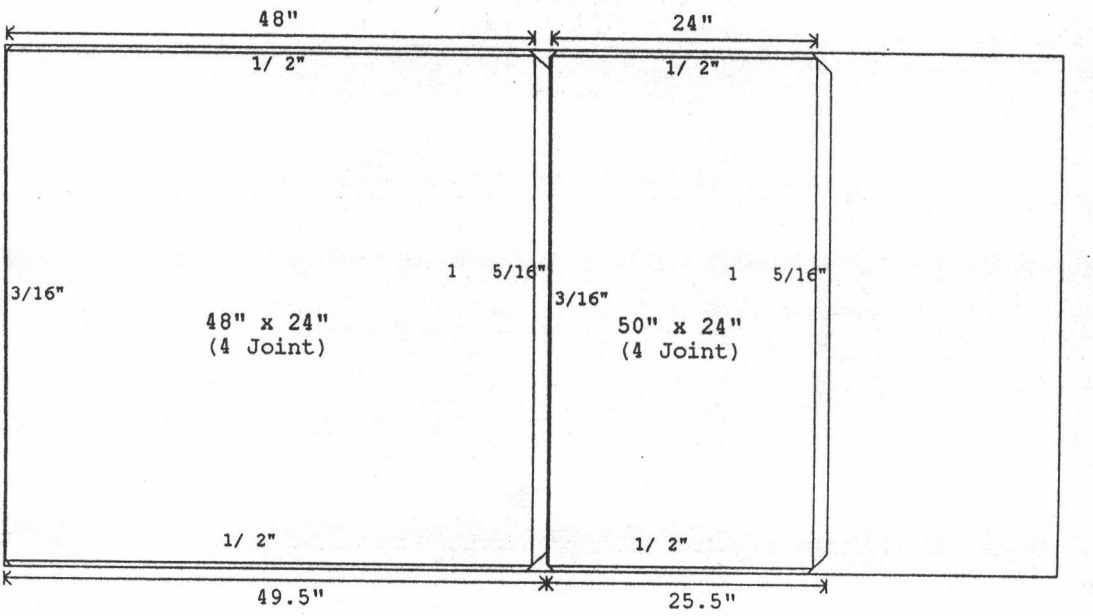
Gage #22 Amount - 2 sheets



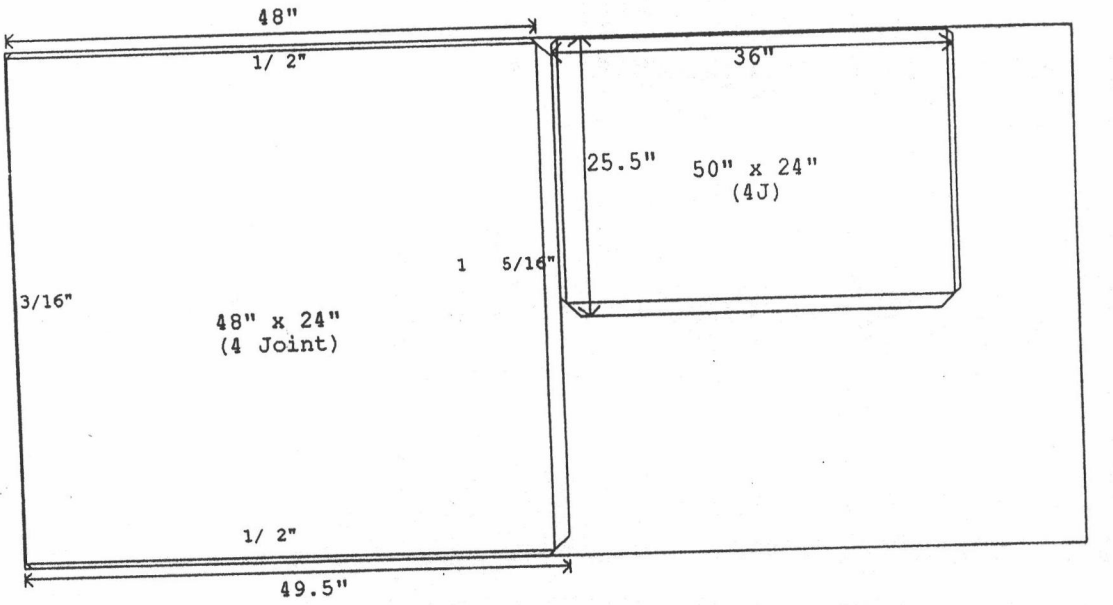
Gage #22 Amount - 2 sheets



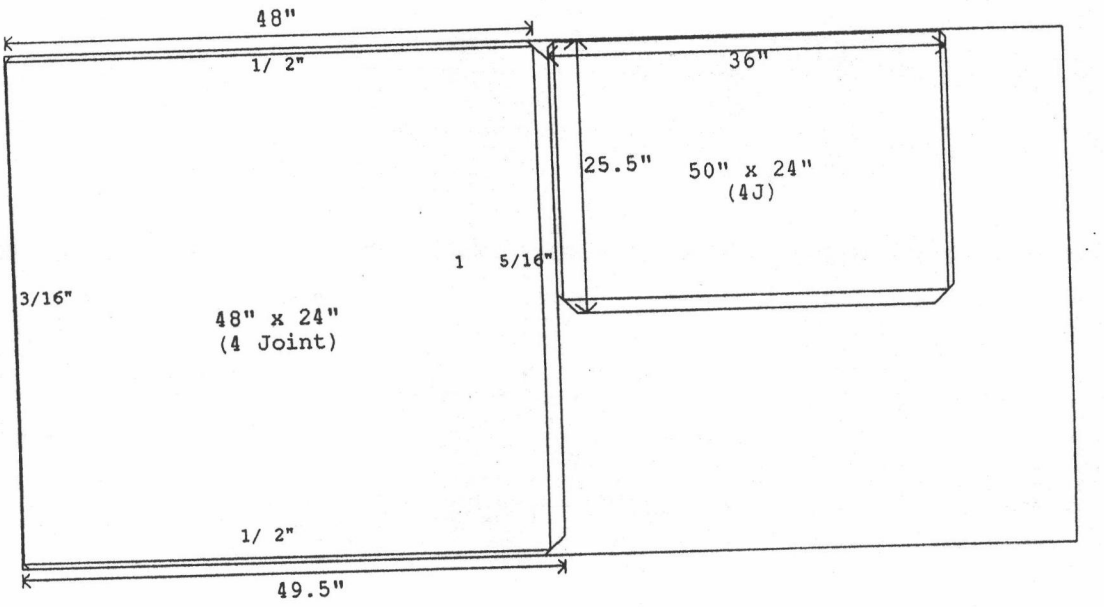
Gage #22 Amount - 2 sheets



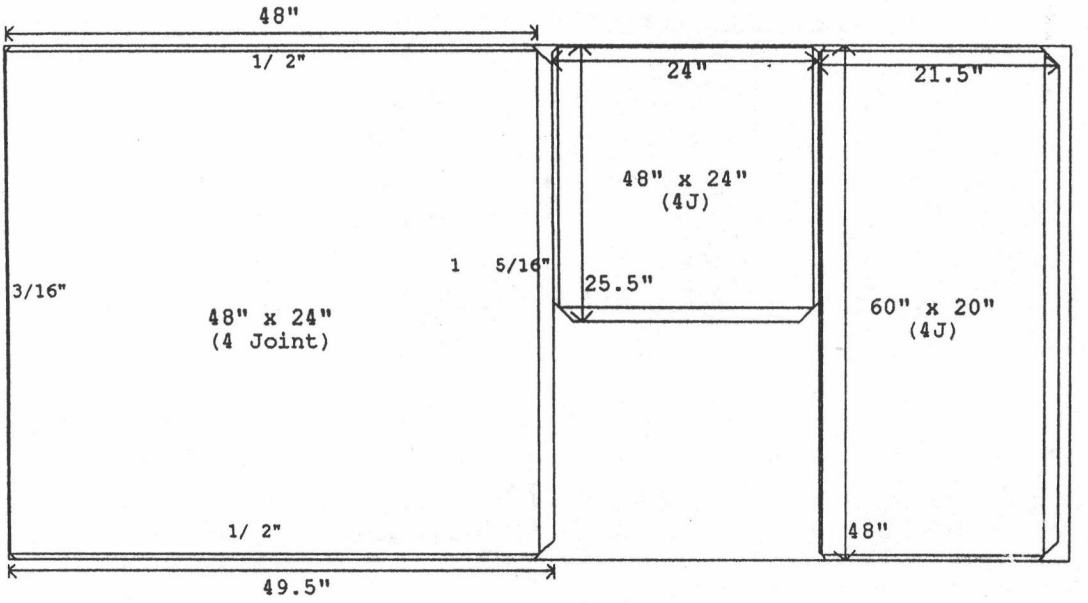
Gage #22 Amount - 2 sheets



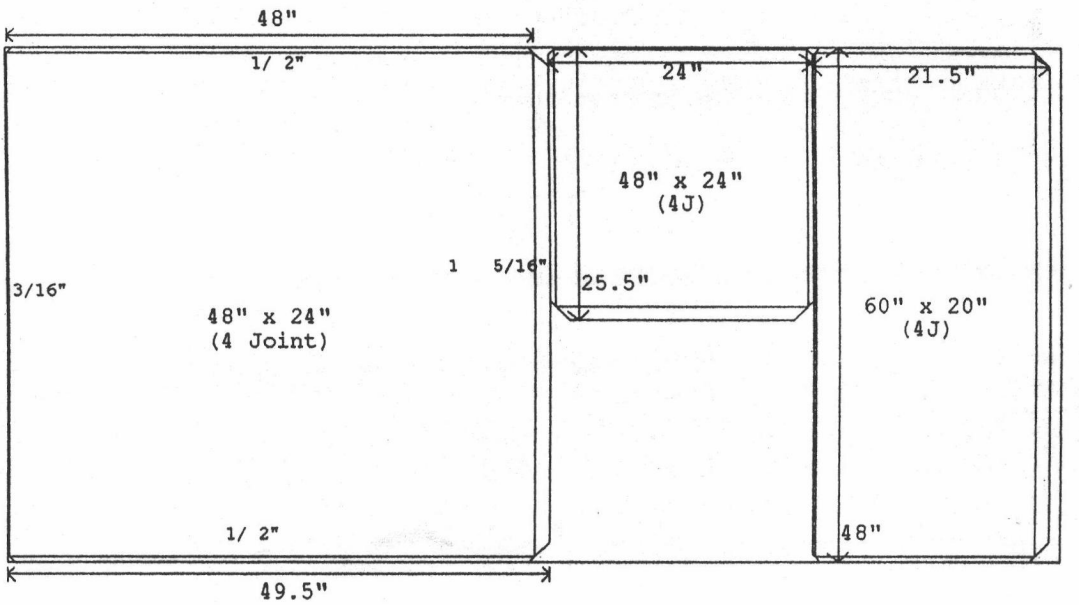
Gage #22 Amount - 1 sheet



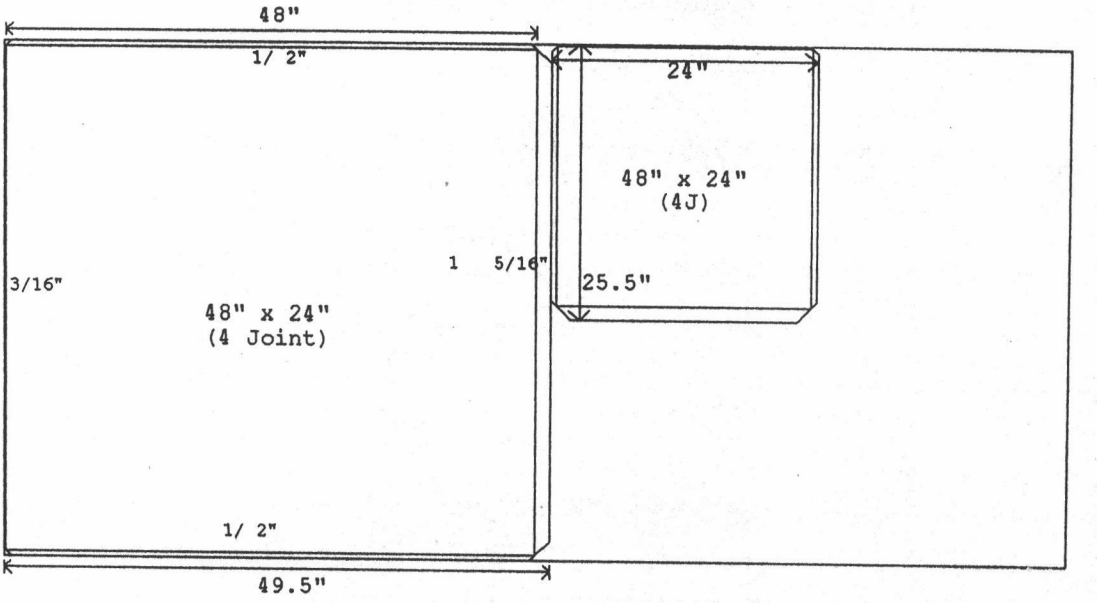
Gage #22 Amount - 1 sheet



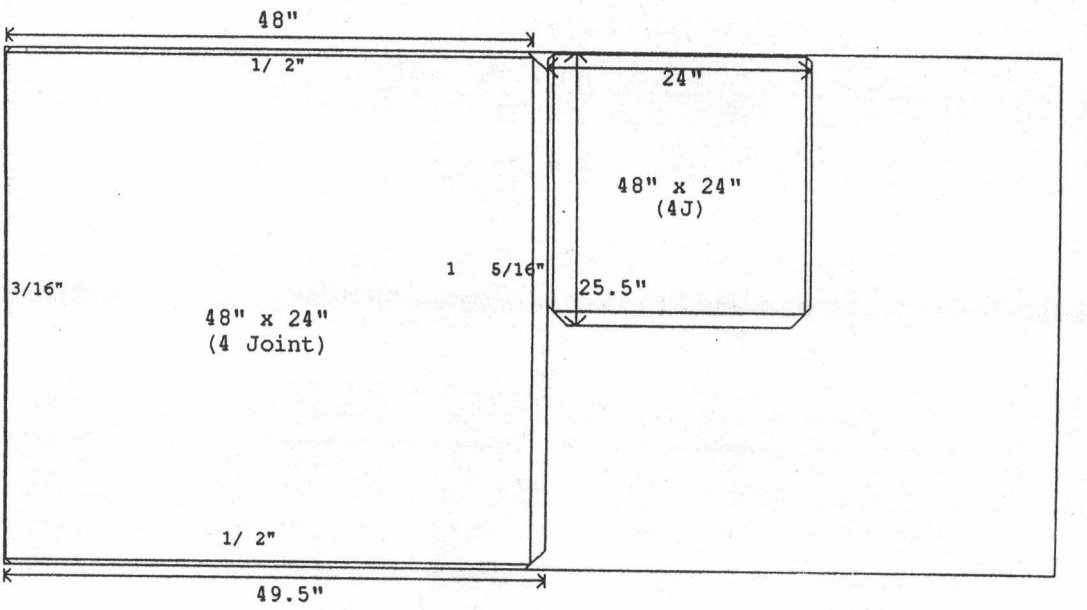
Gage #22 Amount - 1 sheet



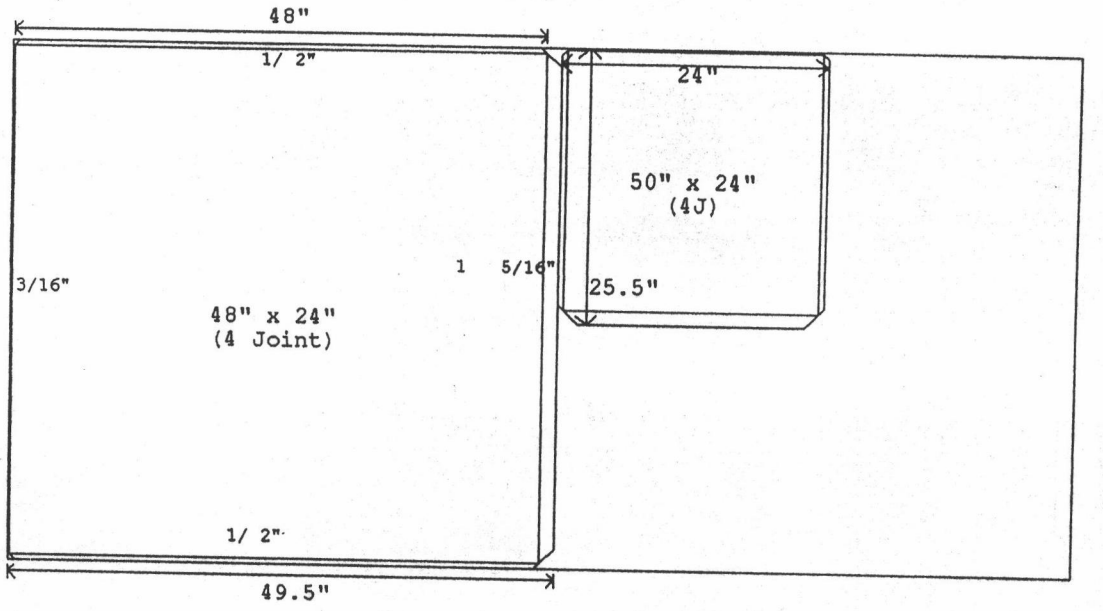
Gage #22 Amount - 1 sheet



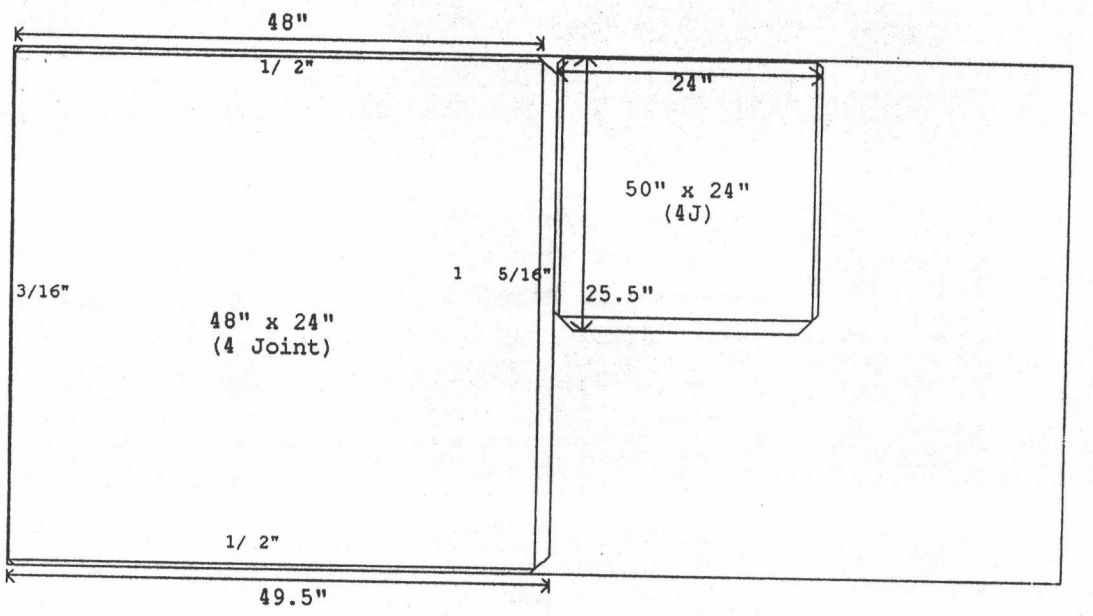
Gage #22 Amount - 1 sheet



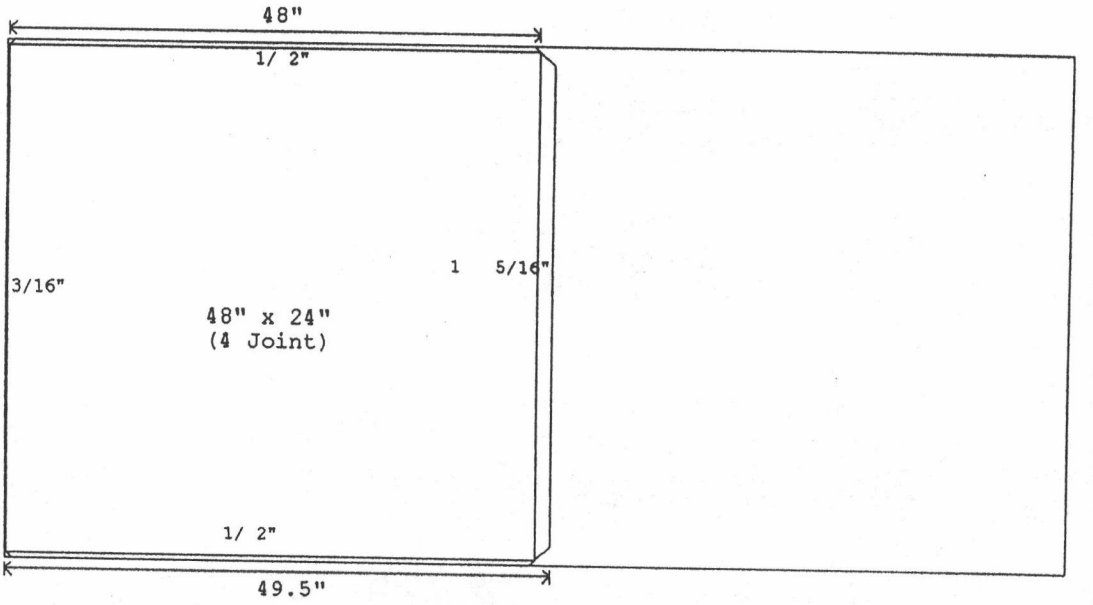
Gage #22 Amount - 1 sheet



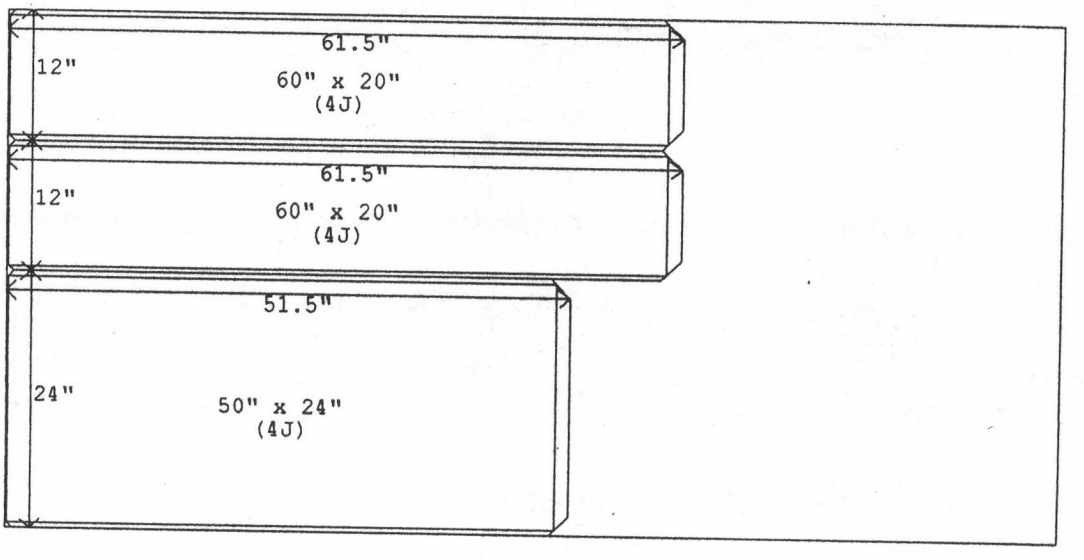
Gage #22 Amount - 1 sheet



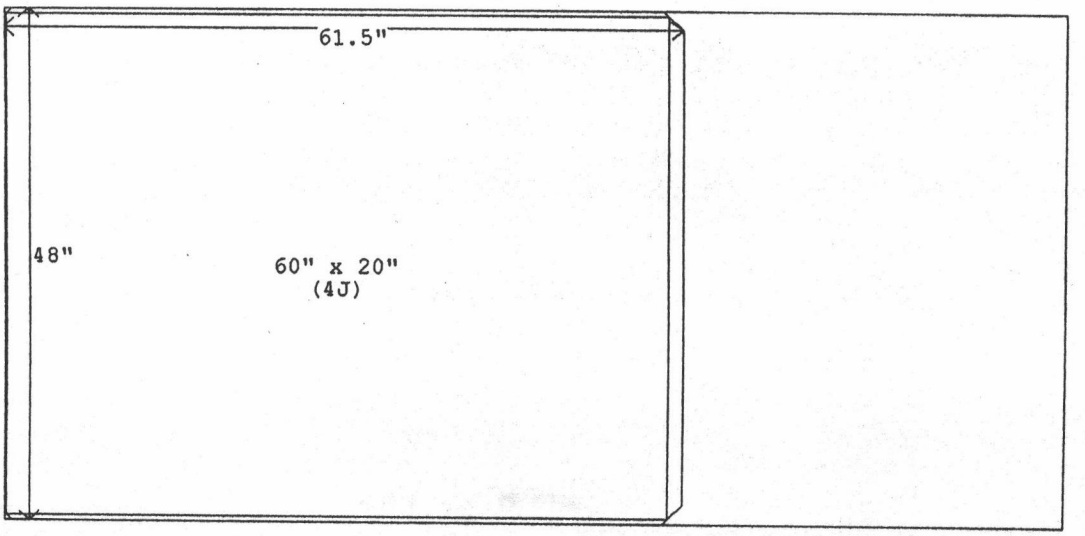
Gage #22 Amount - 1 sheet



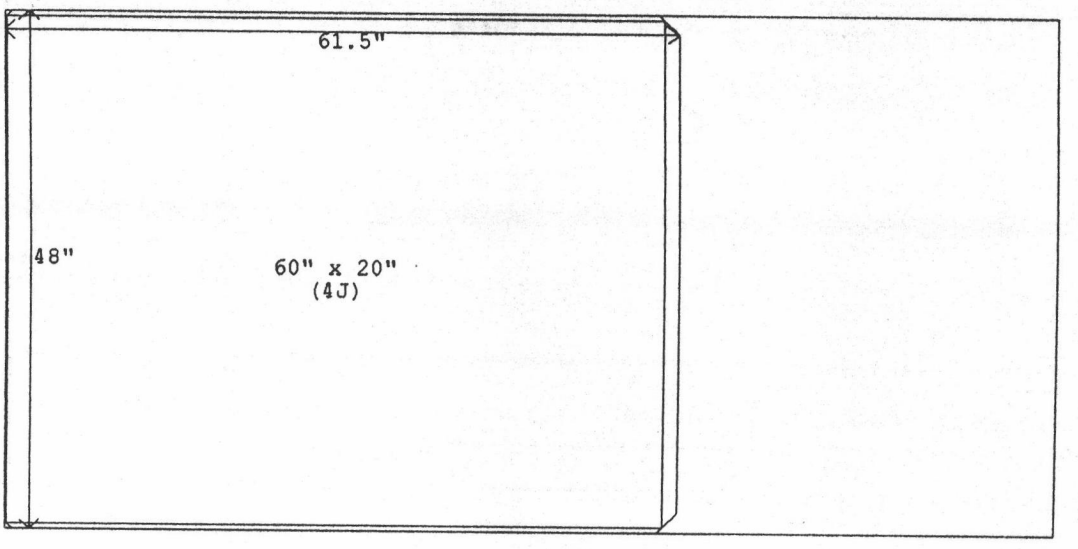
Gage #22 Amount - 5 sheets



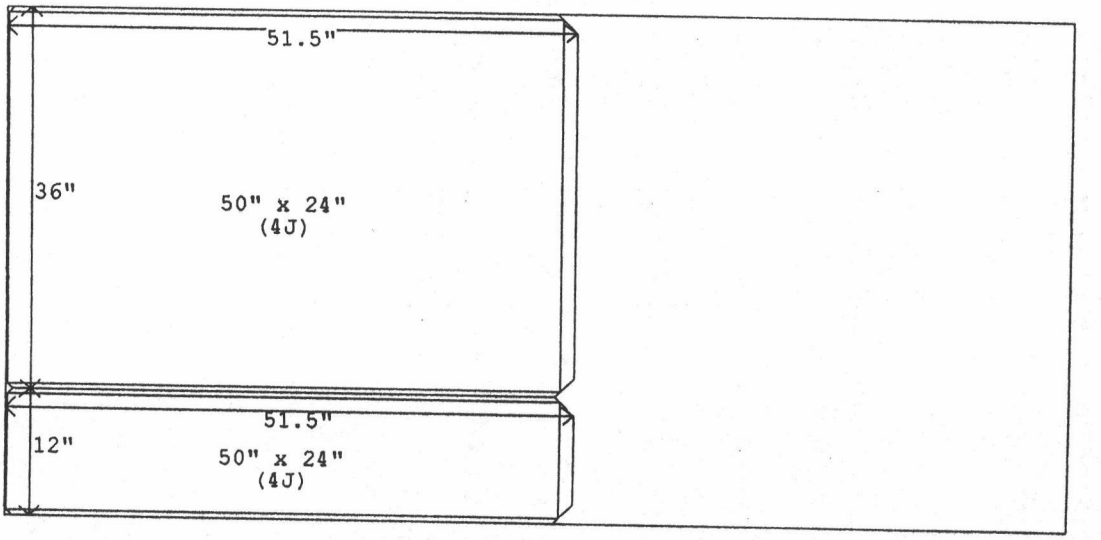
Gage #22 Amount - 1 sheet



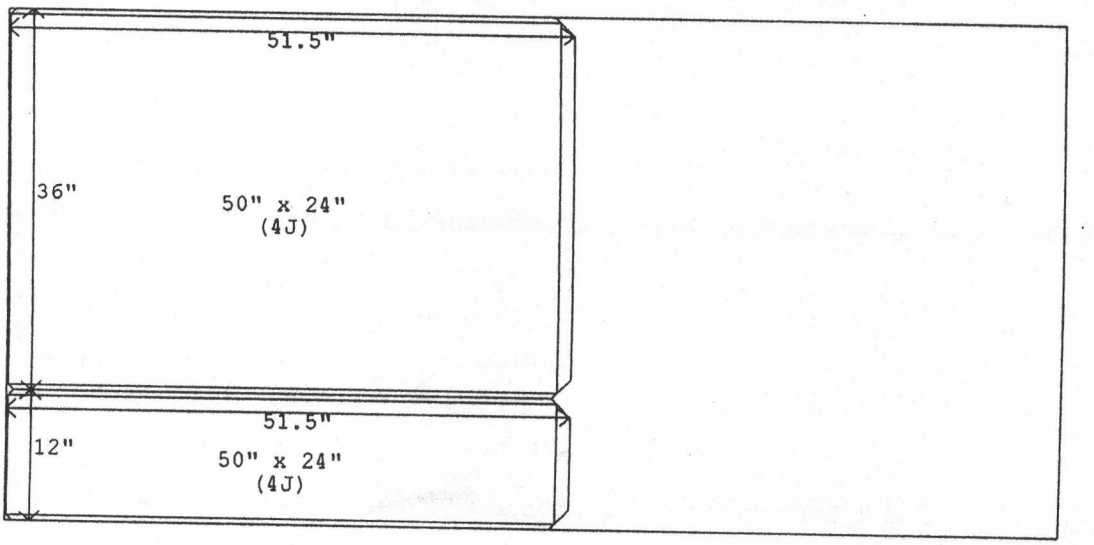
Gage #22 Amount - 1 sheet



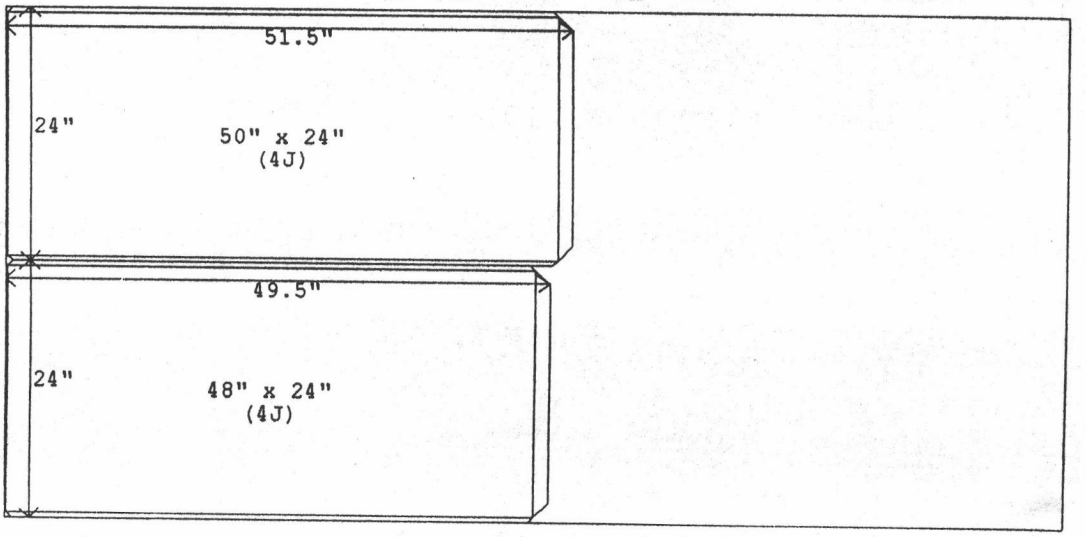
Gage #22 Amount - 1 sheet



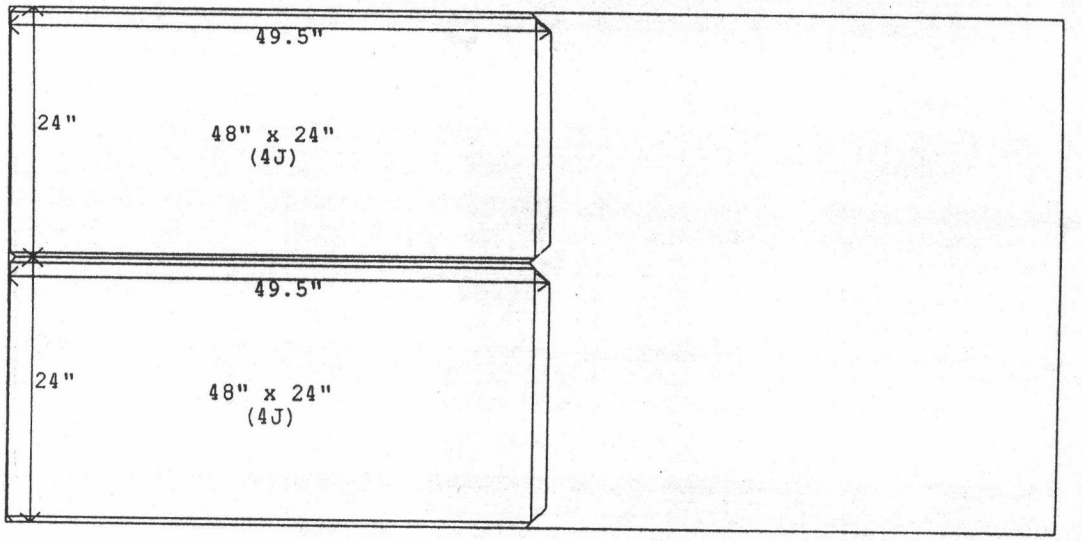
Gage #22 Amount - 1 sheet



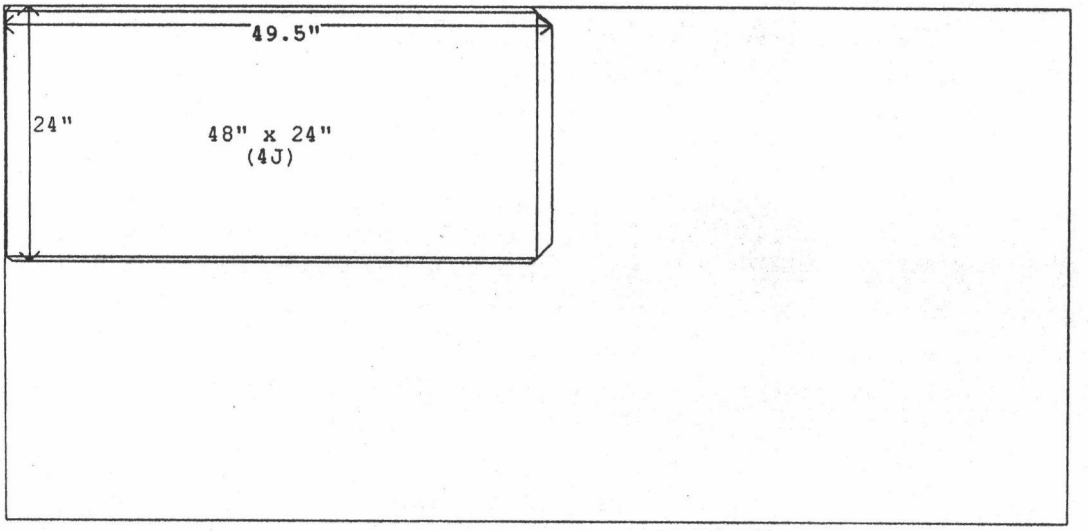
Gage #22 Amount - 1 sheet



Gage #22 Amount - 1 sheet

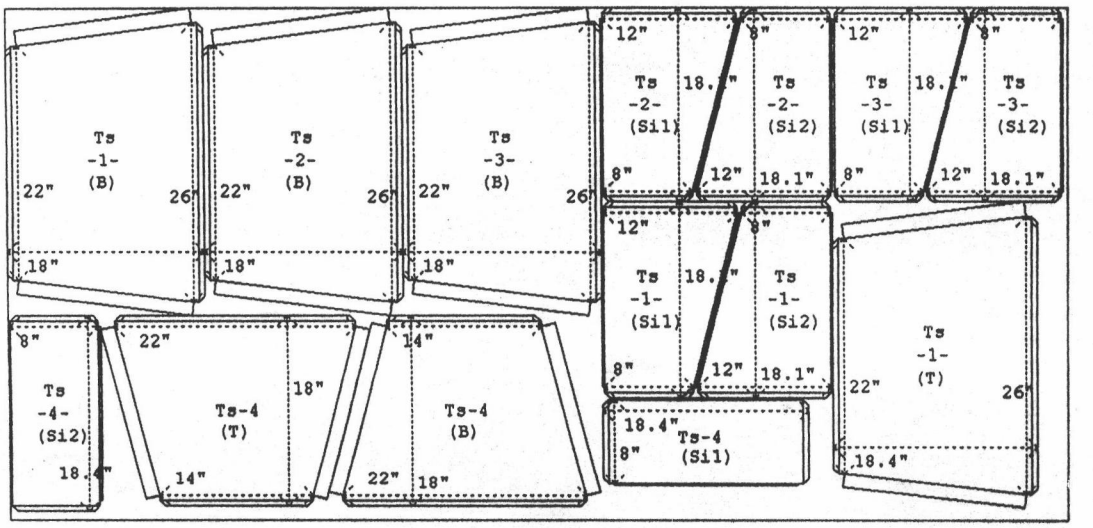


Gage #22 Amount - 1 sheet



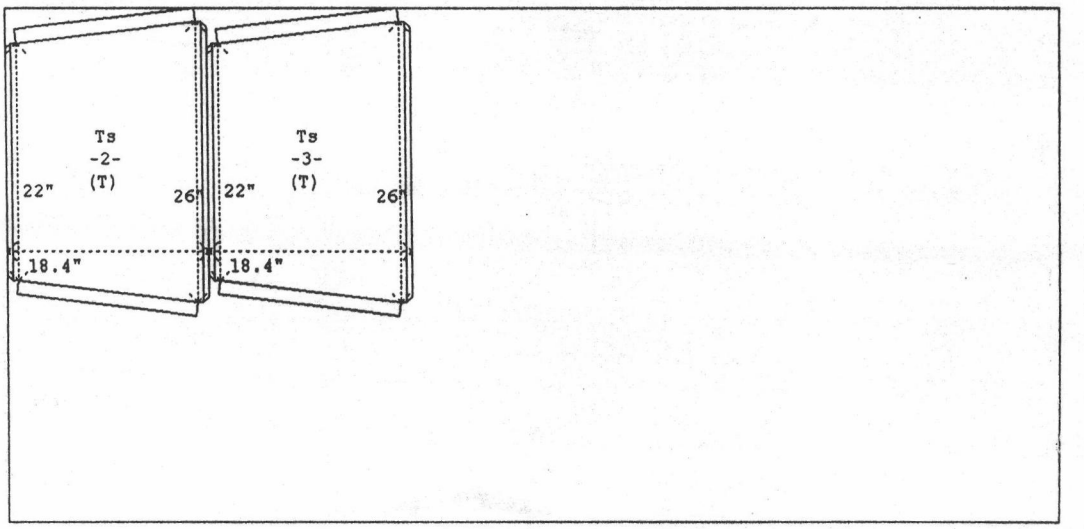
Gage #22 Amount - 1 sheet **Total Gage#22 - 70 sheets**

รูปที่ ง.5 รูปแบบแผ่นคลี่ที่เหมาะสมของแผ่นสังกะสีเบอร์ 28 สำหรับข้อต่อเปลี่ยนขนาด ในตัวอย่างระบบท่อลมที่ 1



Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

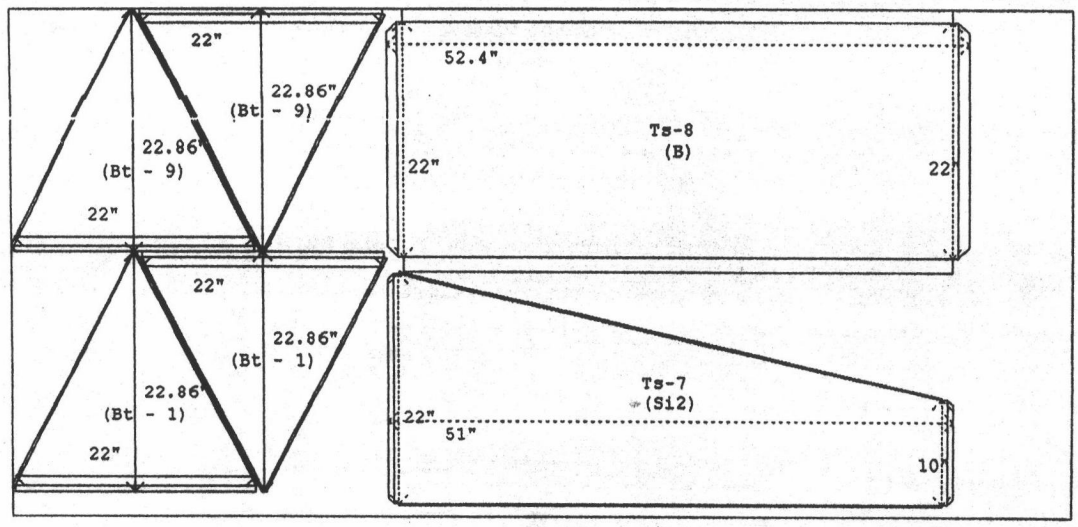
Gage #26 Amount - 1 sheet



Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

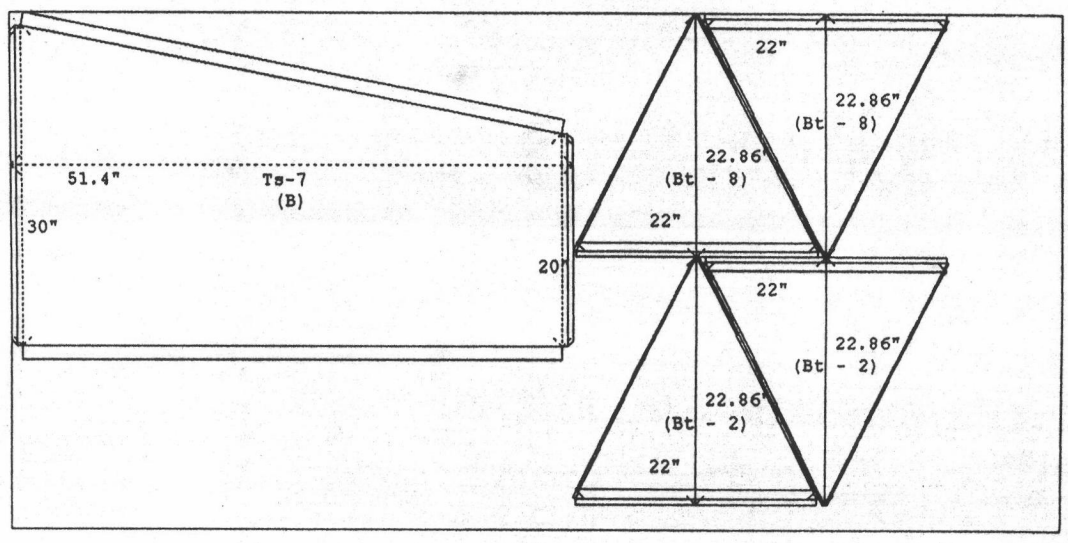
Gage #26 Amount - 1 sheet **Total Gage#26 - 2 sheets**

รูปที่ ง.6 รูปแบบแผ่นคลี่ที่เหมาะสมของแผ่นสังกะสีเบอร์ 24 สำหรับข้อต่อเปลี่ยนขนาด และ คอหัวจ่ายลม ในตัวอย่างระบบท่อลมที่ 1



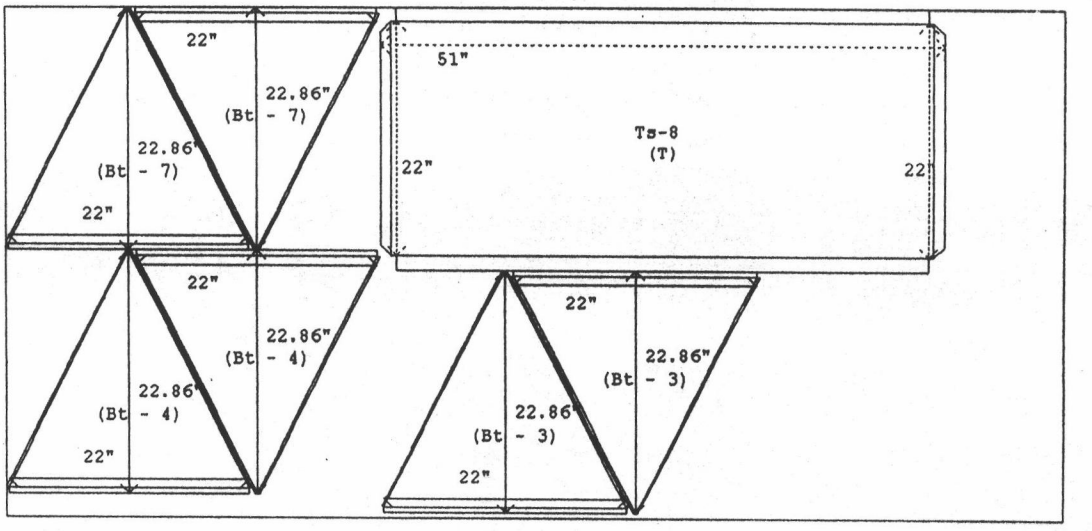
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #24 Amount - 1 sheet



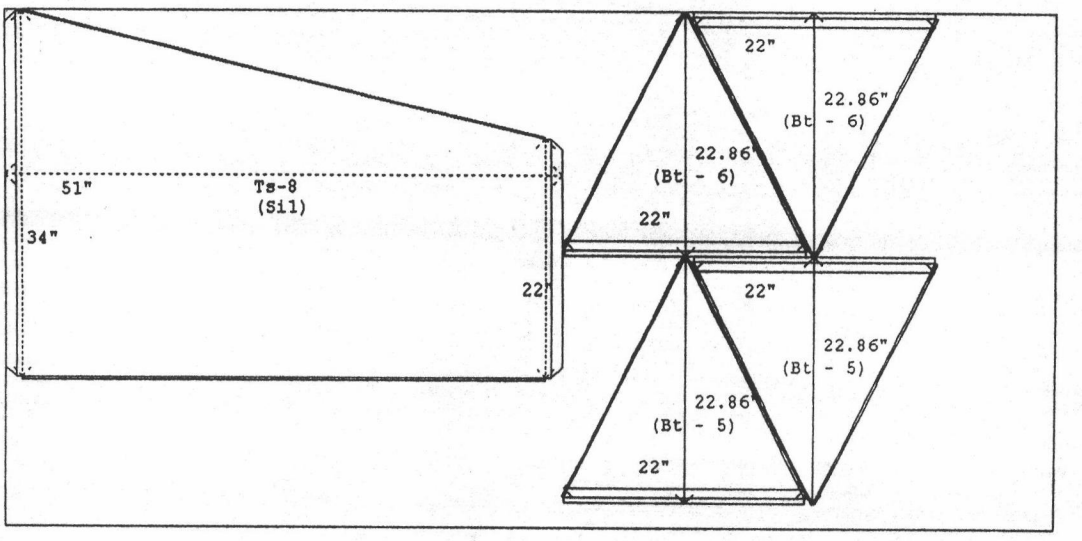
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #24 Amount - 1 sheet



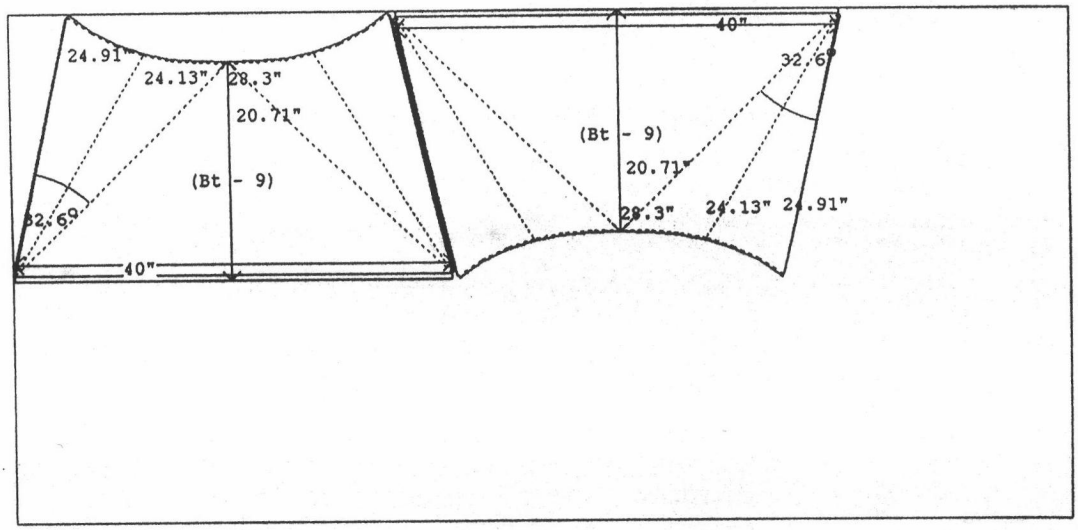
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #24 Amount - 1 sheet



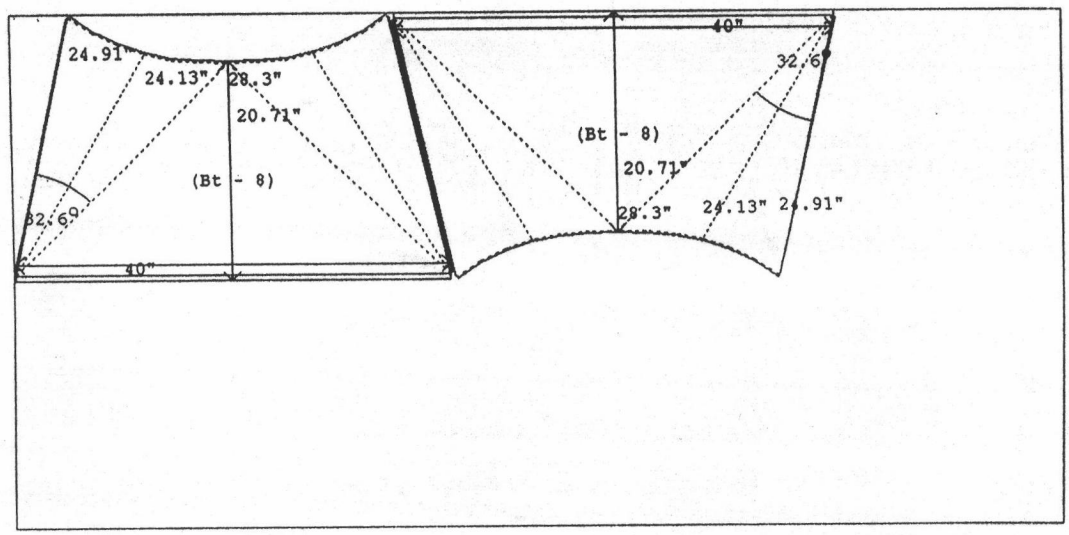
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #24 Amount - 1 sheet



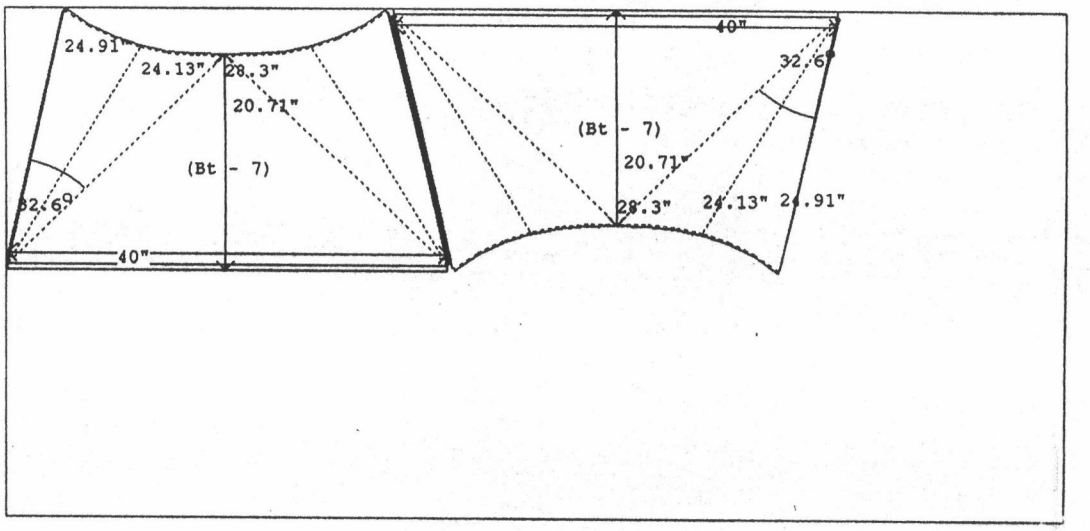
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #24 Amount - 1 sheet



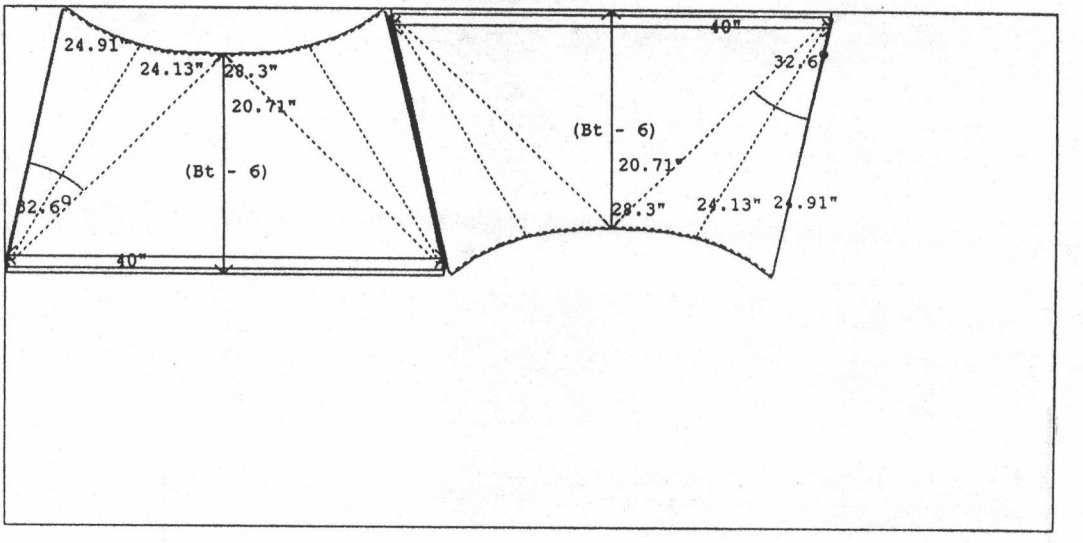
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #24 Amount - 1 sheet



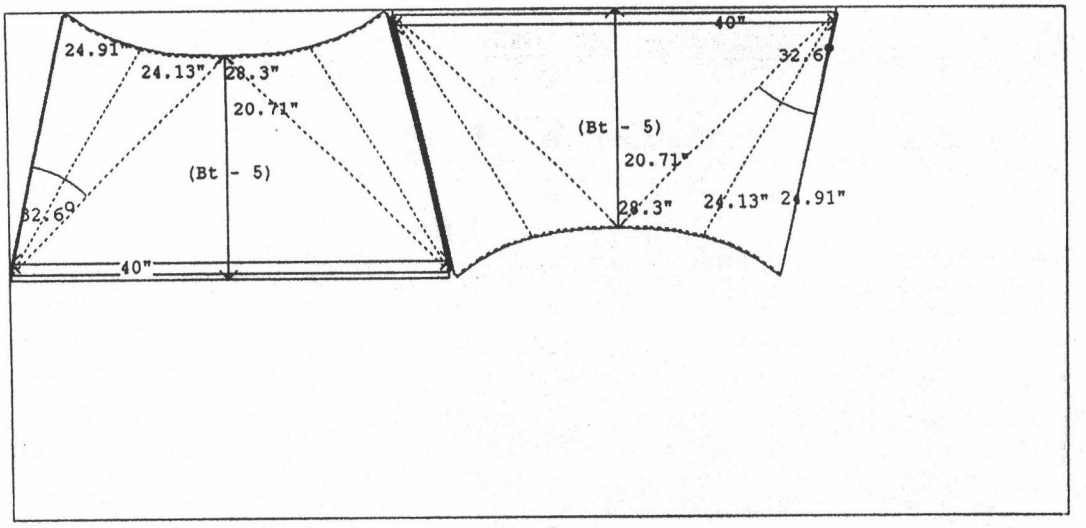
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #24 Amount - 1 sheet



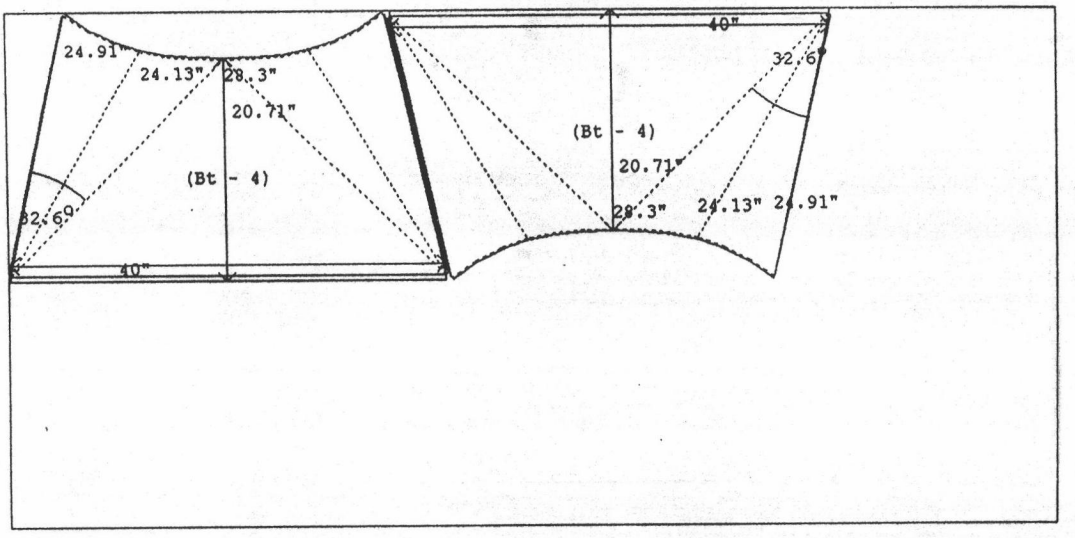
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #24 Amount - 1 sheet



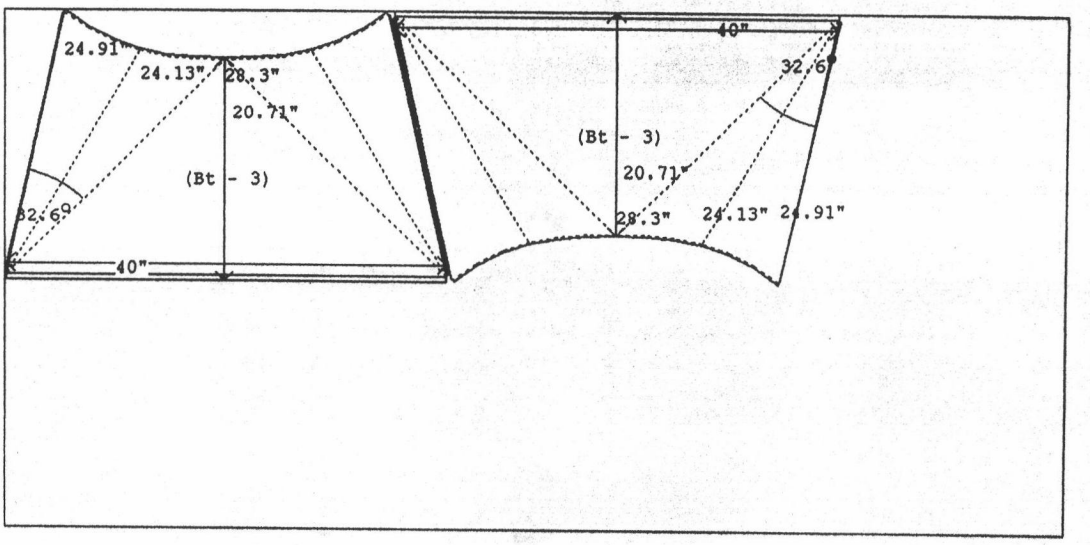
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #24 Amount - 1 sheet



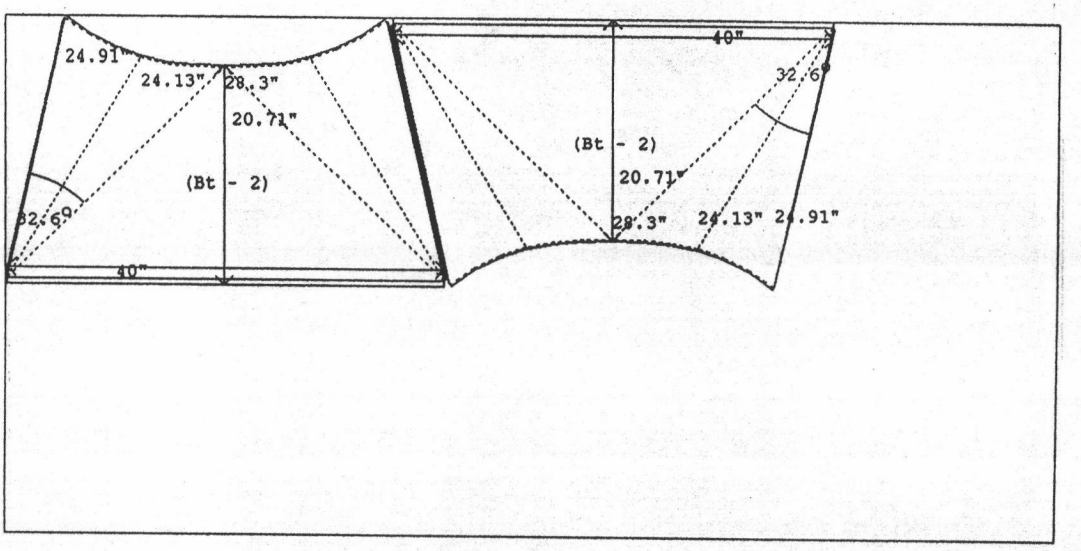
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #24 Amount - 1 sheet



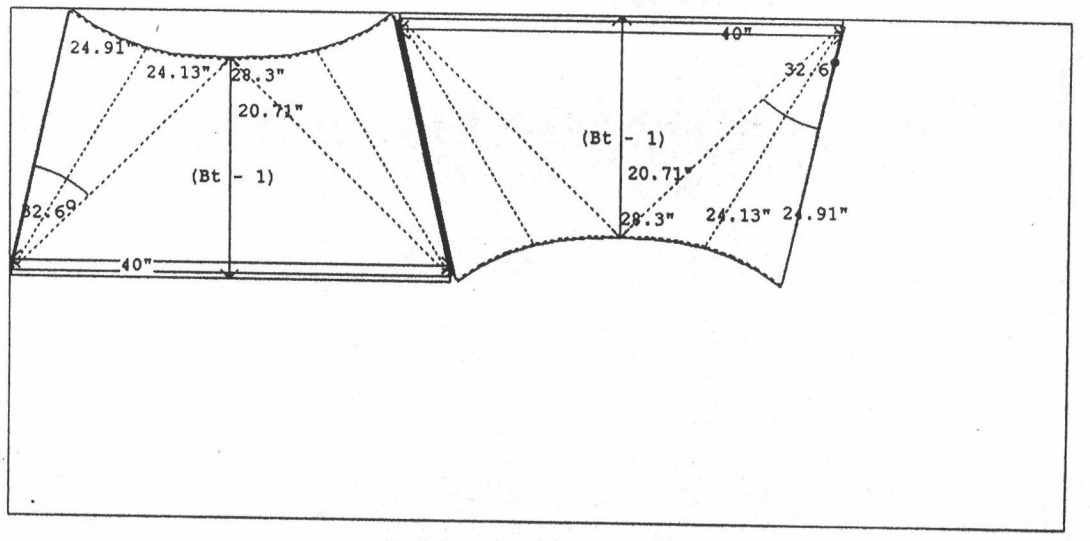
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #24 Amount - 1 sheet



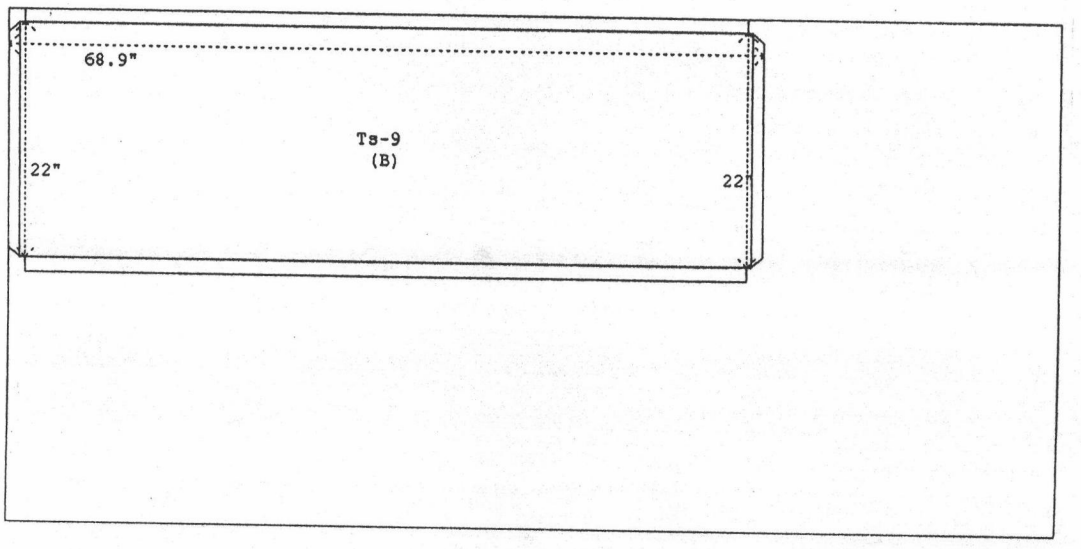
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #24 Amount - 1 sheet



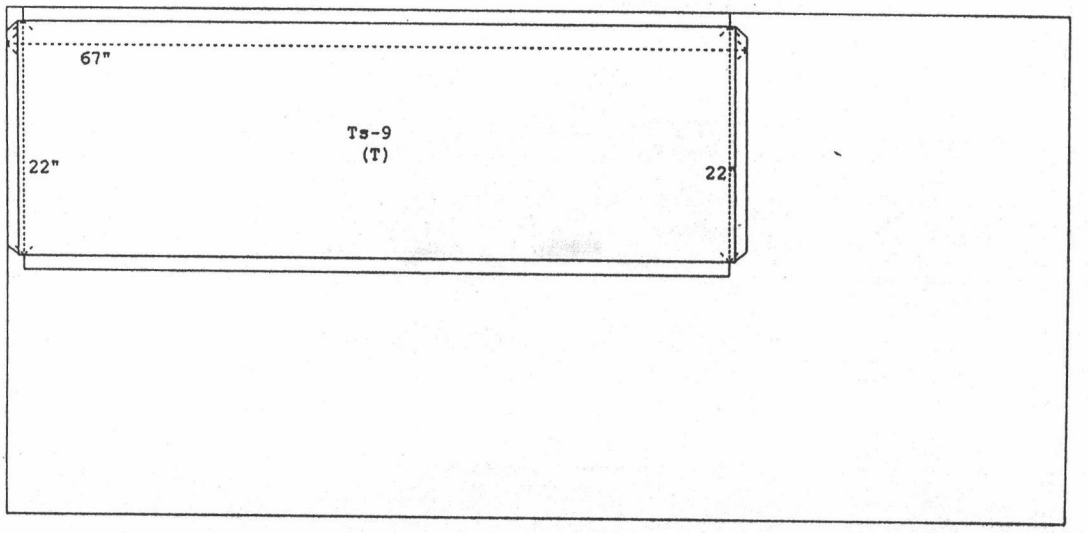
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #24 Amount - 1 sheet



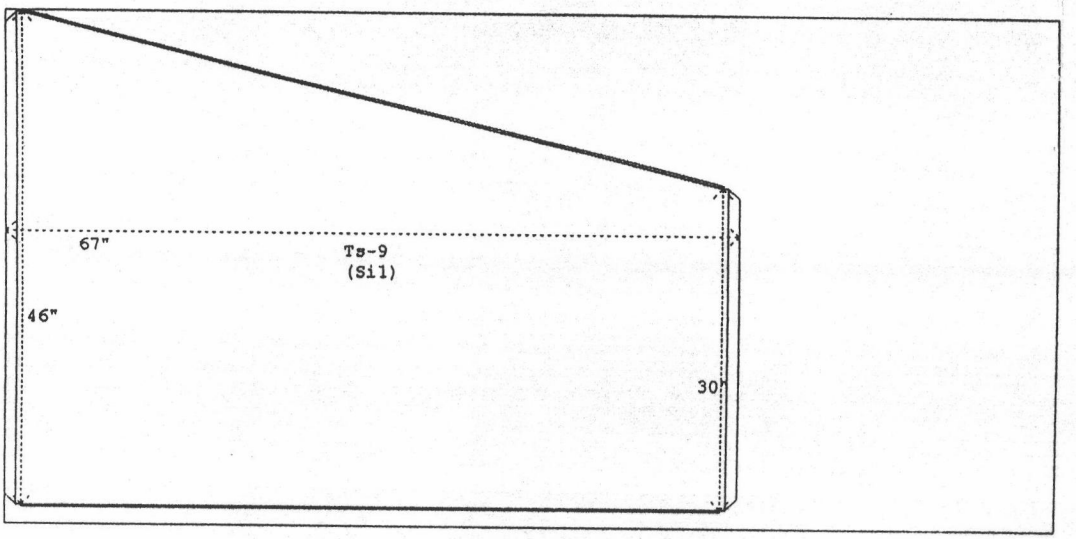
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #24 Amount - 1 sheet



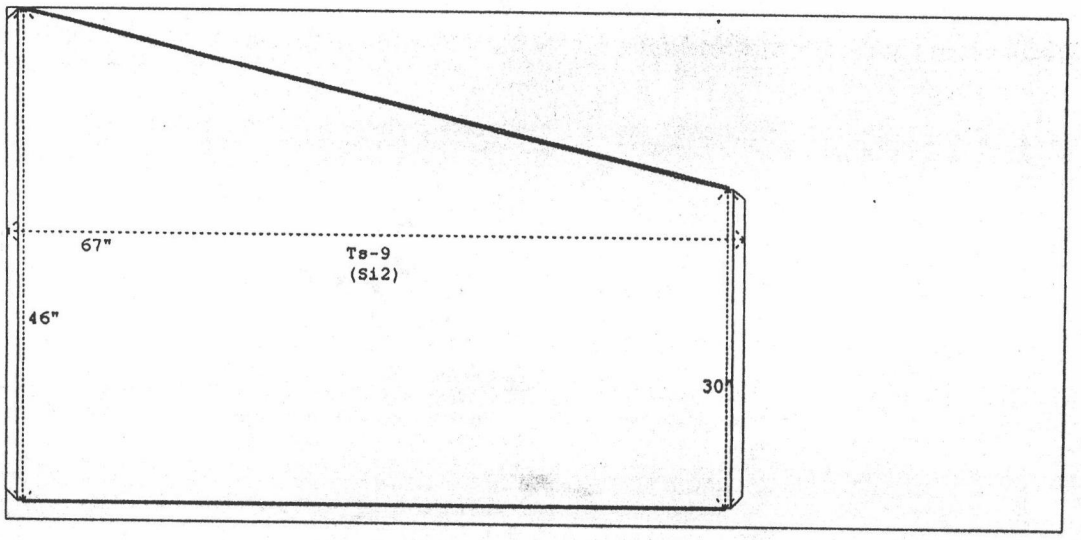
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #24 Amount - 1 sheet



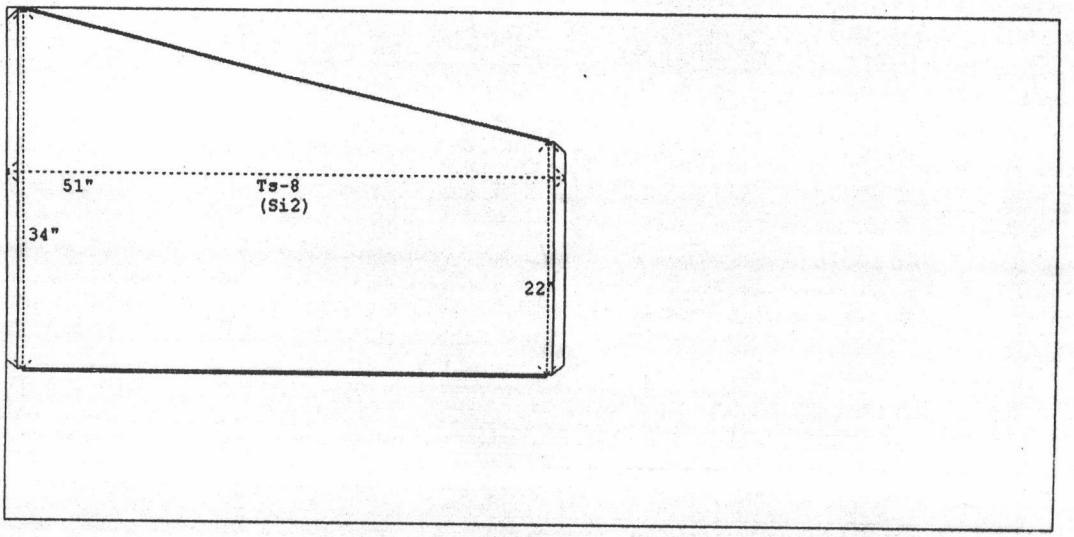
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #24 Amount - 1 sheet



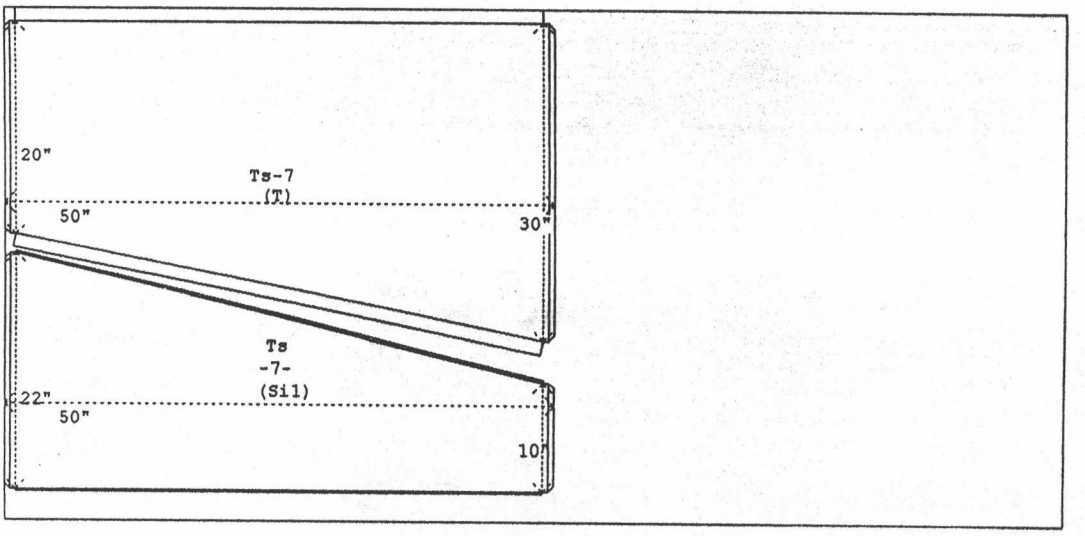
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #24 Amount - 1 sheet



Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

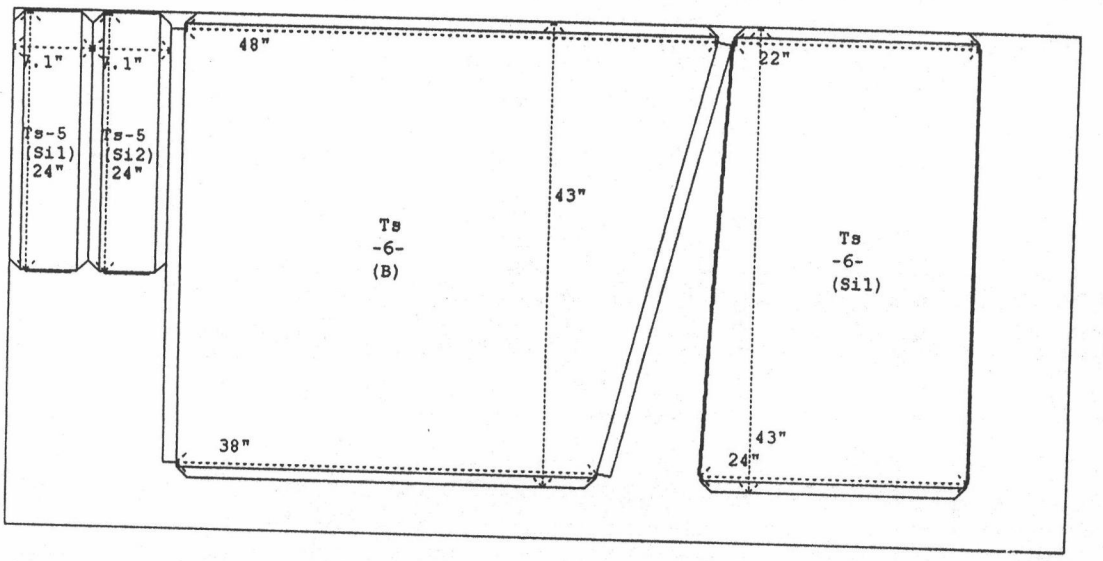
Gage #24 Amount - 1 sheet



Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

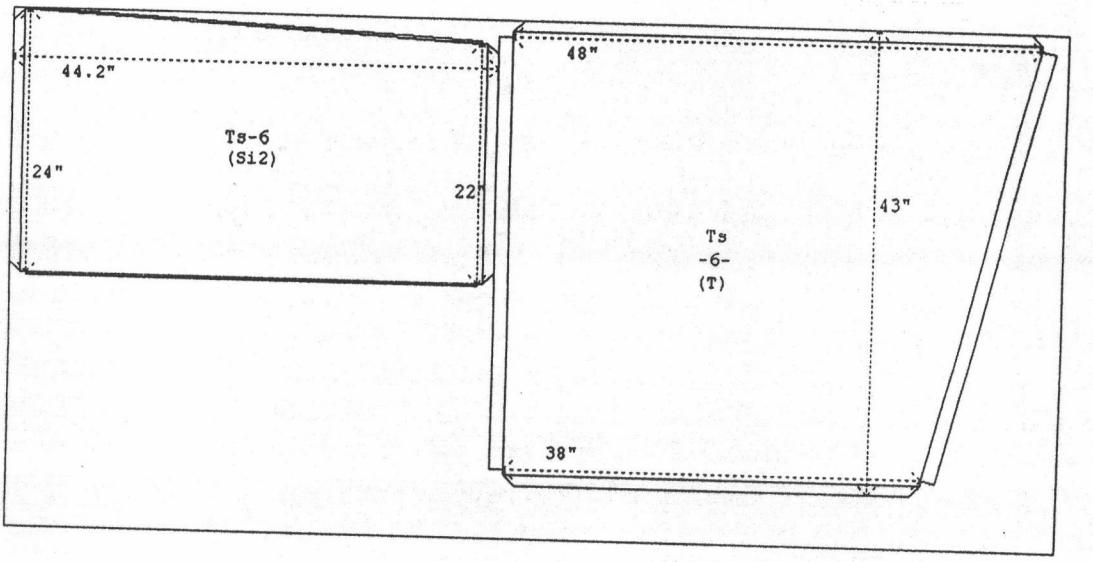
Gage #24 Amount - 1 sheet **Total Gage#24 - 19 sheets**

รูปที่ ง.7 รูปแบบแผ่นคลี่ที่เหมาะสมของแผ่นสังกะสีเบอร์ 22 สำหรับข้อต่อเปลี่ยนขนาด ในตัวอย่างระบบท่อลมที่ 1



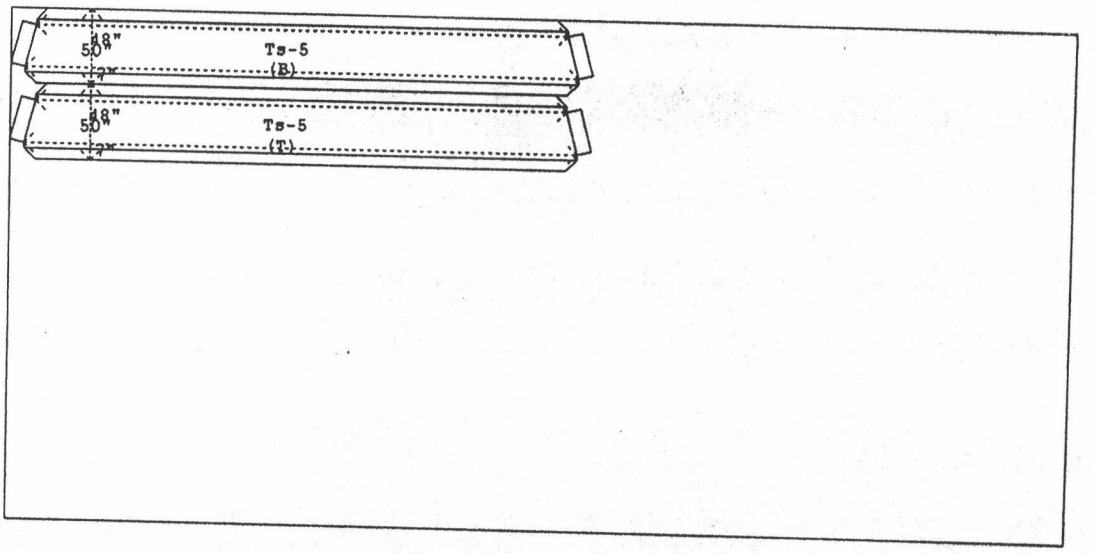
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #22 Amount - 1 sheet



Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

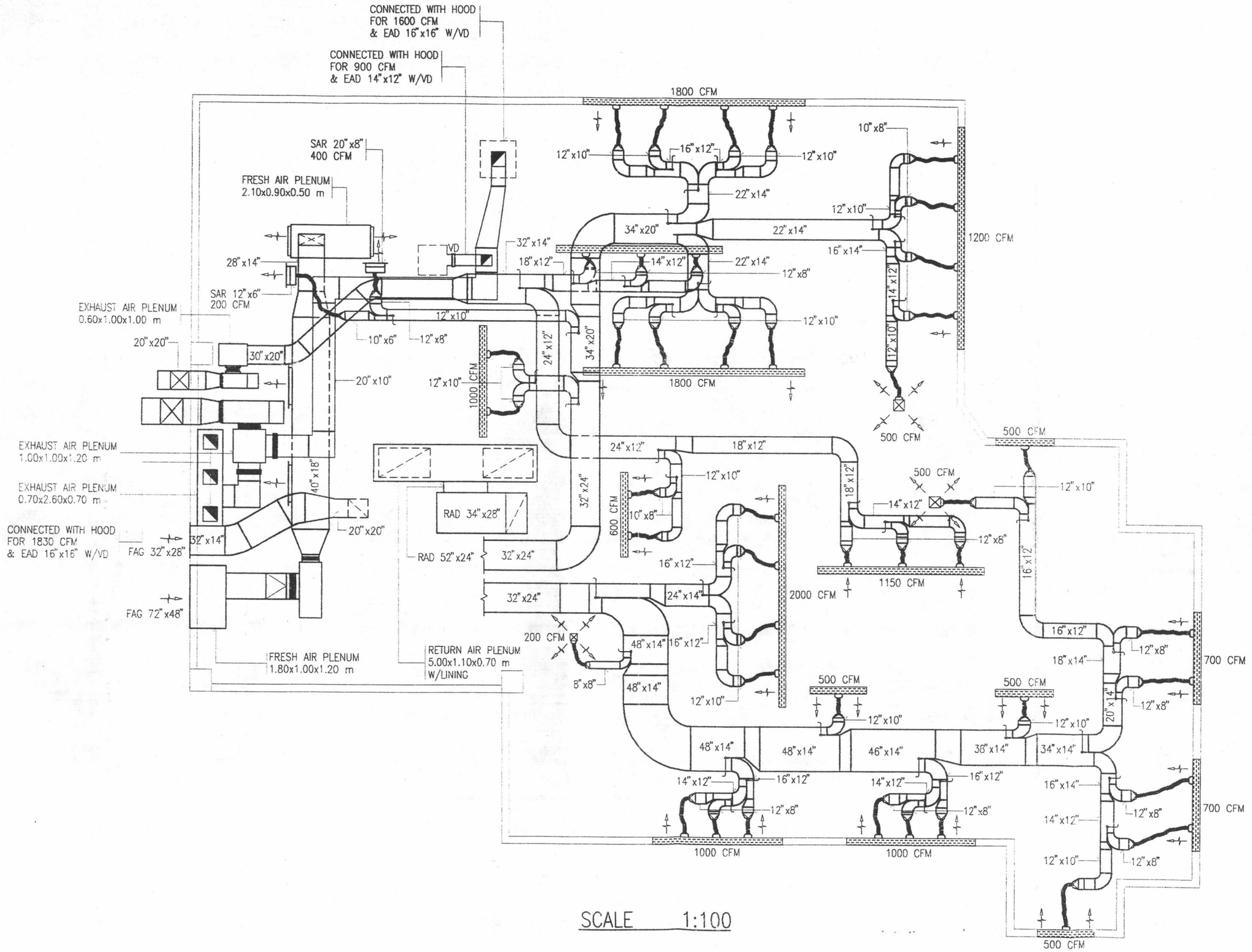
Gage #22 Amount - 1 sheet



Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

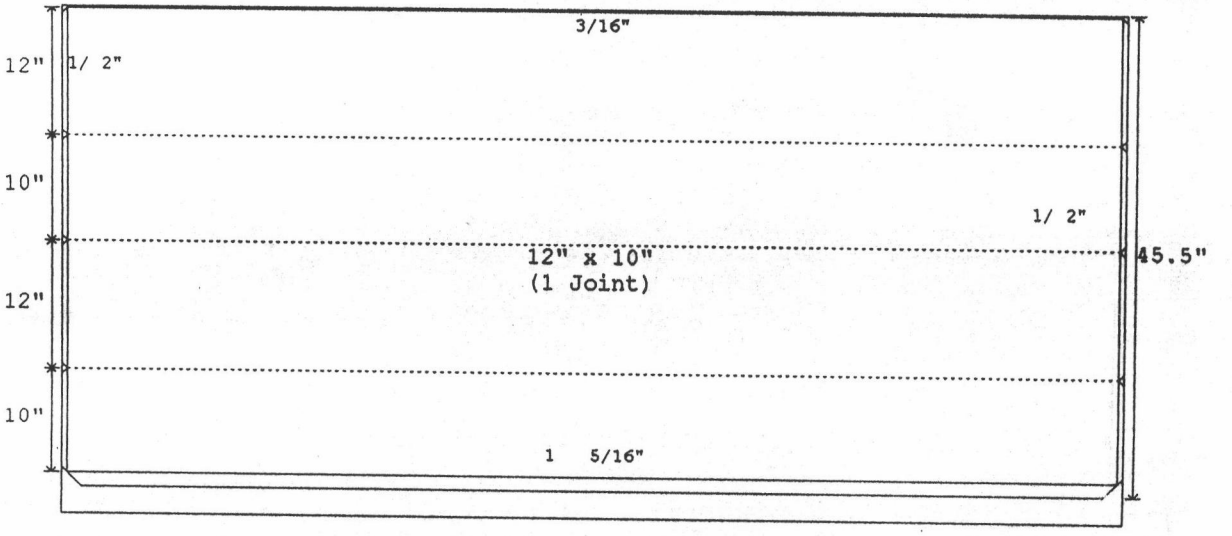
Gage #22 Amount - 1 sheet **Total Gage#22 - 3 sheets**

รูปที่ ง.8 แบบแปลนตัวอย่างระบบท่อลมที่ 2

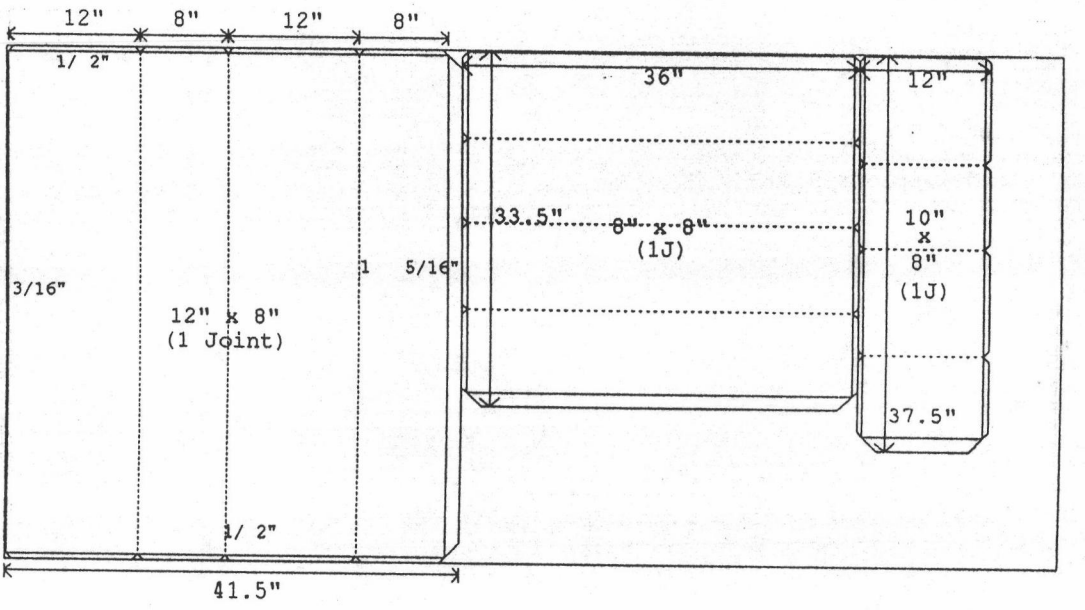

CONNECTED WITH HOOD FOR 1600 CFM & EAD 16"x16" W/VD
CONNECTED WITH HOOD FOR 900 CFM & EAD 14"x12" W/VD
1800 CFM
SAR 20"x8" 400 CFM
FRESH AIR PLENUM 2.10x0.90x0.50 m
12"x10"
16"x12"
12"x10"
10"x8"
22"x14"
12"x10"
34"x20"
22"x14"
1200 CFM
16"x14"
VD
32"x14"
18"x12"
14"x12"
22"x14"
28"x14"
12"x8"
SAR 12"x6" 200 CFM
EXHAUST AIR PLENUM 0.60x1.00x1.00 m
12"x10"
14"x12"
12"x10"
10"x6"
12"x8"
20"x20"
30"x20"
24"x12"
34"x20"
20"x10"
12"x10"
1000 CFM
1800 CFM
500 CFM
EXHAUST AIR PLENUM 1.00x1.00x1.20 m
24"x12"
18"x12"
40"x18"
12"x10"
EXHAUST AIR PLENUM 0.70x2.60x0.70 m
18"x12"
500 CFM
10"x8"
14"x12"
12"x10"
CONNECTED WITH HOOD FOR 1830 CFM & EAD 16"x16" W/VD
32"x14"
FAG 32"x28"
20"x20"
RAD 34"x28"
32"x24"
600 CFM
12"x8"
RAD 52"x24"
32"x24"
16"x12"
1150 CFM
32"x24"
24"x14"
2000 CFM
16"x12"
FAG 72"x48"
200 CFM
48"x14"
16"x12"
12"x8"
700 CFM
FRESH AIR PLENUM 1.80x1.00x1.20 m
RETURN AIR PLENUM 5.00x1.10x0.70 m W/LINING
8"x8"
48"x14"
12"x10"
500 CFM
500 CFM
12"x10"
12"x10"
18"x14"
12"x8"
20"x14"
12"x8"
48"x14"
48"x14"
46"x14"
38"x14"
34"x14"
14"x12"
16"x12"
14"x12"
16"x12"
16"x14"
12"x8"
700 CFM
14"x12"
12"x8"
12"x8"
1000 CFM
1000 CFM
12"x10"
12"x8"
500 CFM

SCALE 1:100

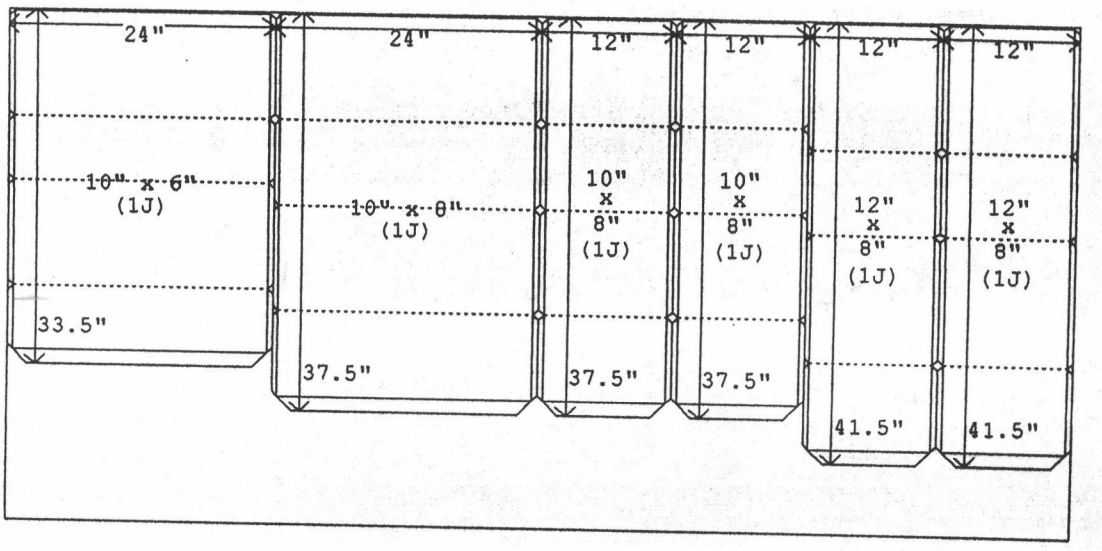
รูปที่ ง.9 รูปแบบแผ่นคลี่ที่เหมาะสมของแผ่นสังกะสีเบอร์ 26 สำหรับท่อลมตรง
ในตัวอย่างระบบท่อลมที่ 2



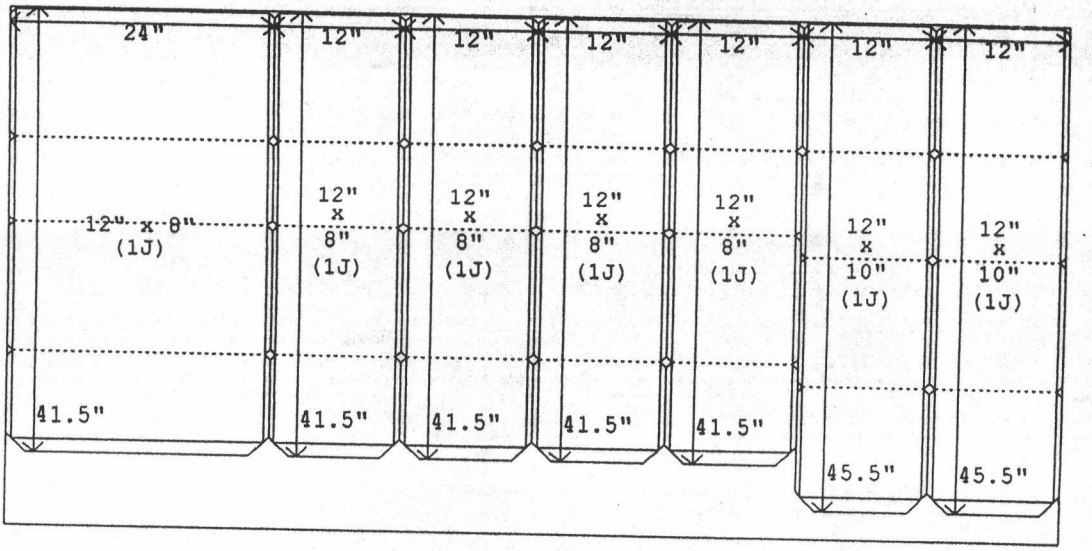
Gage #26 Amount - 1 sheet



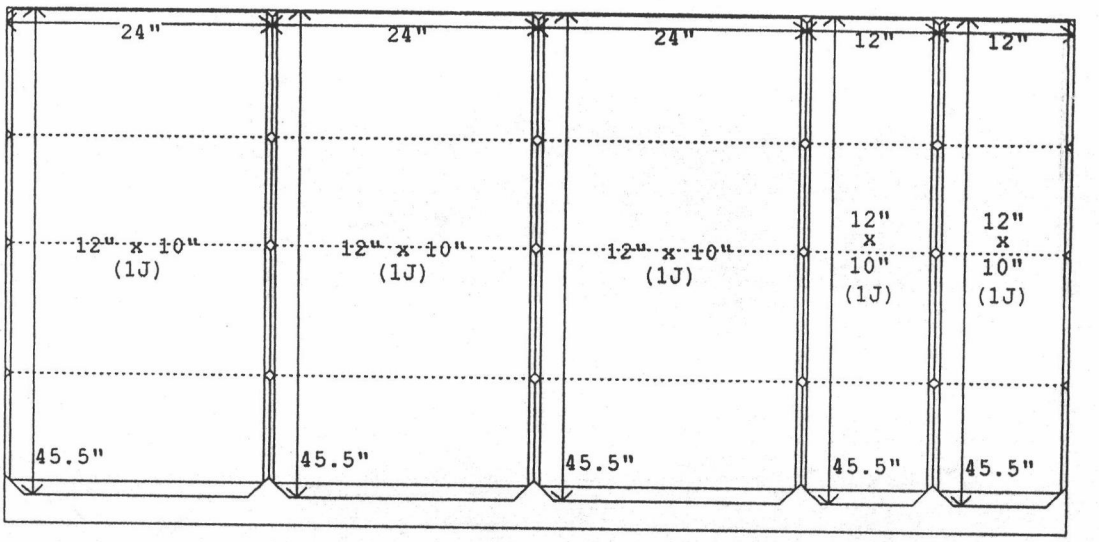
Gage #26 Amount - 1 sheet



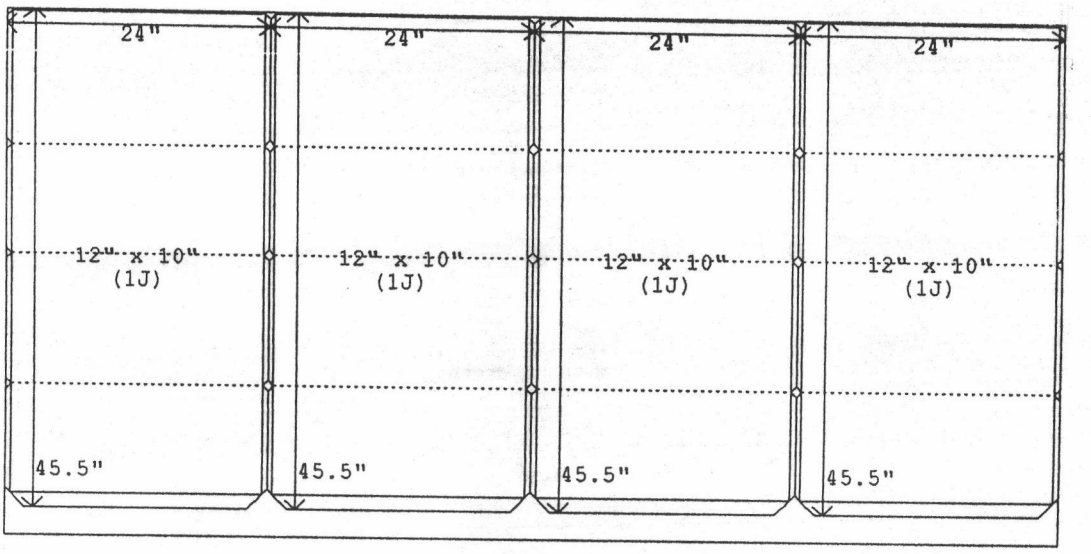
Gage #26 Amount - 1 sheet



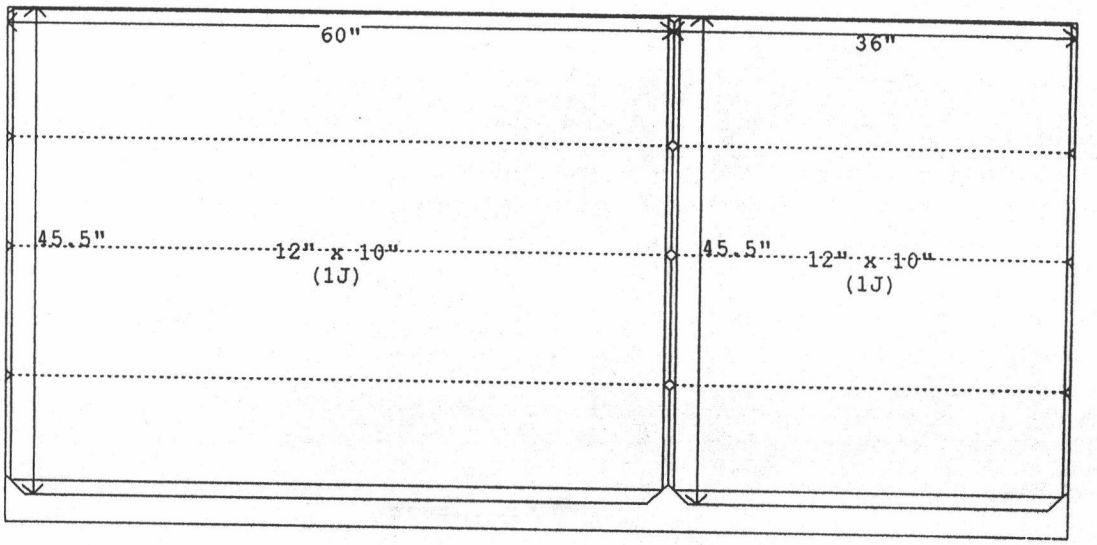
Gage #26 Amount - 1 sheet



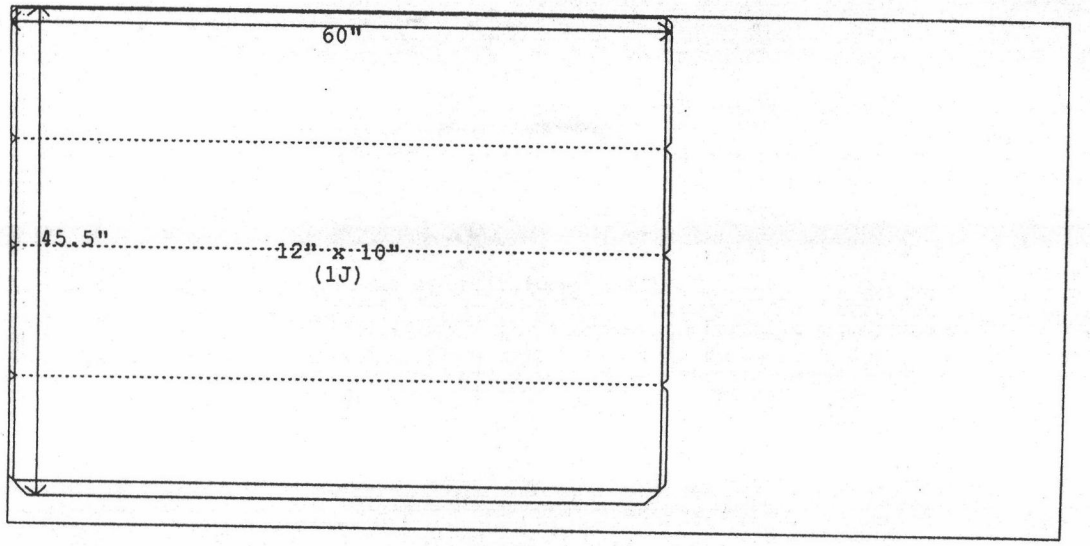
Gage #26 Amount - 1 sheet



Gage #26 Amount - 1 sheet

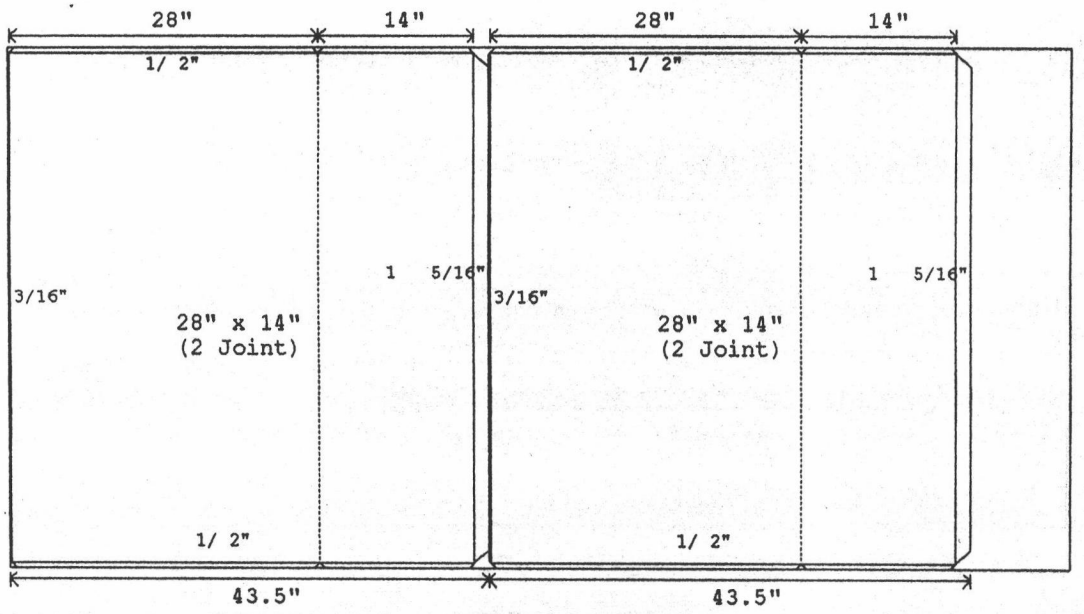


Gage #26 Amount - 1 sheet

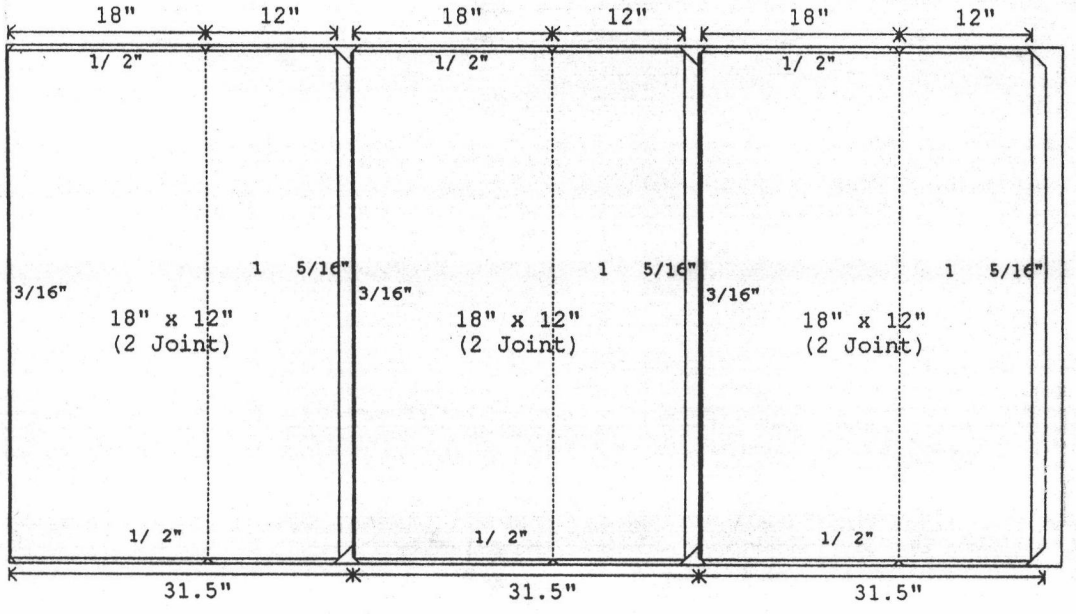


Gage #26 Amount - 1 sheet **Total Gage#26 - 8 sheets**

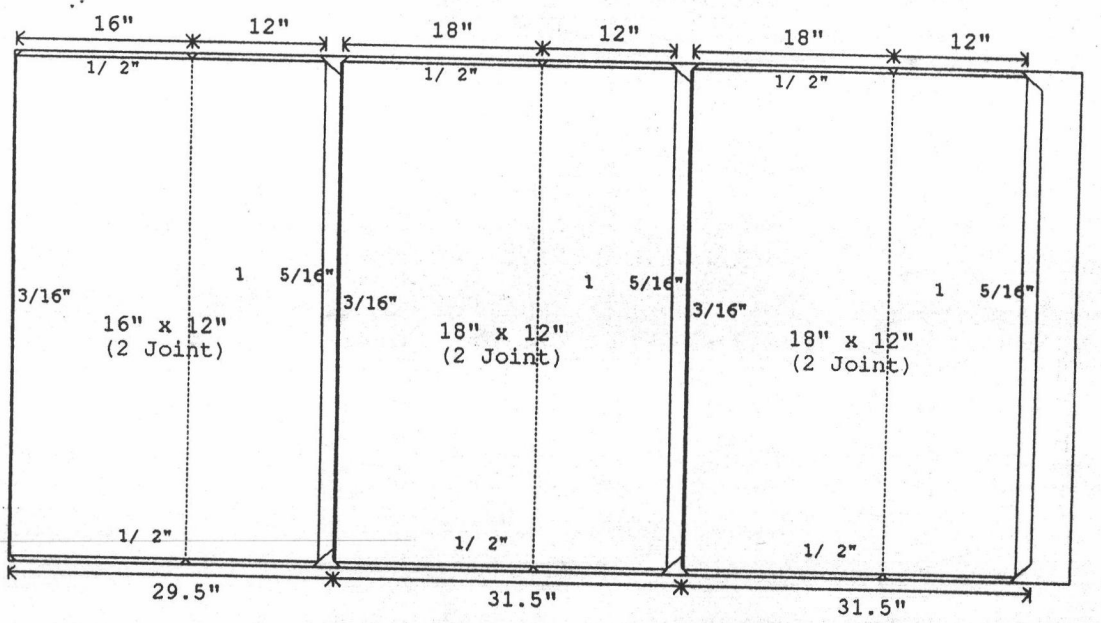
รูปที่ ง.10 รูปแบบแผ่นคลี่ที่เหมาะสมของแผ่นสังกะสีเบอร์ 24 สำหรับท่อลมตรง ในตัวอย่างระบบท่อลมที่ 2



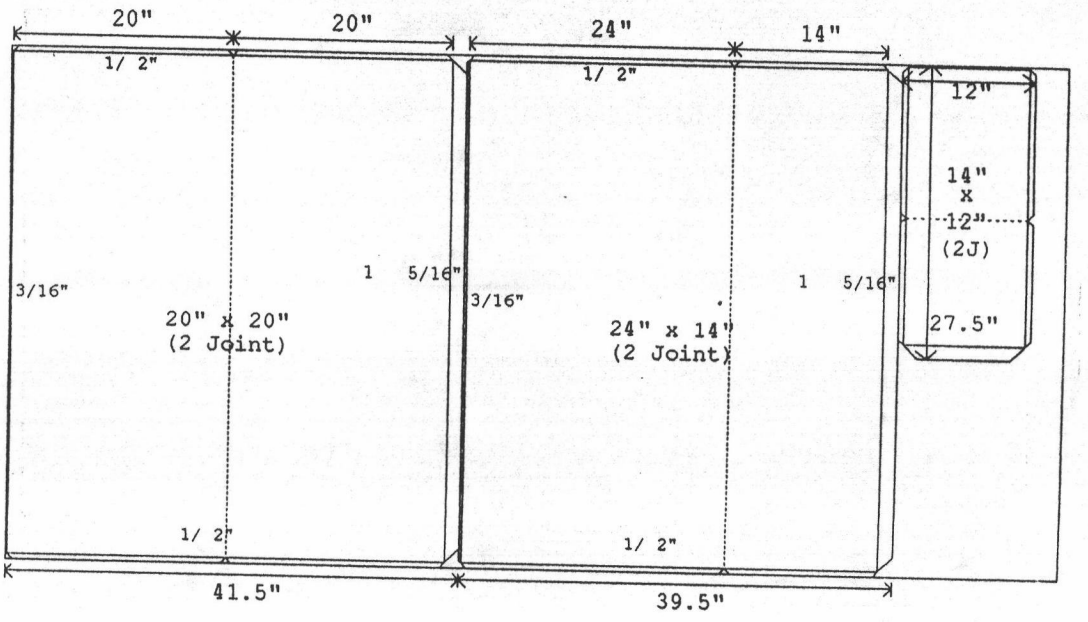
Gage #24 Amount - 1 sheet



Gage #24 Amount - 2 sheets



Gage #24 Amount - 1 sheet



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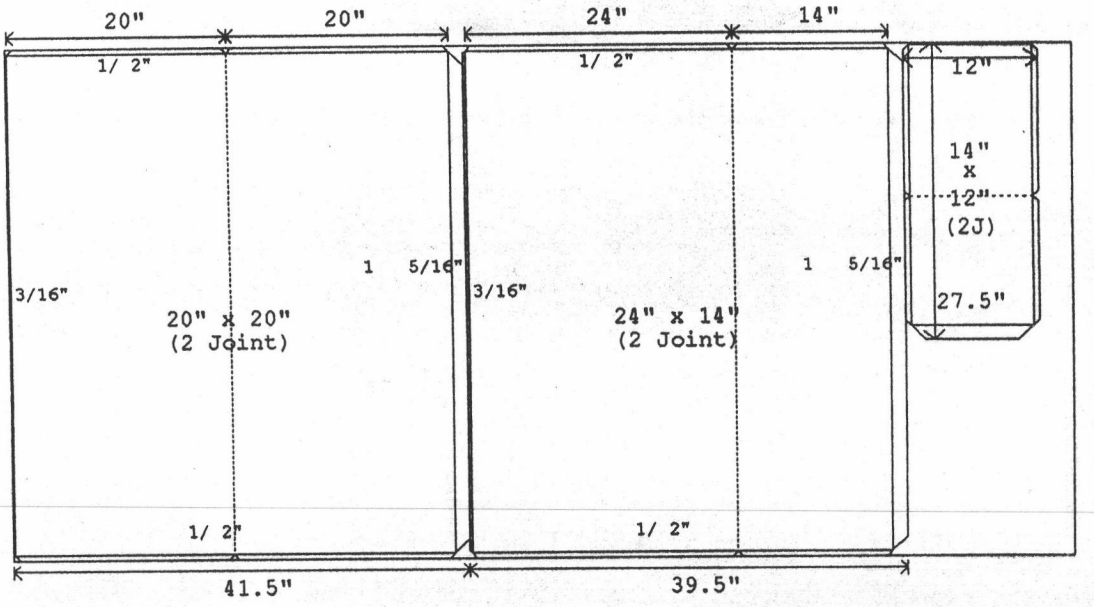

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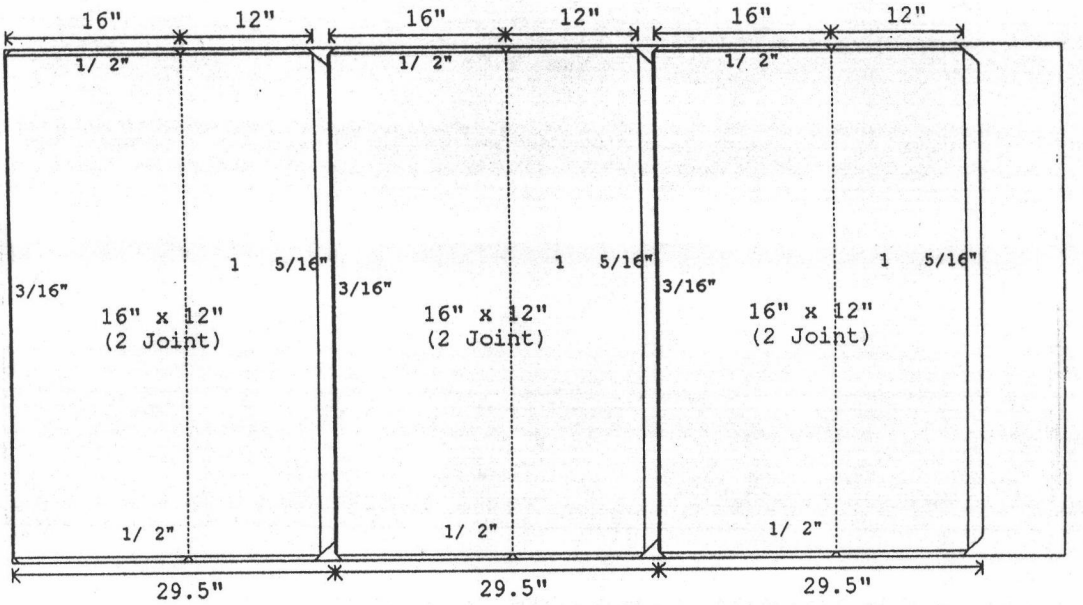
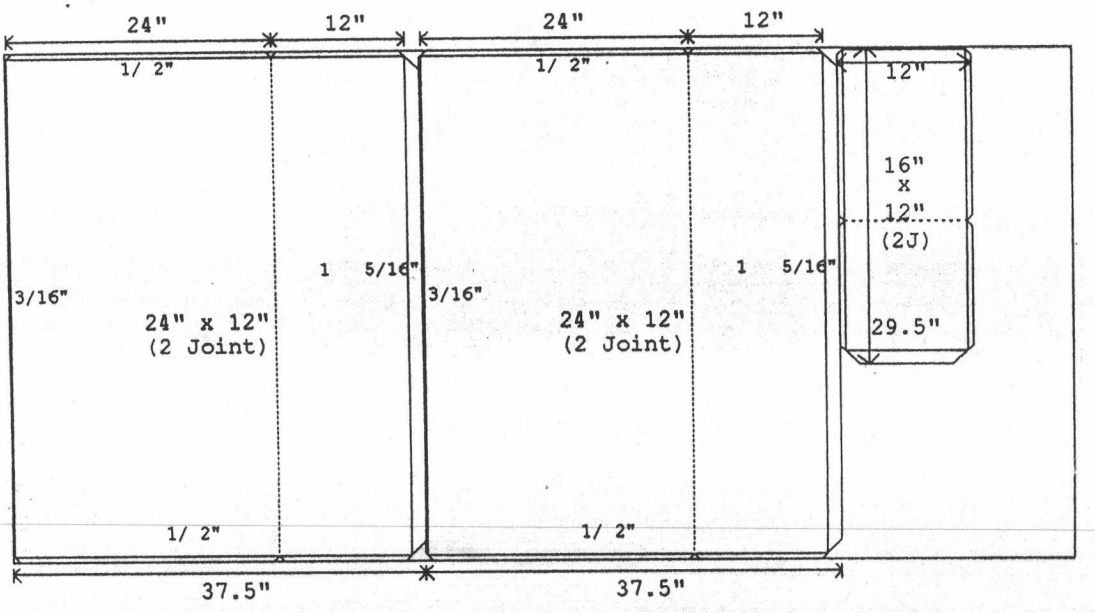


Gage #24 Amount - 1 sheet



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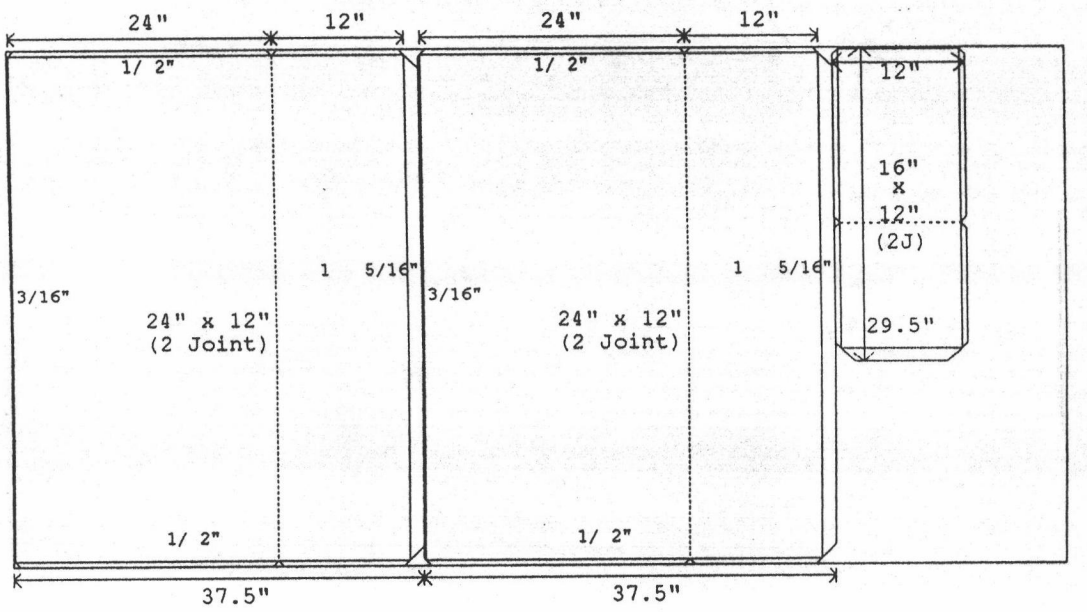

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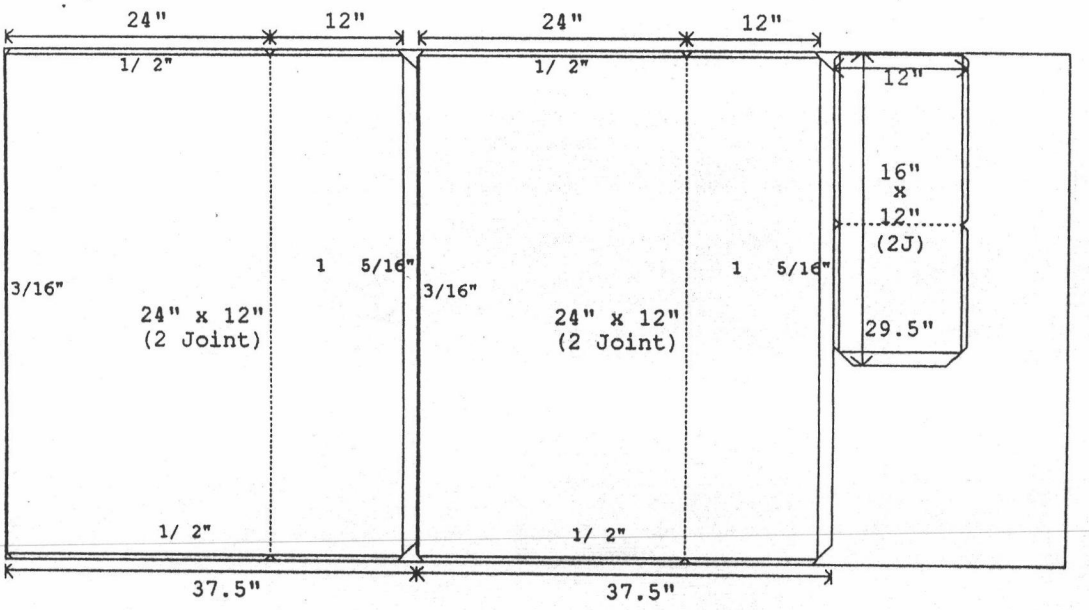

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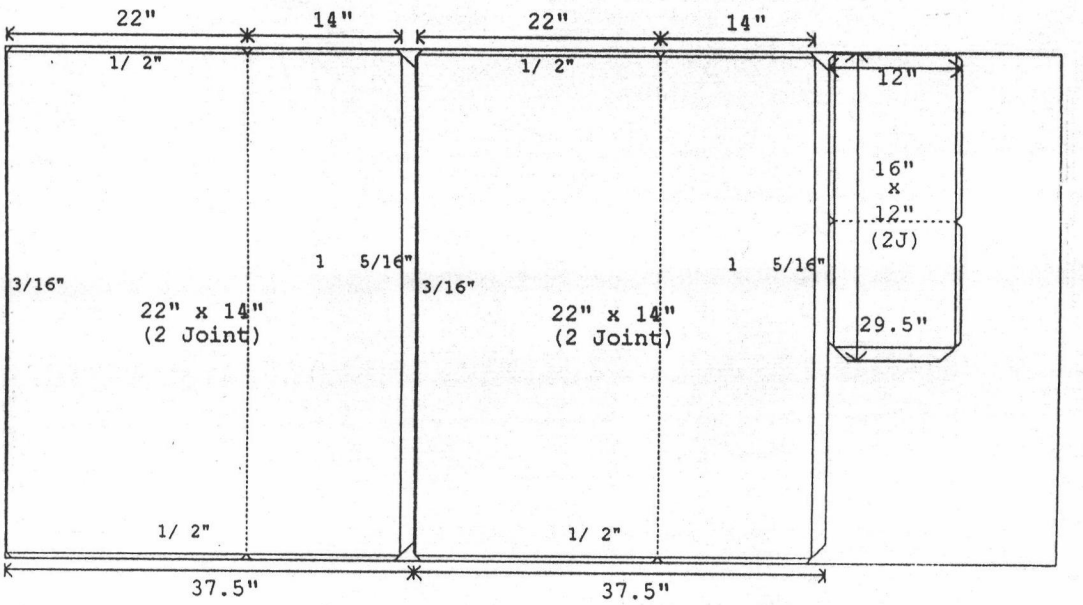

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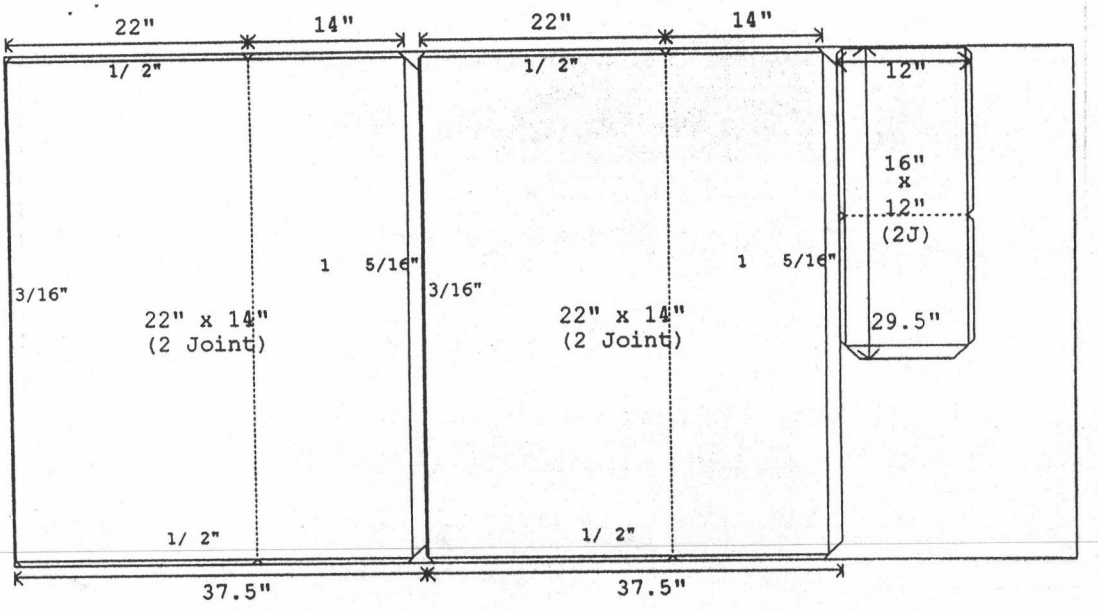

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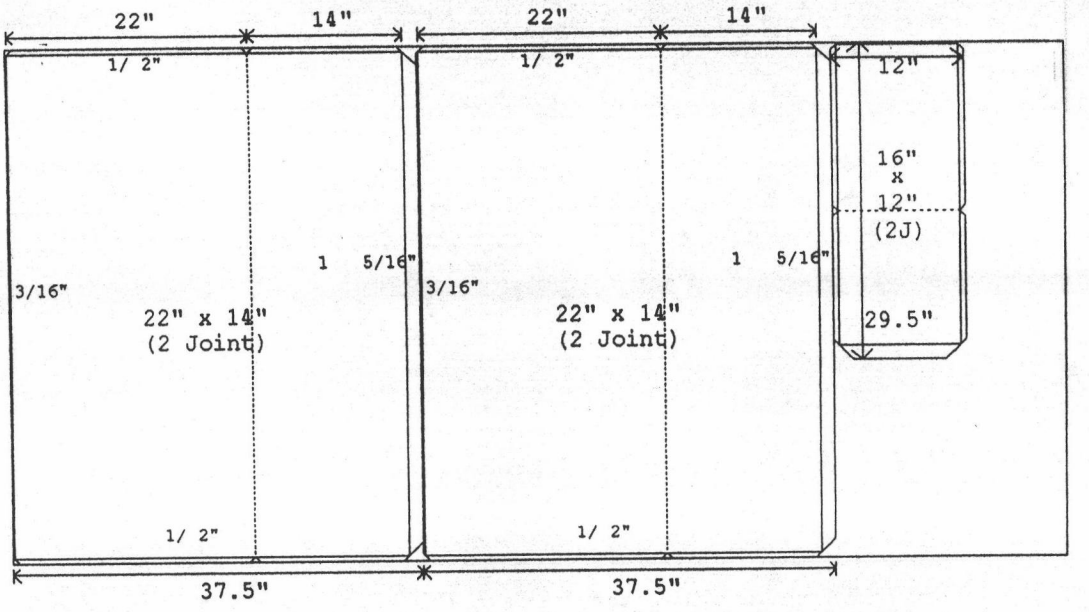

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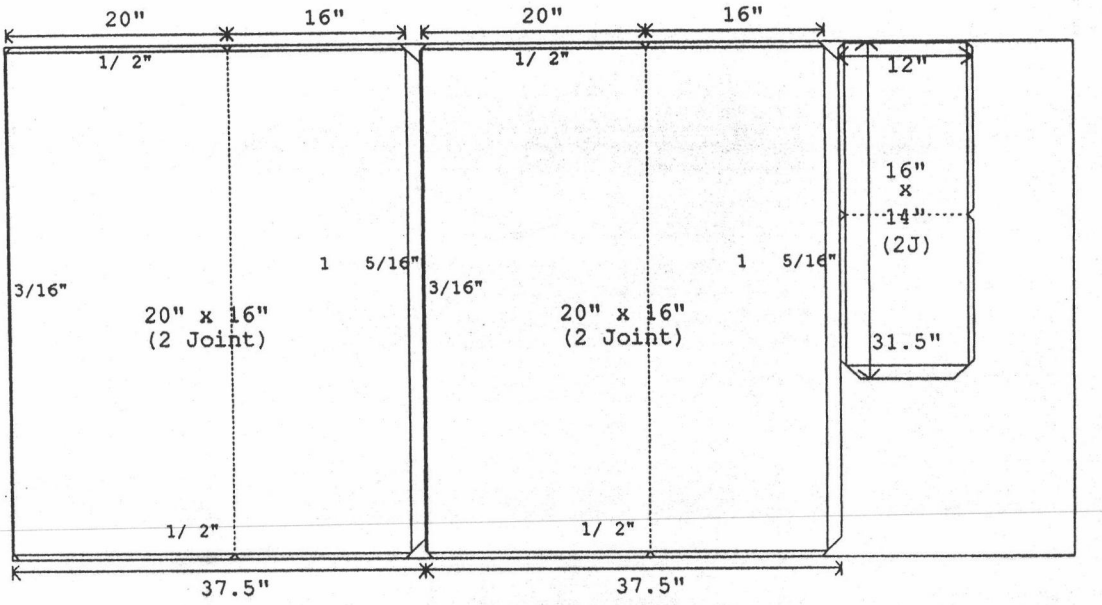

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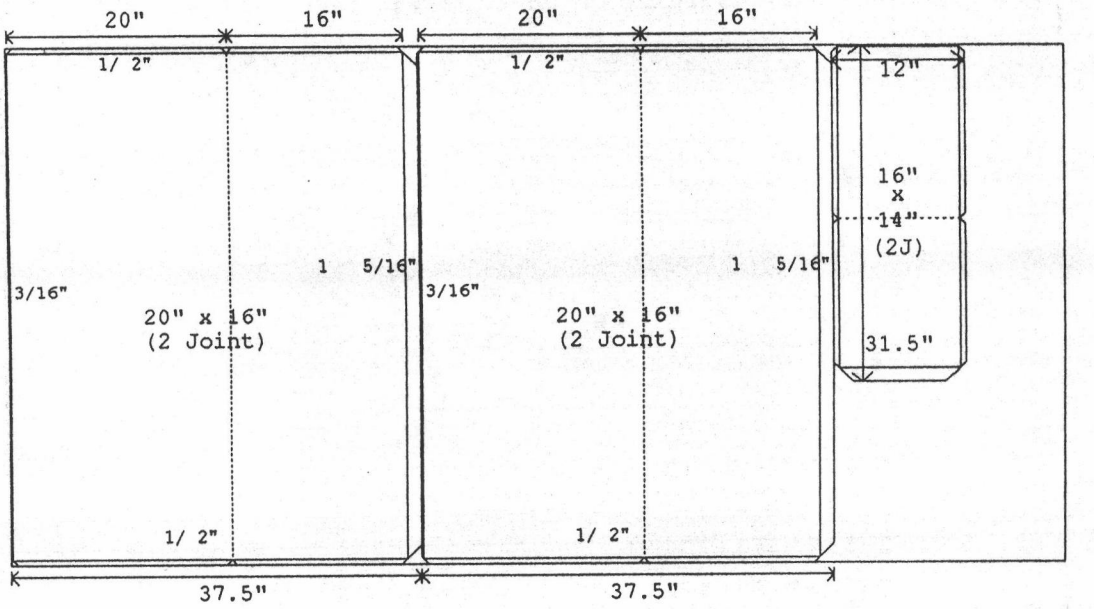
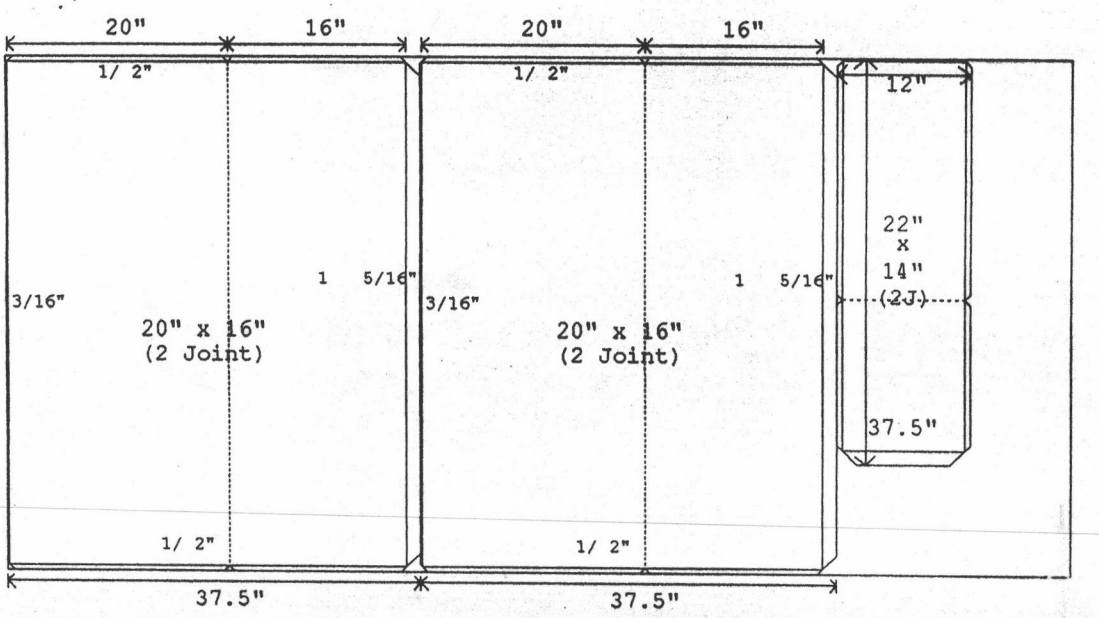


Gage #24 Amount - 1 sheet



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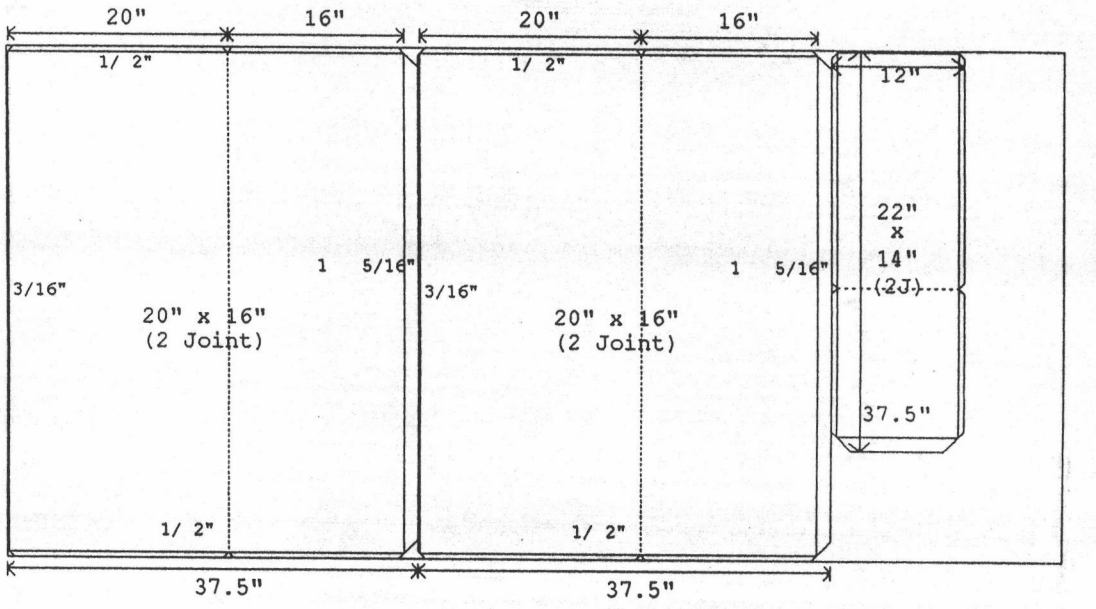

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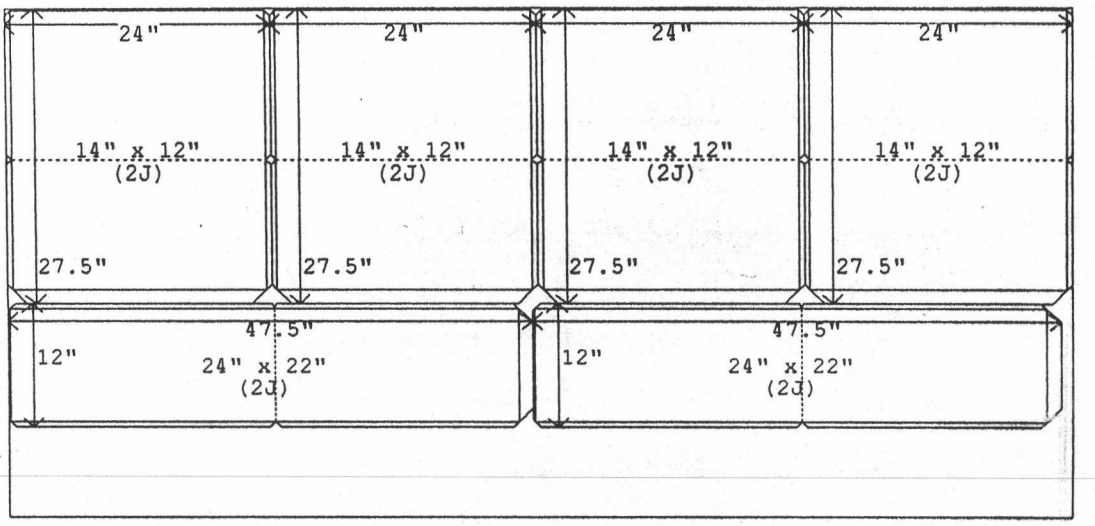

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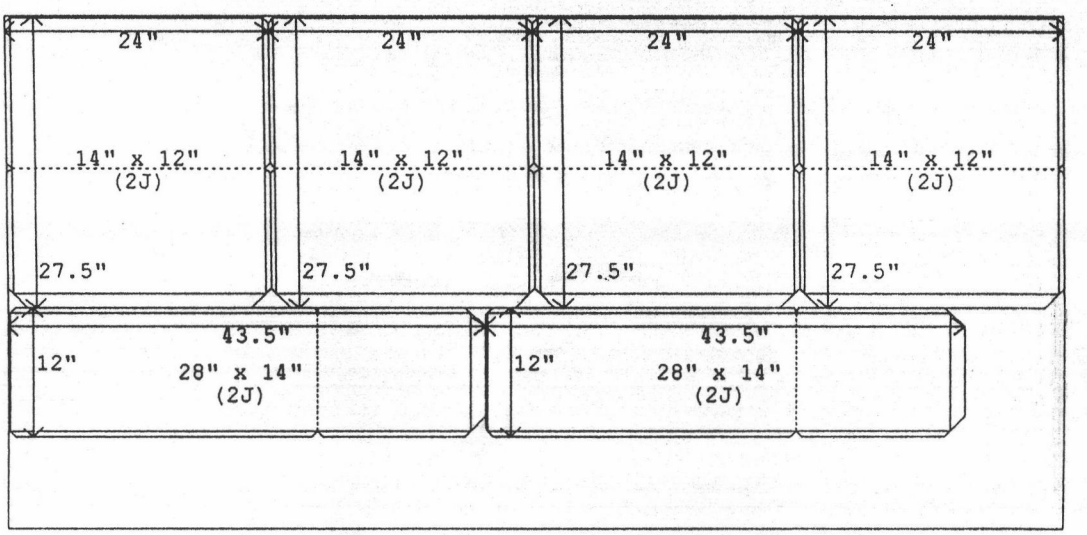

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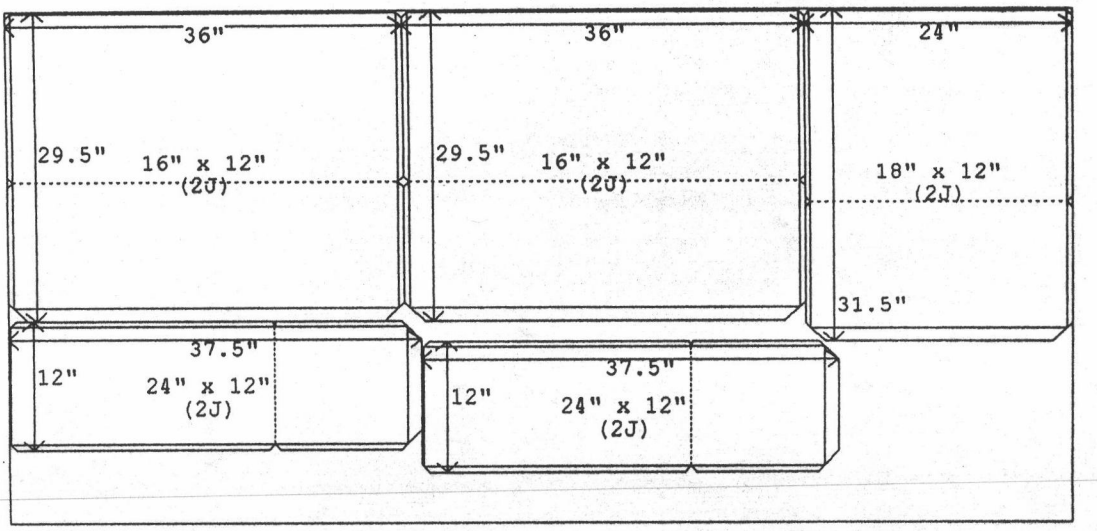

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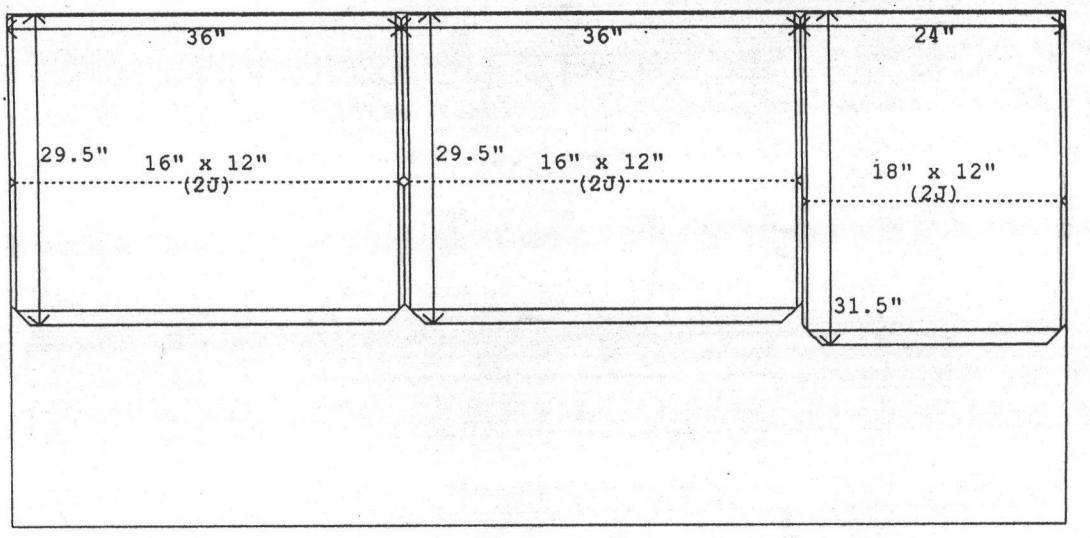

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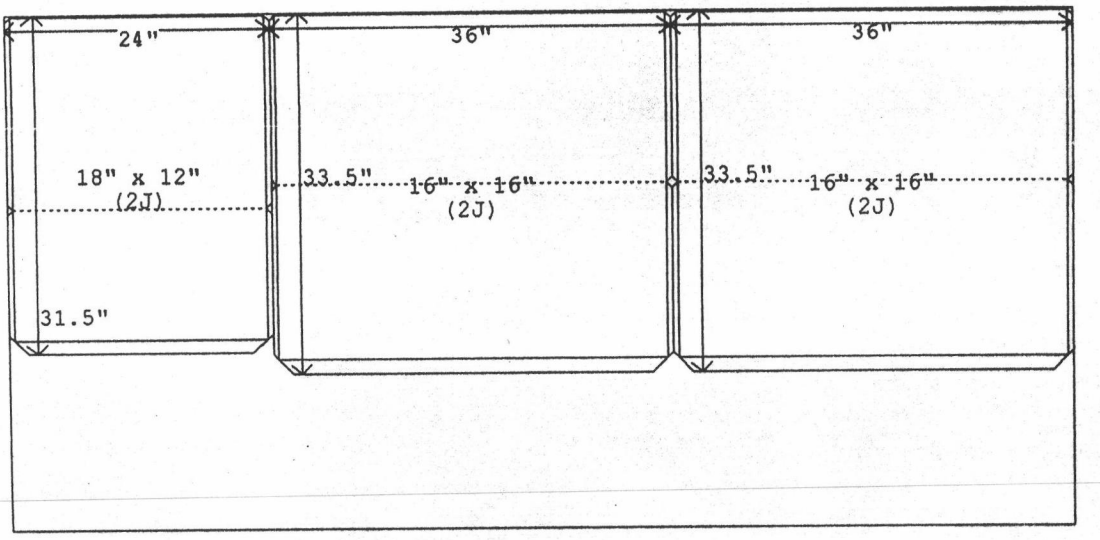

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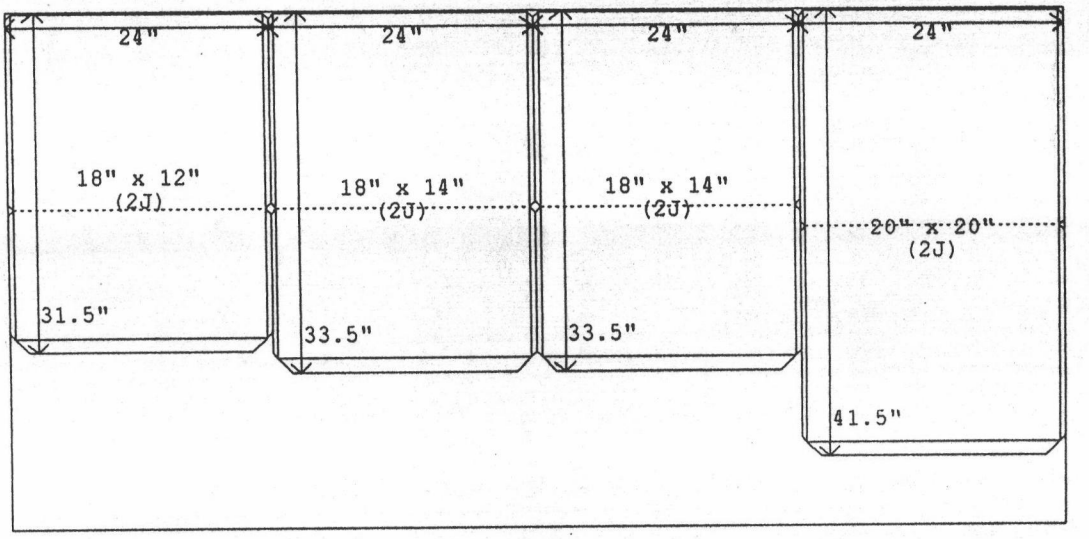

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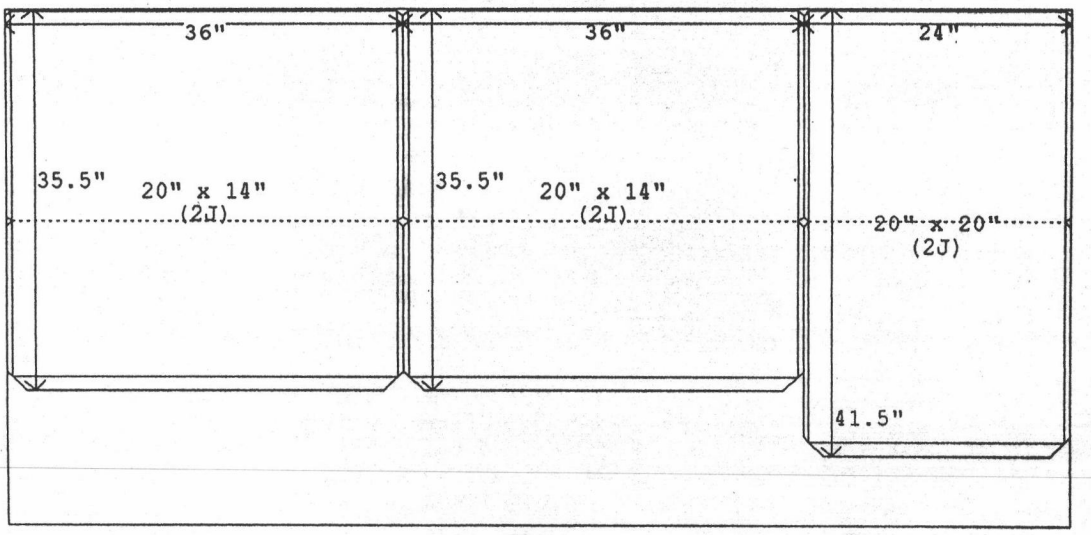

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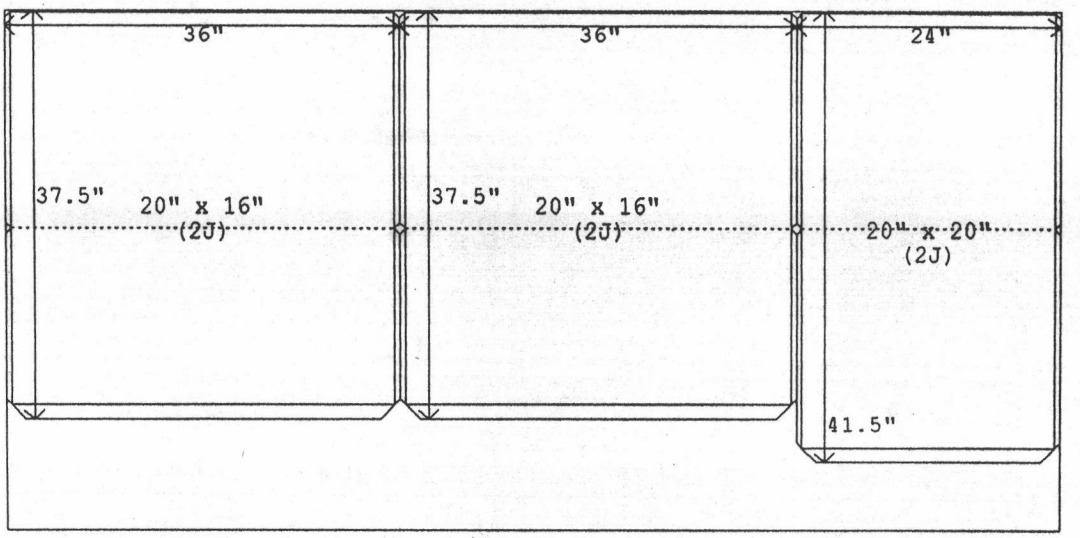

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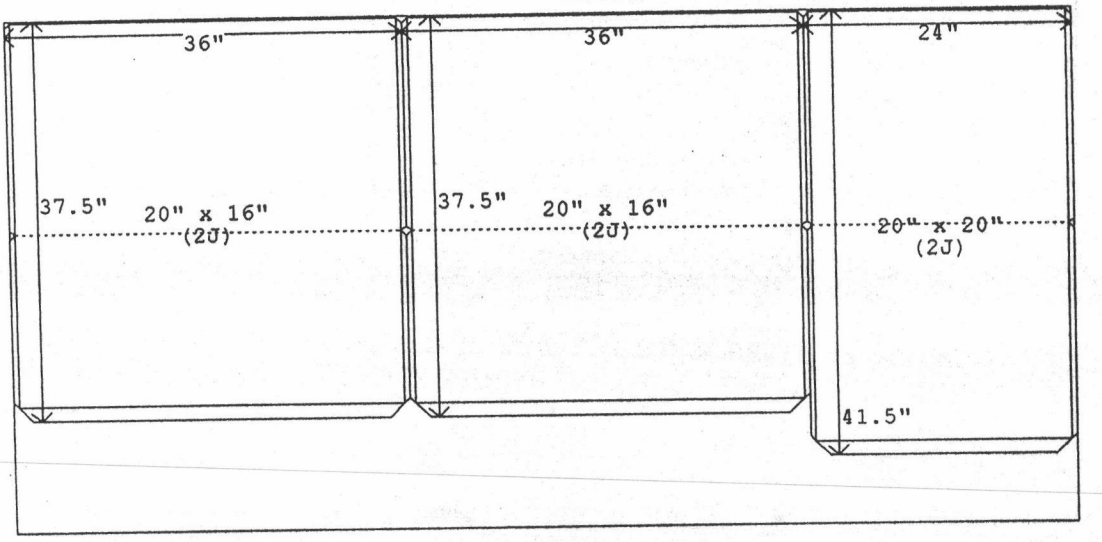

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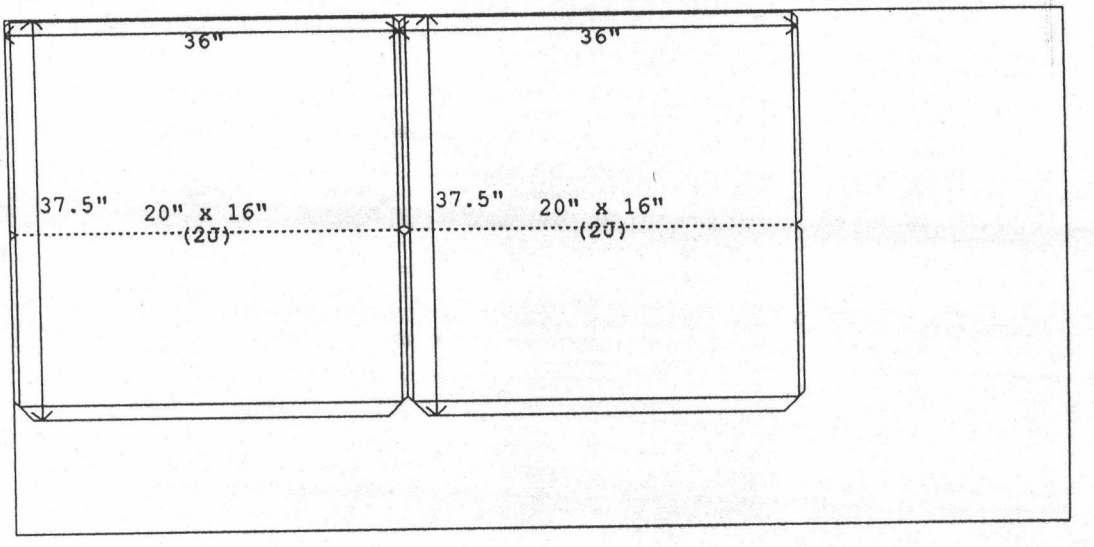

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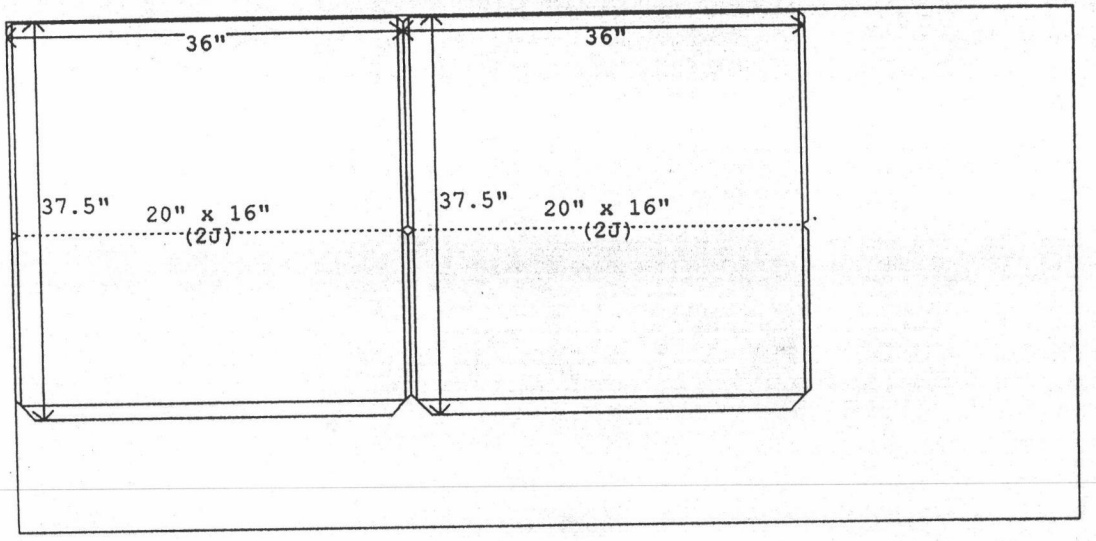

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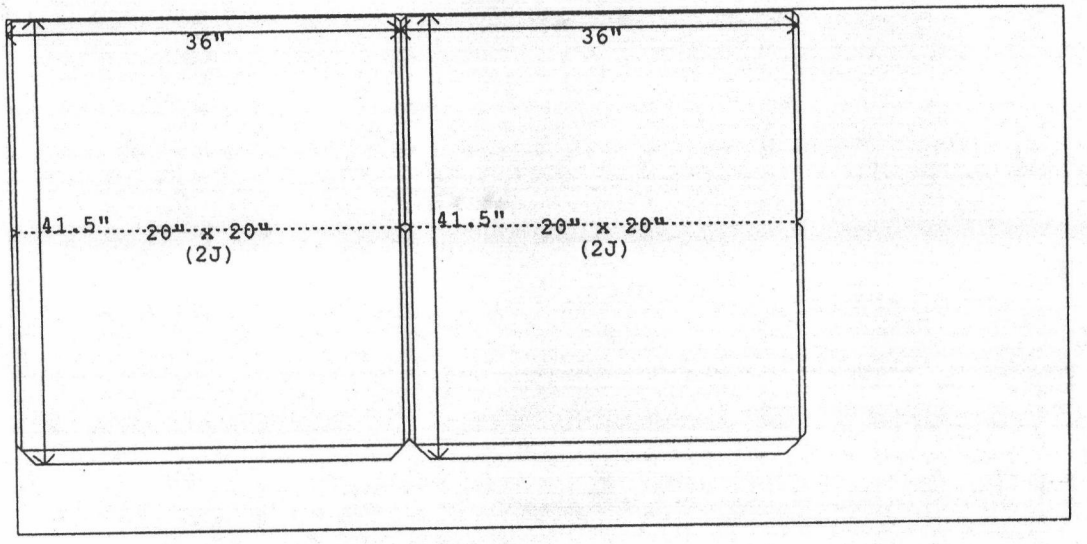

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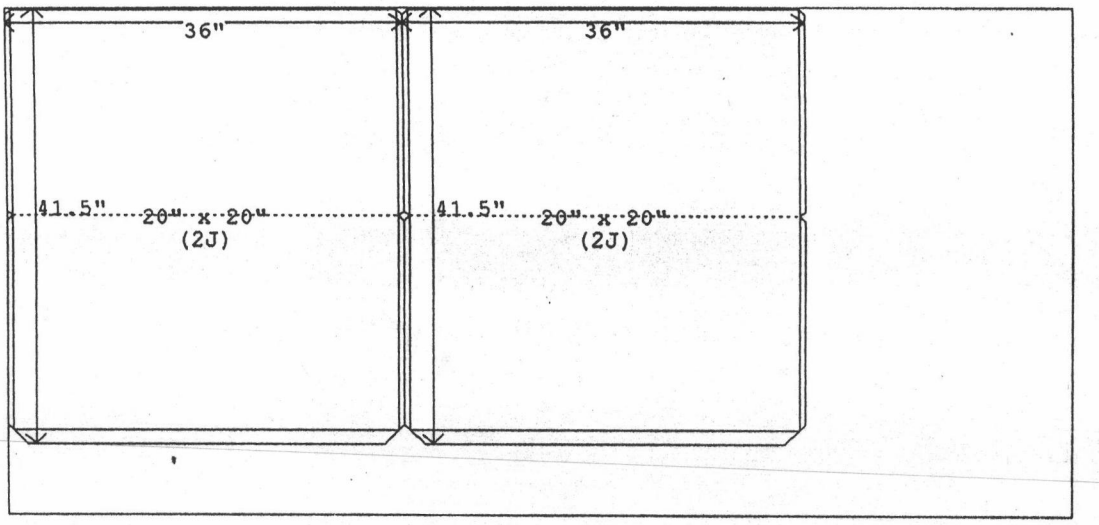

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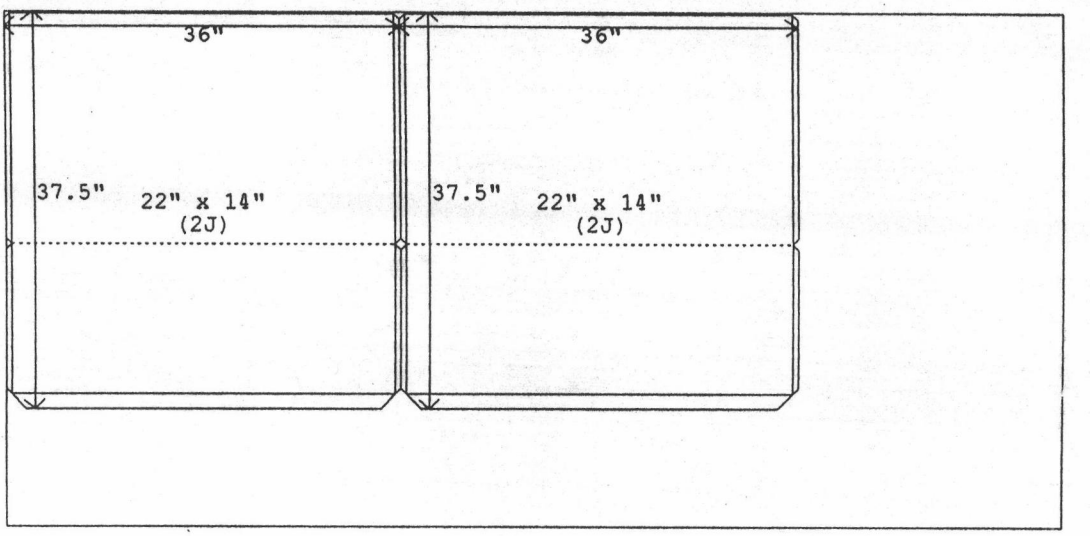

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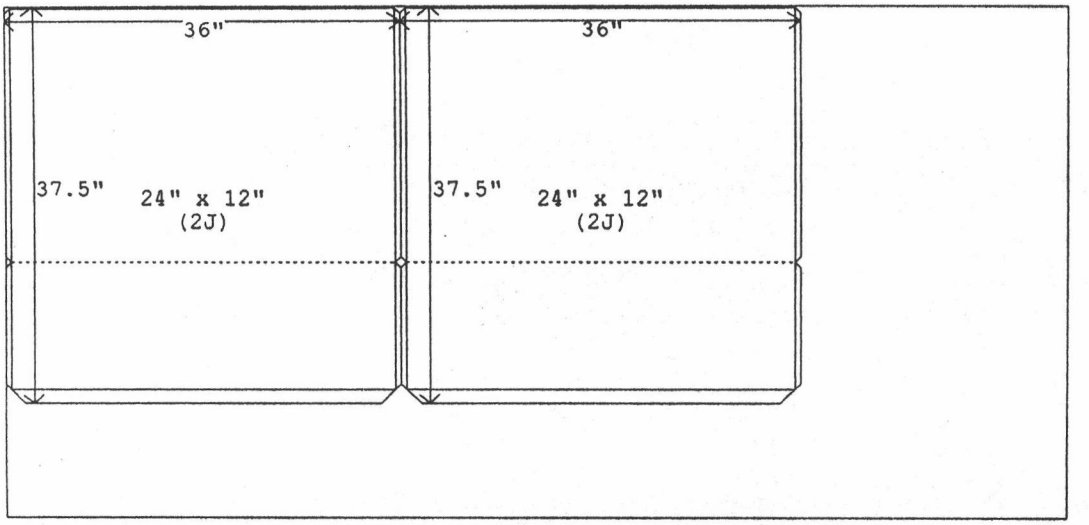
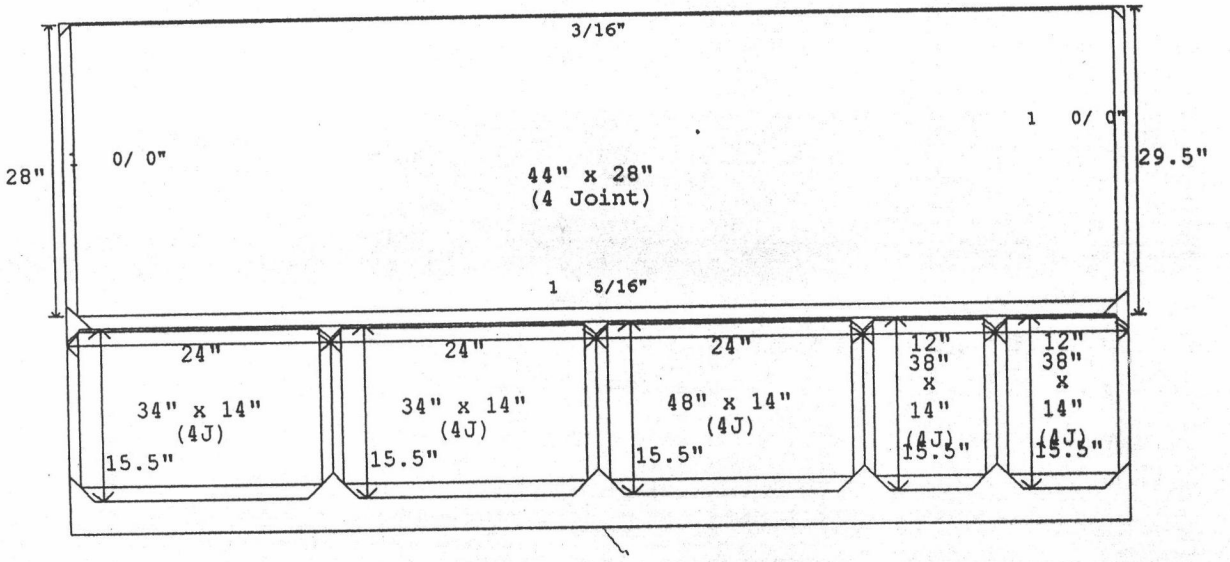
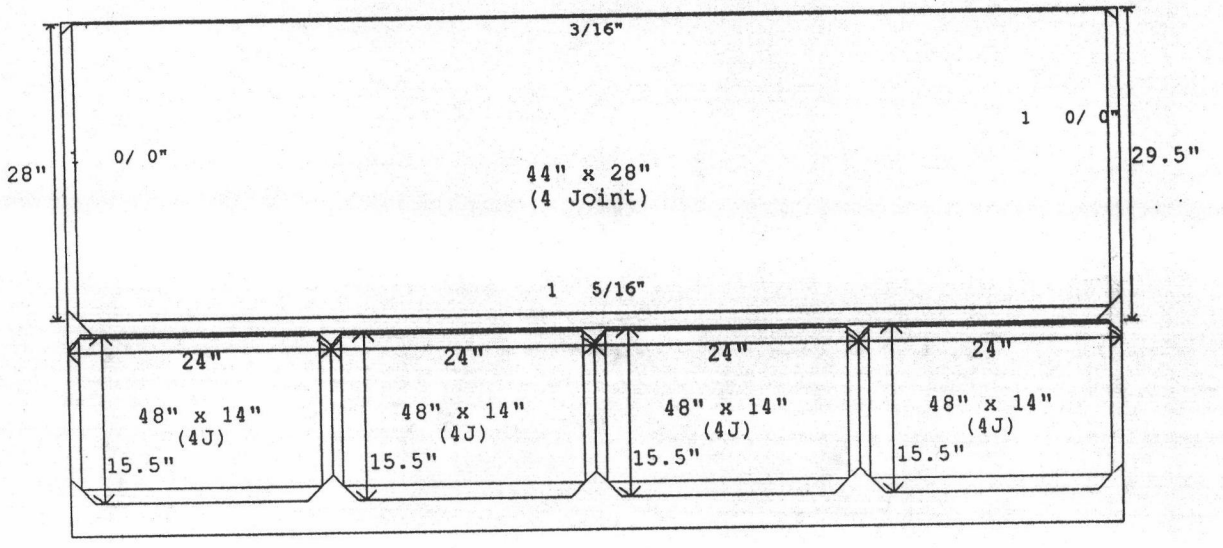


Gage #24 Amount - 1 sheet **Total Gage#24 - 32 sheets**

รูปที่ ง.11 รูปแบบแผ่นคลี่ที่เหมาะสมของแผ่นสังกะสีเบอร์ 22 สำหรับท่อลมตรง ในตัวอย่างระบบท่อลมที่ 2



Gage #22 Amount - 1 sheet



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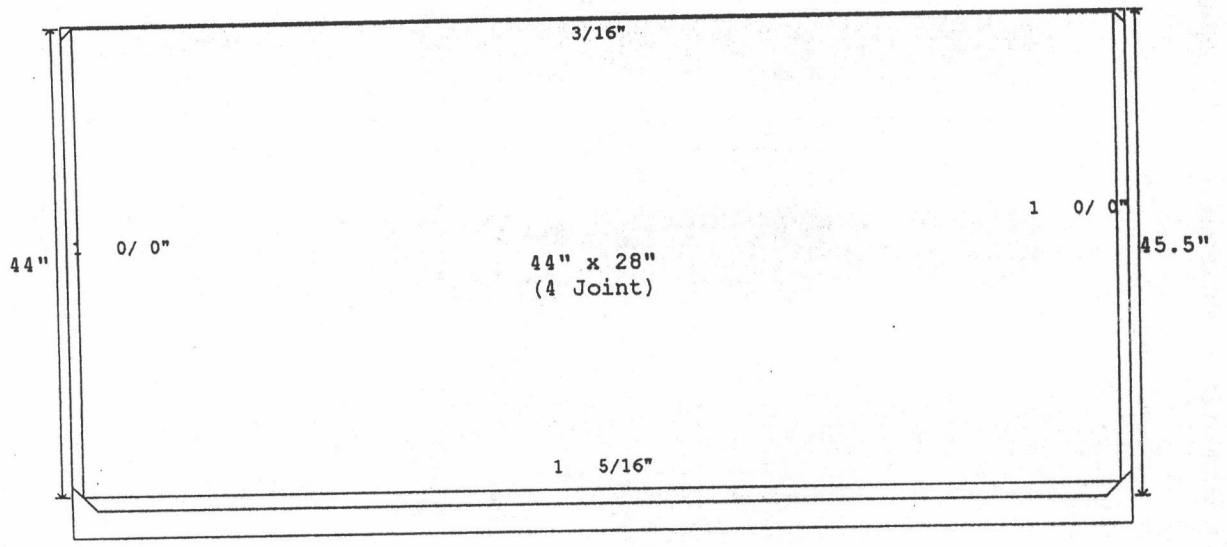
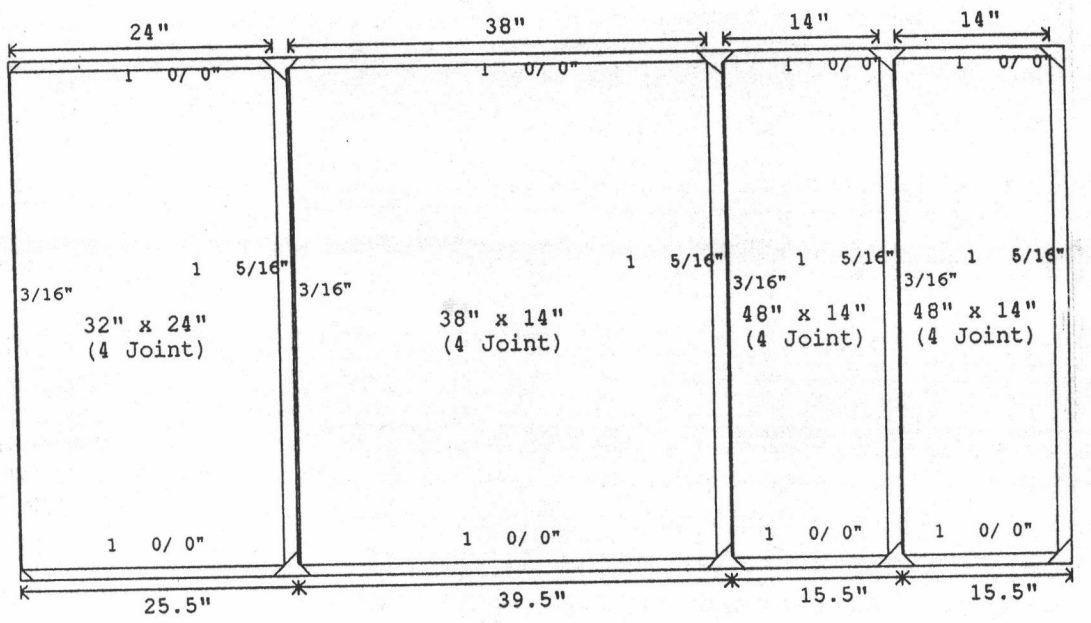


Gage #22 Amount - 2 sheets



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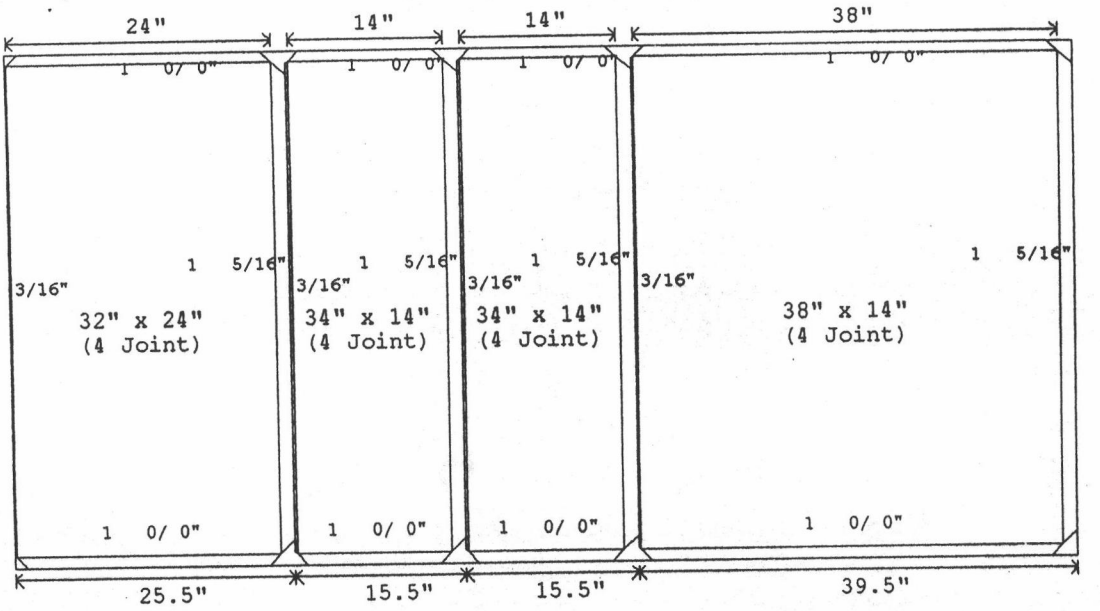

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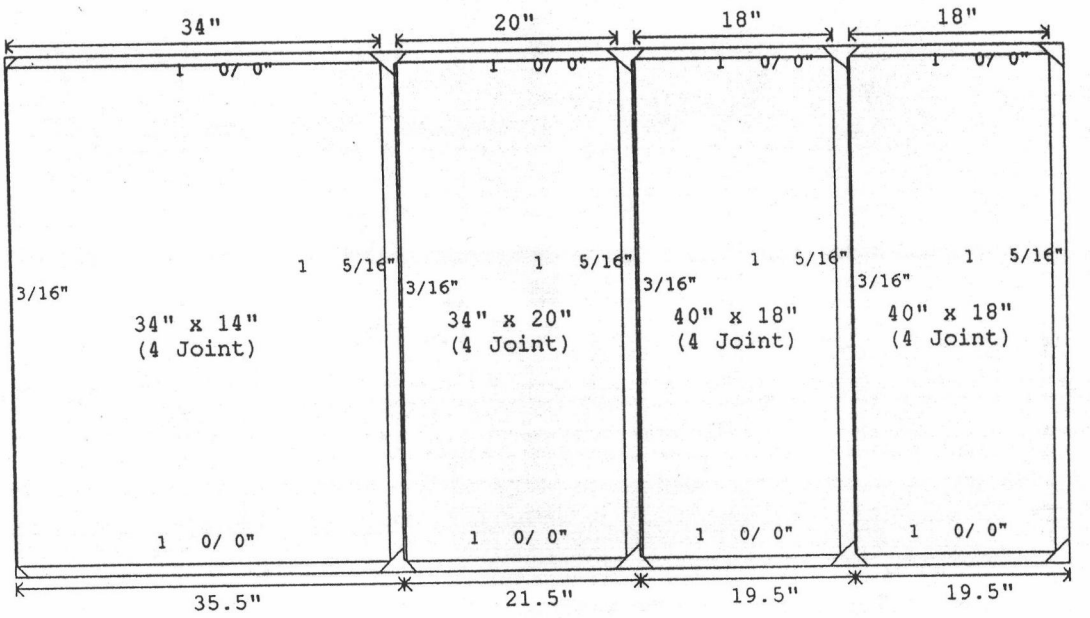

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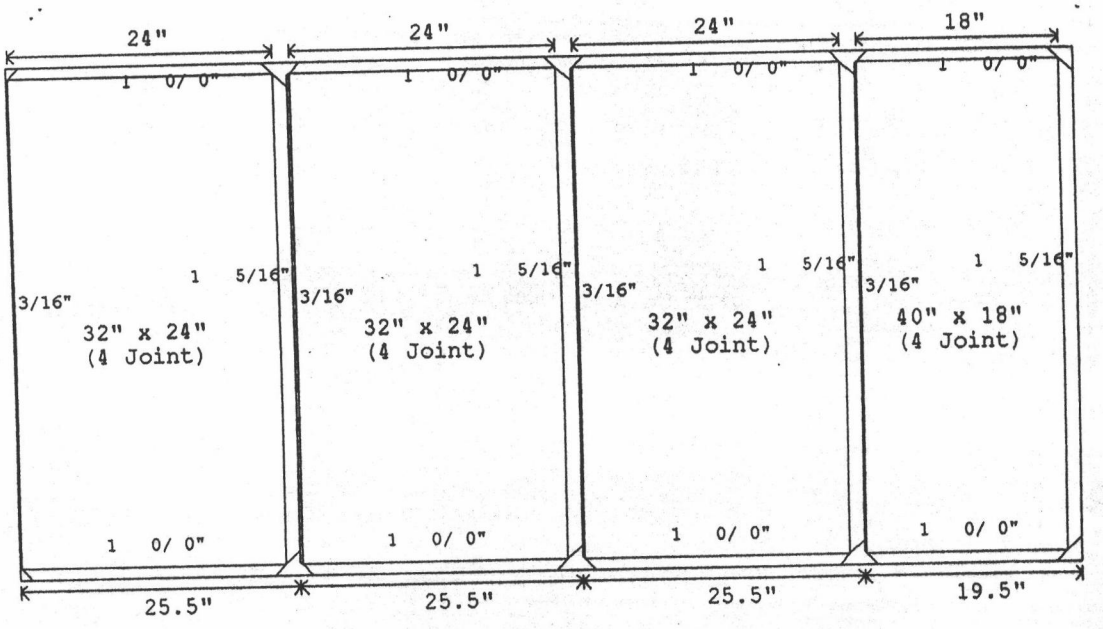

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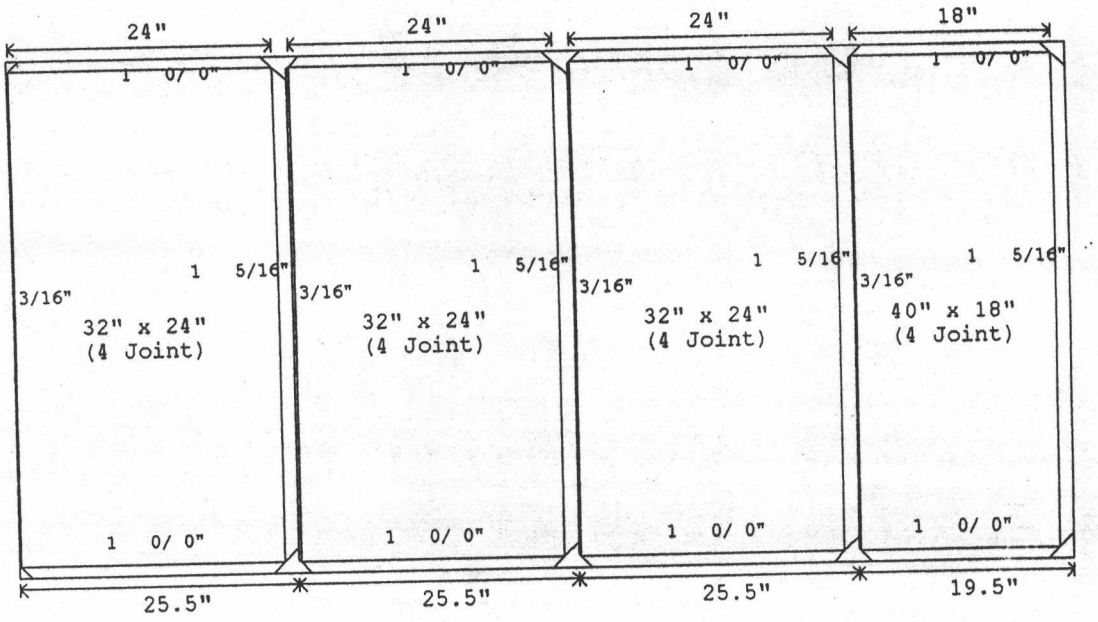

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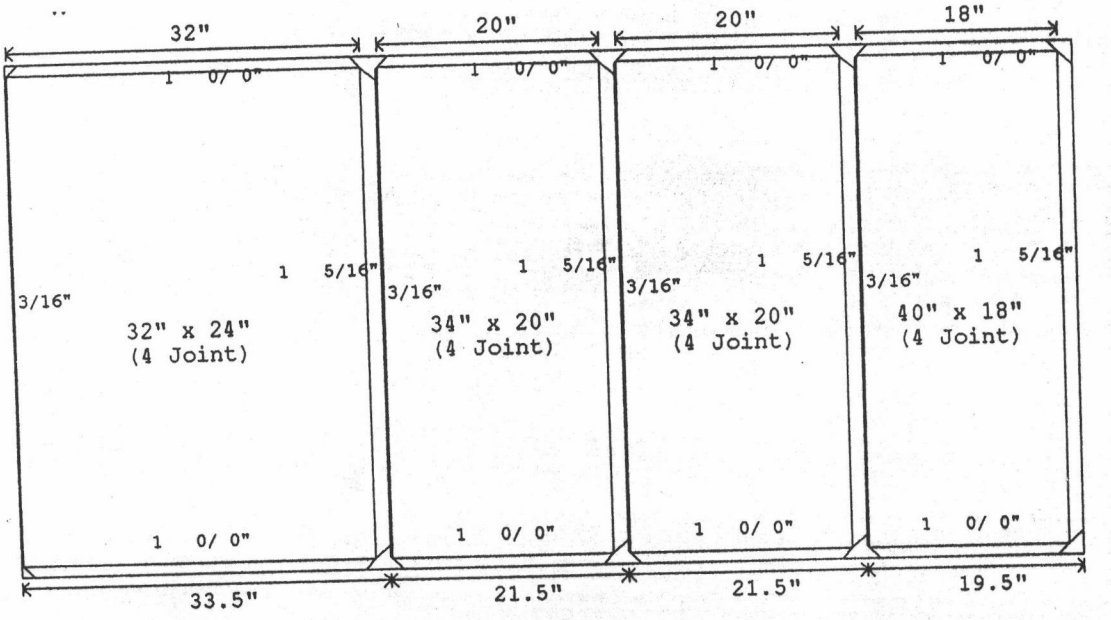

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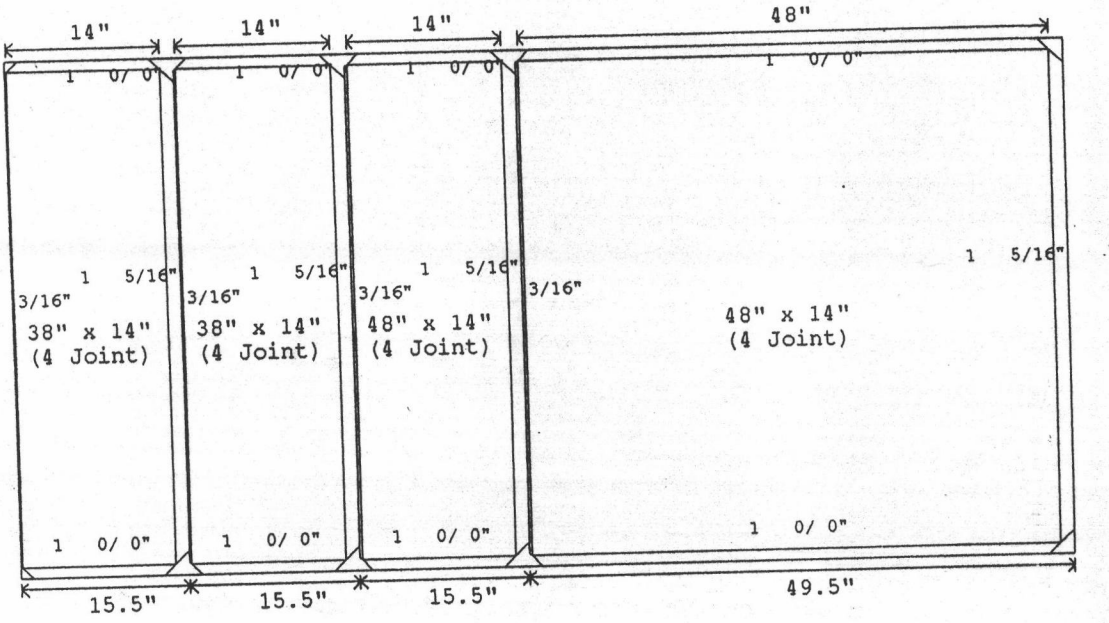

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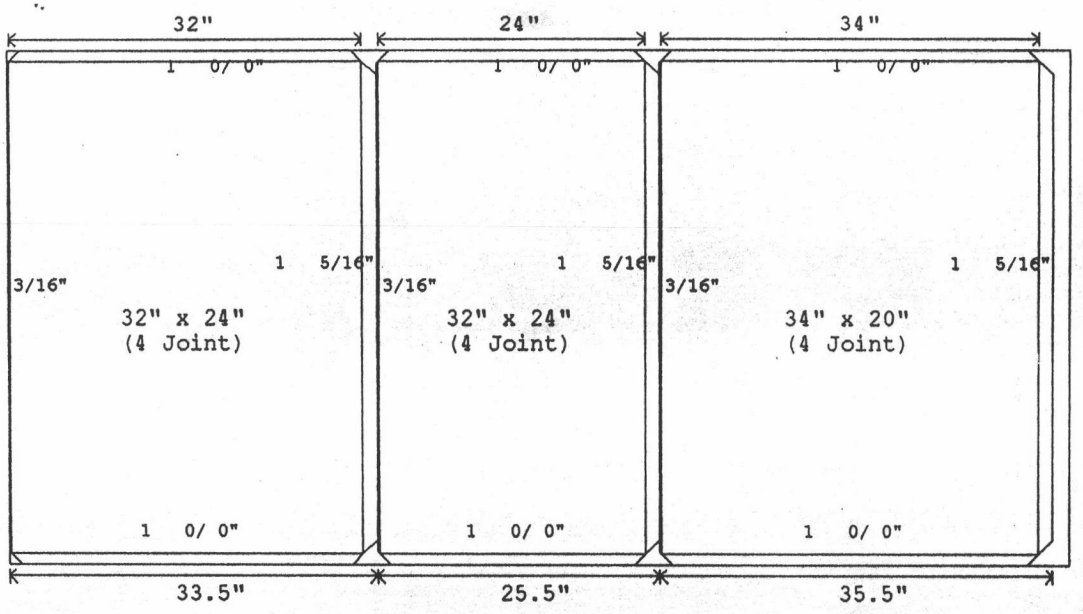

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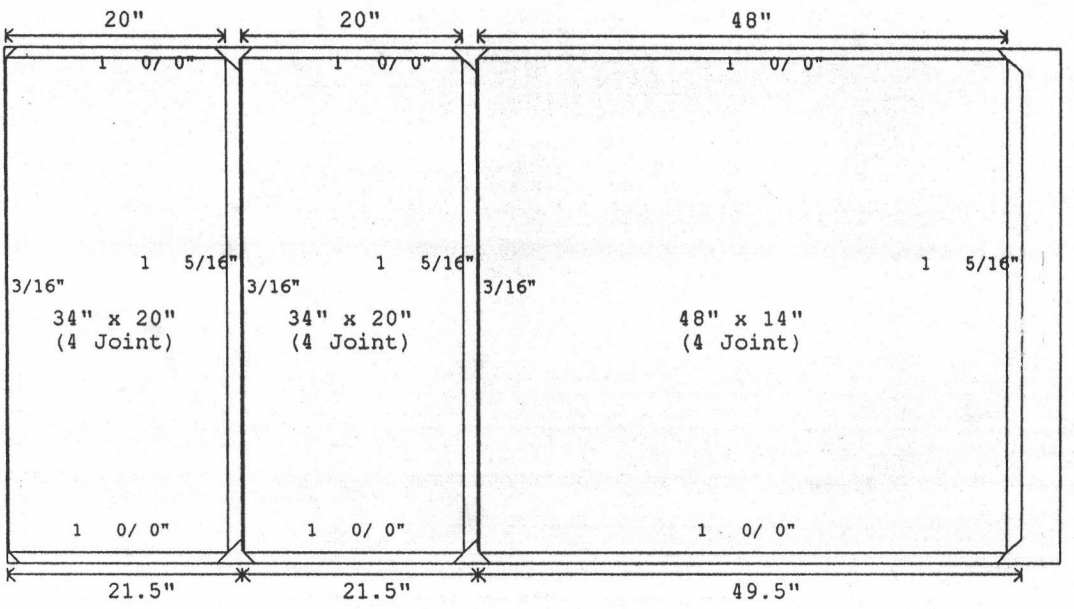

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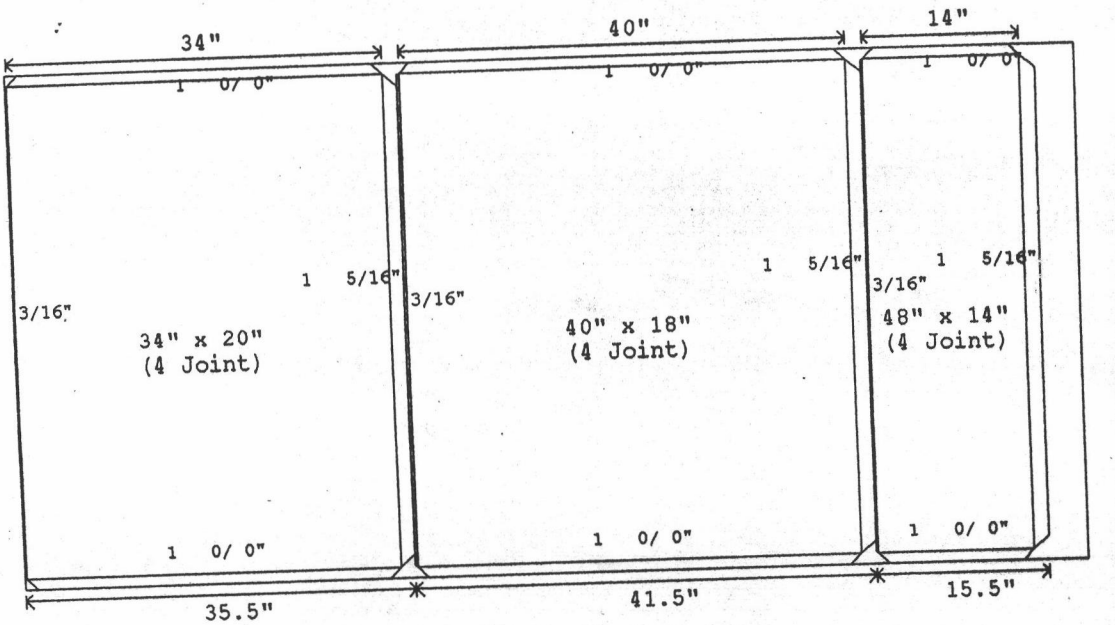
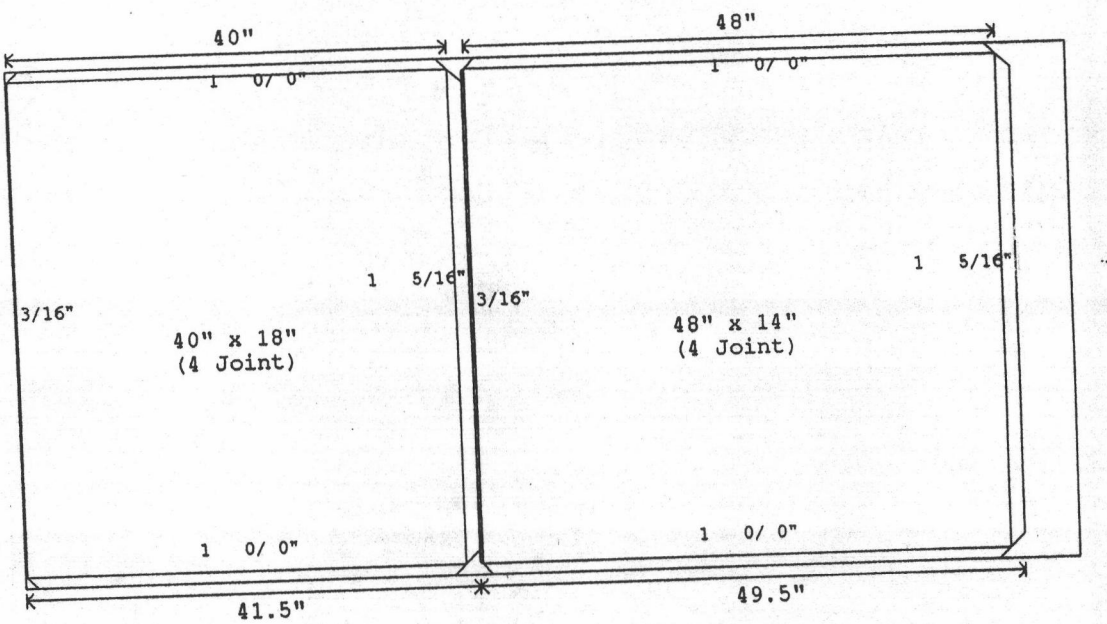
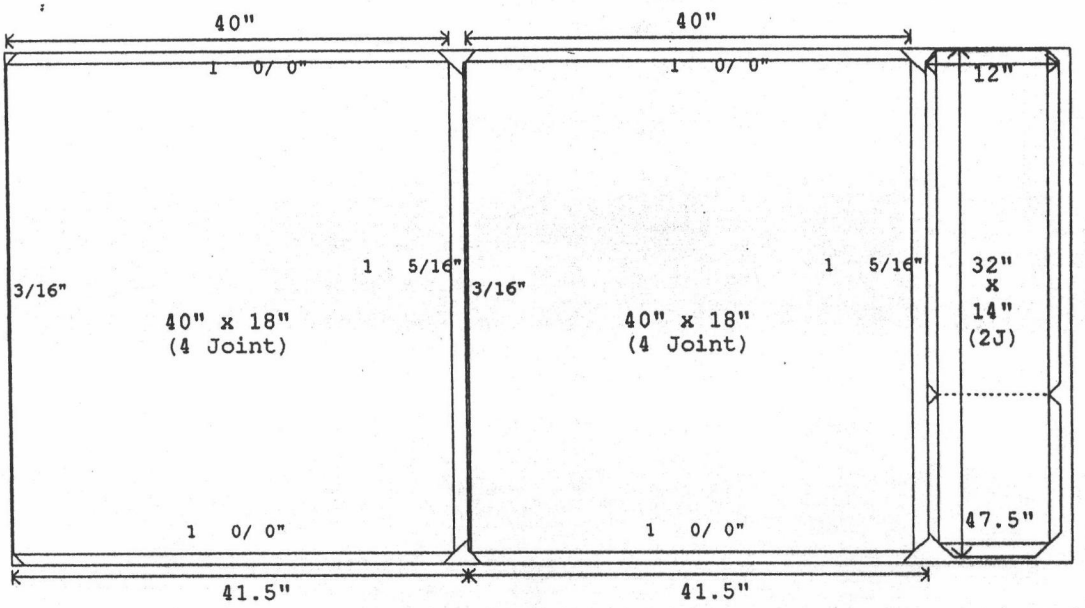


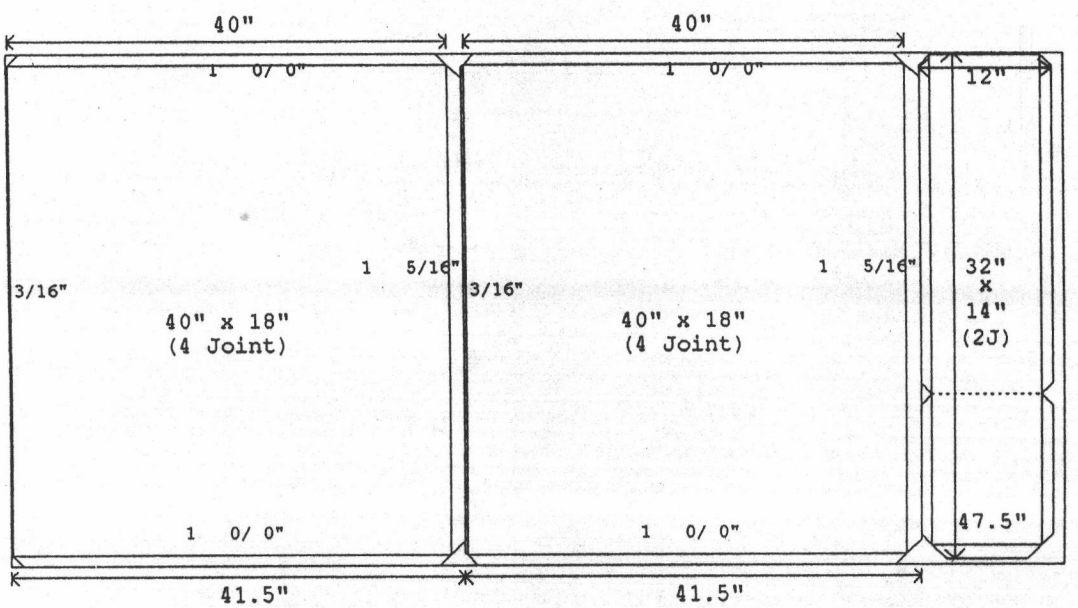
Gage #22 Amount - 1 sheet



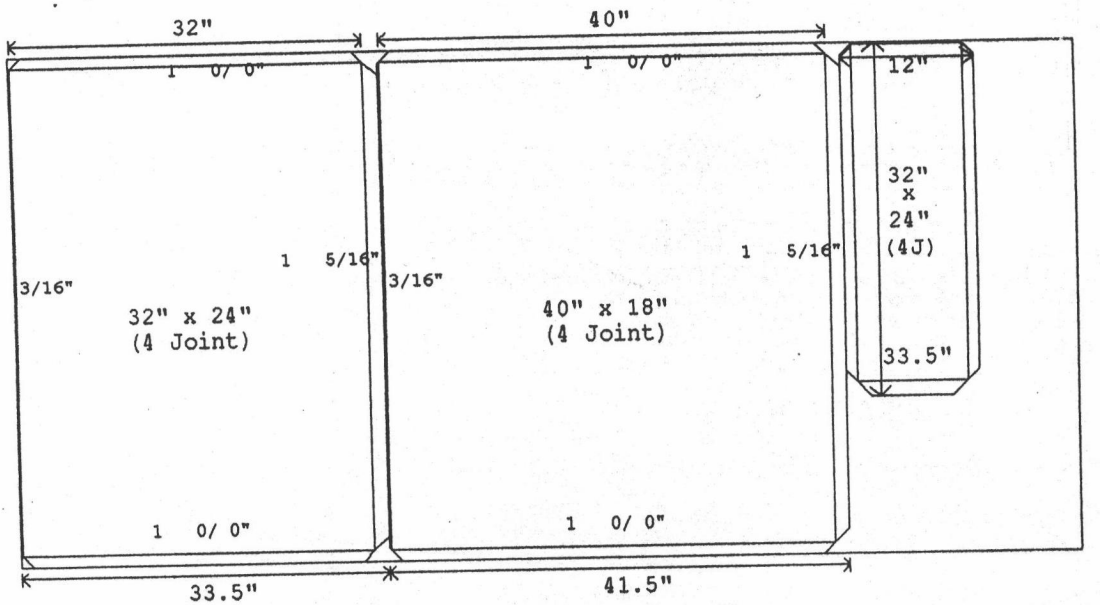
Gage #22 Amount - 2 sheets



Gage #22 Amount - 1 sheet



Gage #22 Amount - 1 sheet



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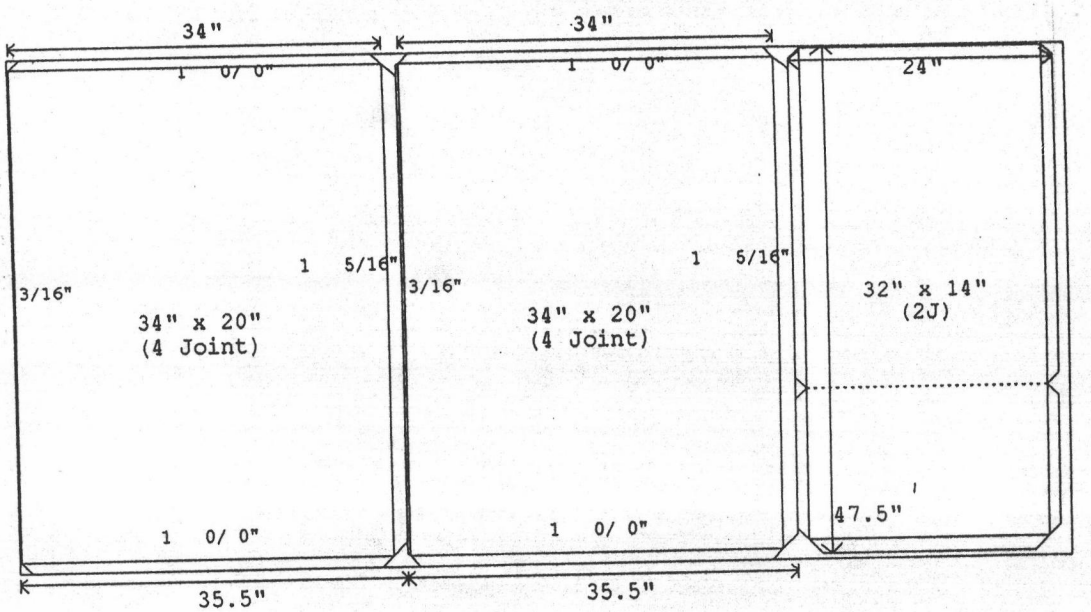

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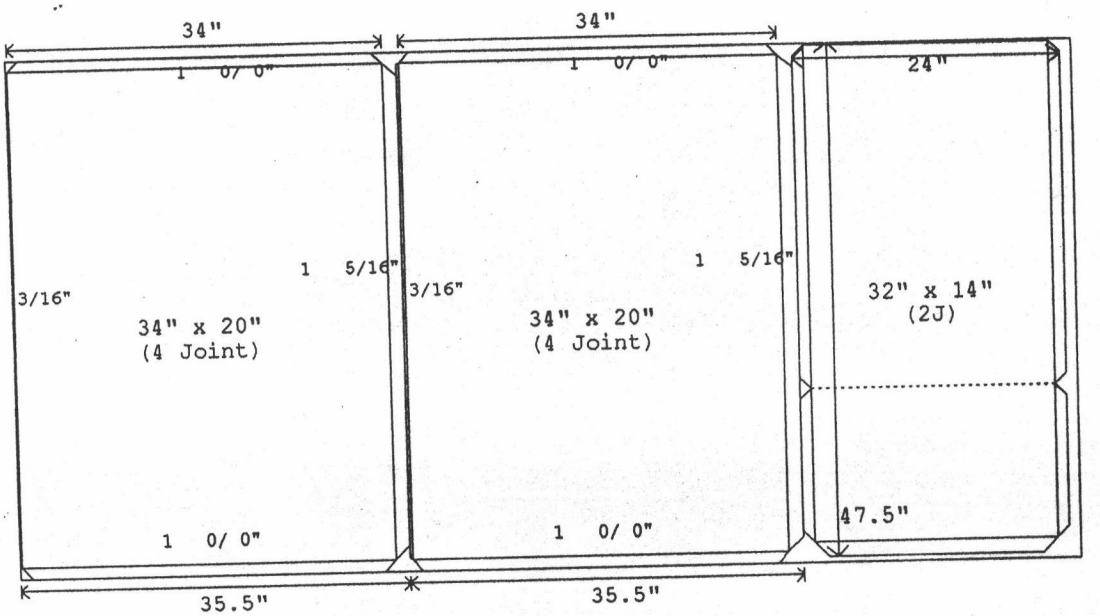

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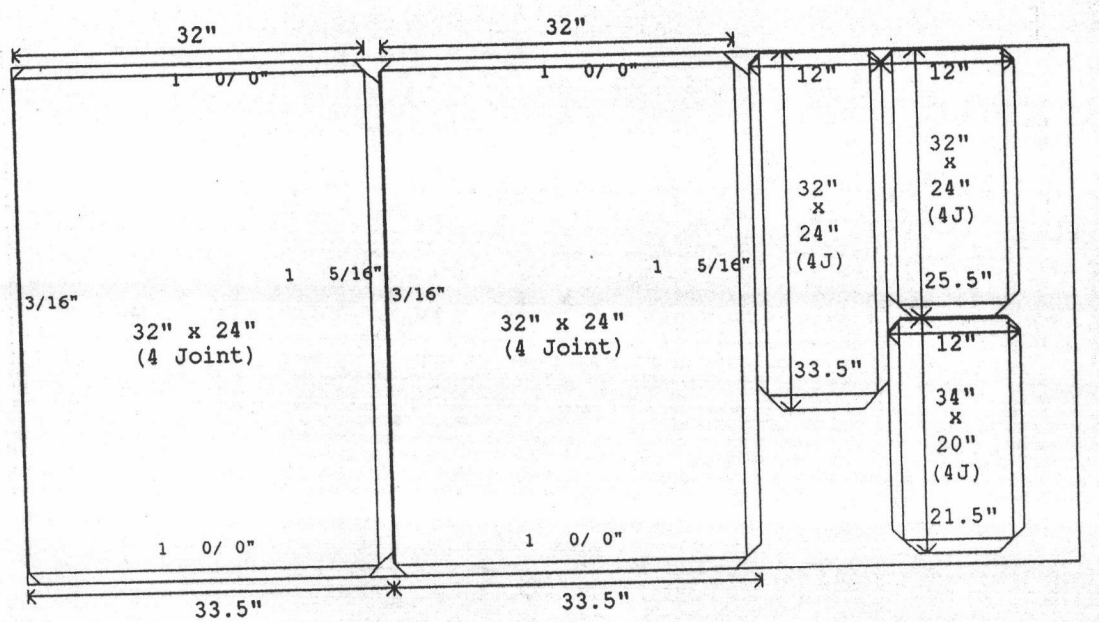

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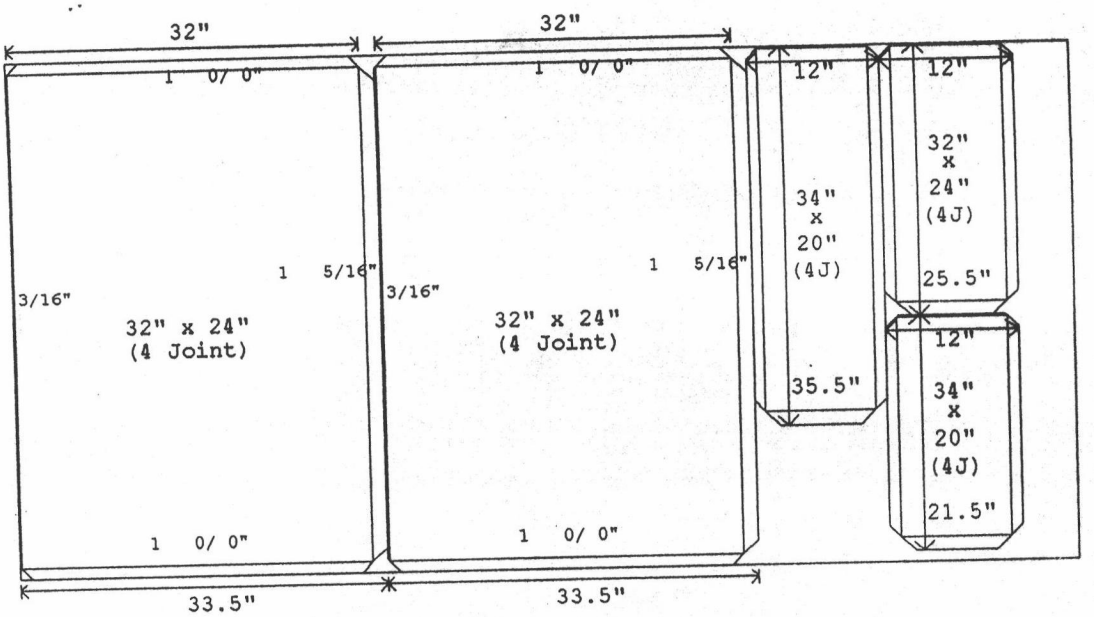
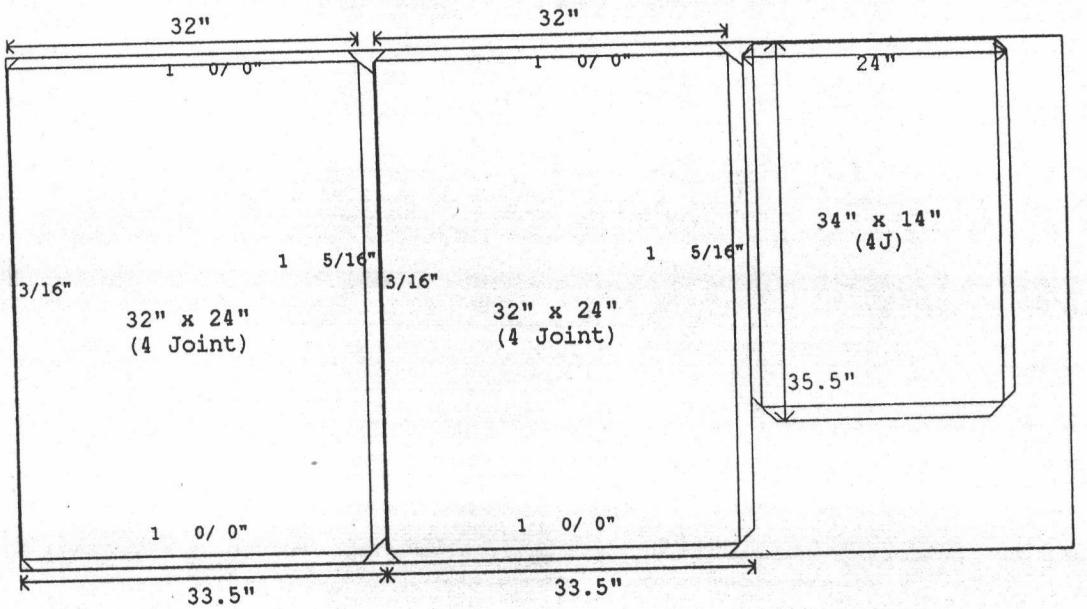
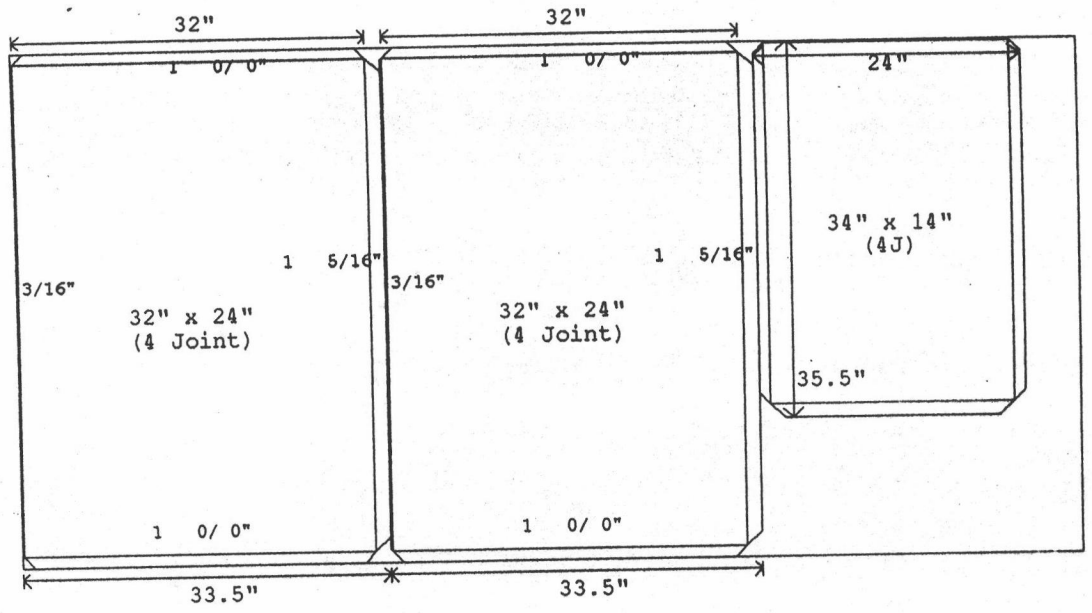


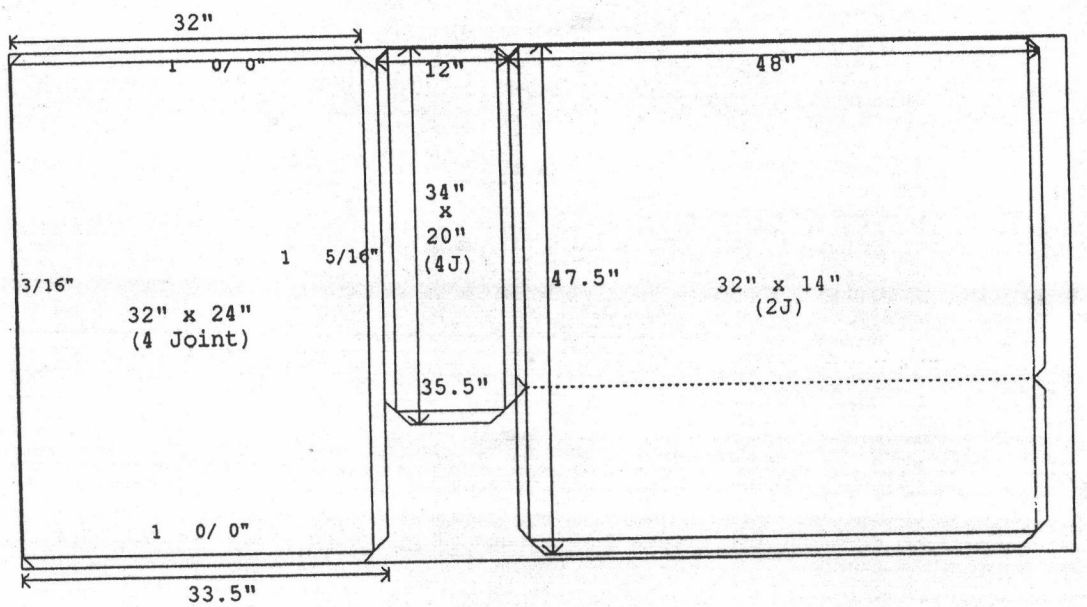
Gage #22 Amount - 1 sheet



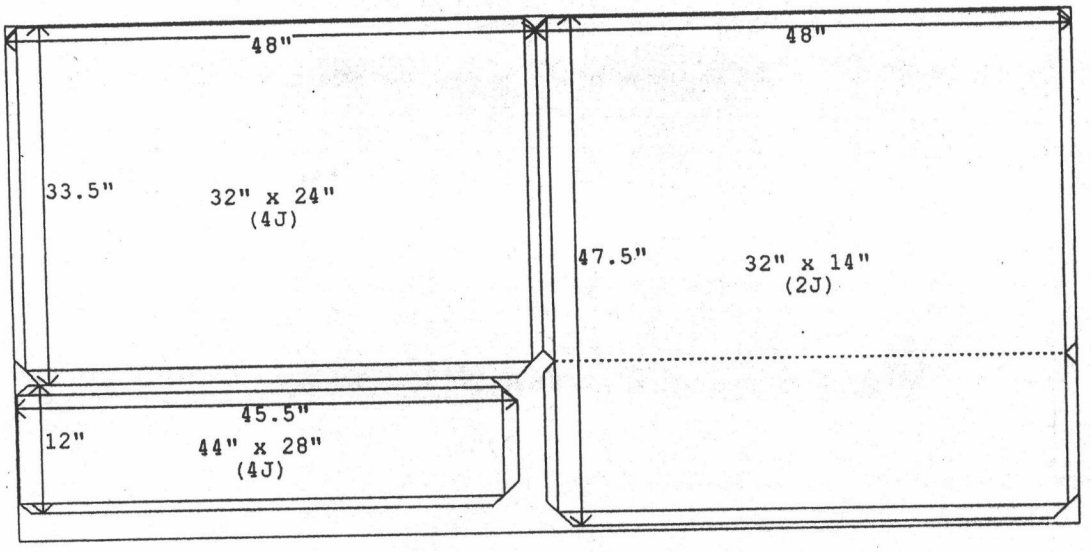
Gage #22 Amount - 1 sheet



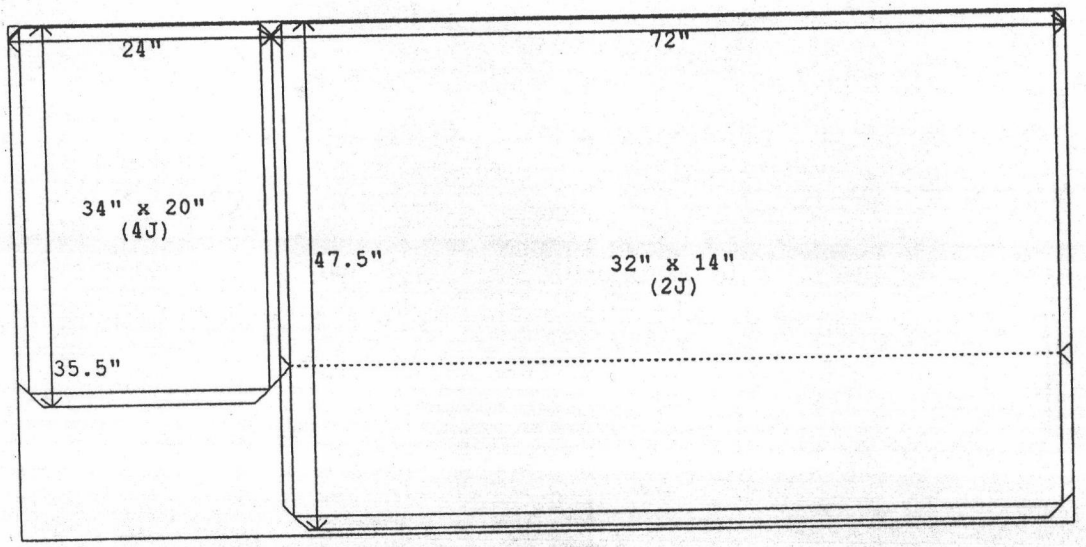
Gage #22 Amount - 1 sheet



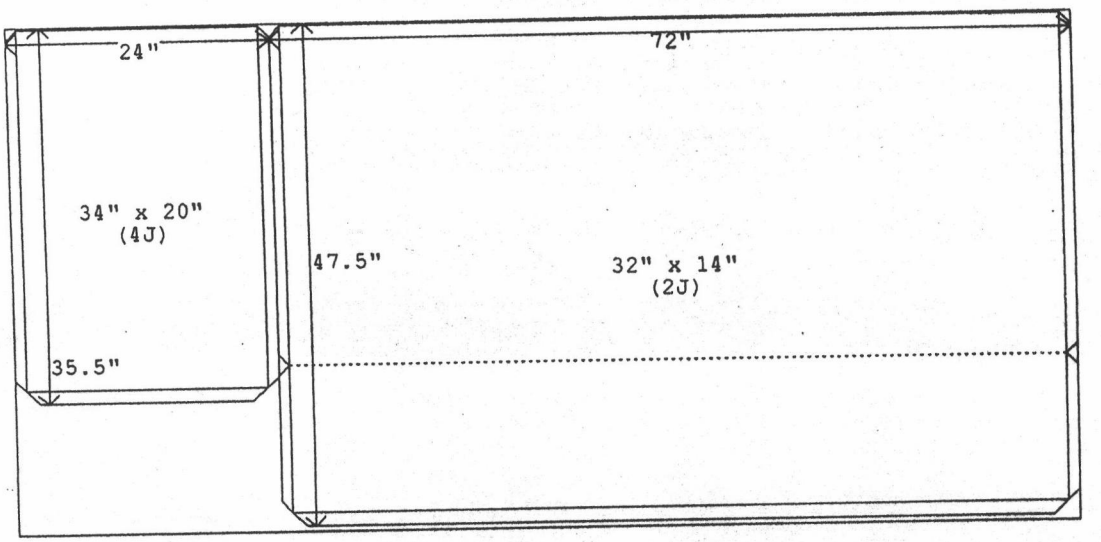
Gage #22 Amount - 1 sheet



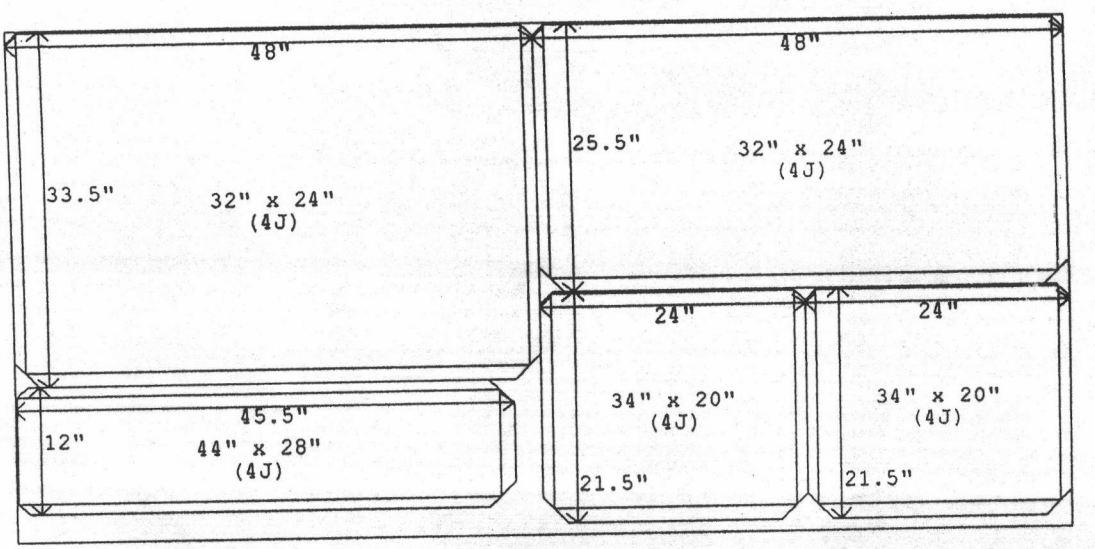
Gage #22 Amount - 1 sheet



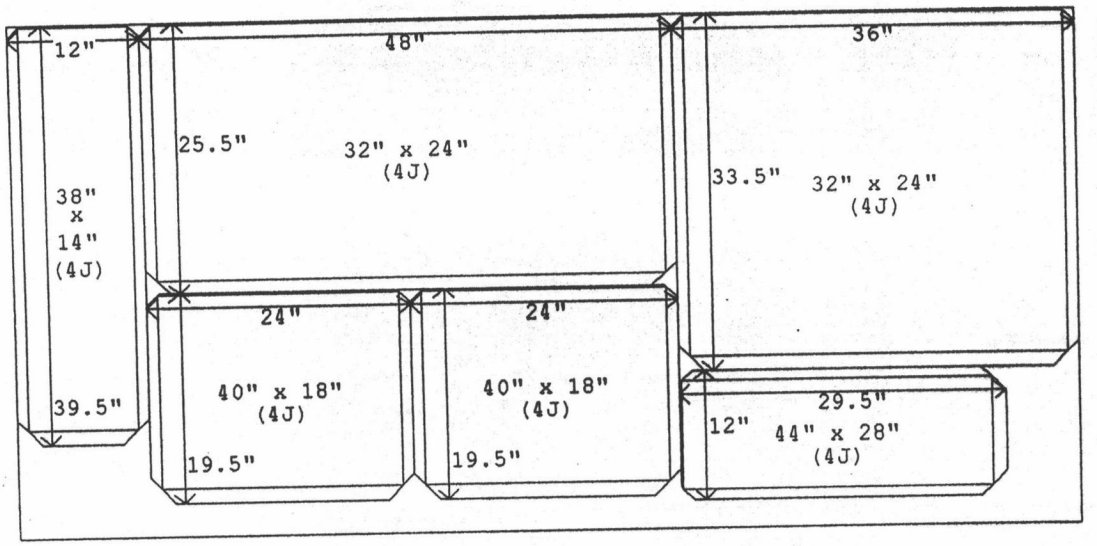
Gage #22 Amount - 1 sheet



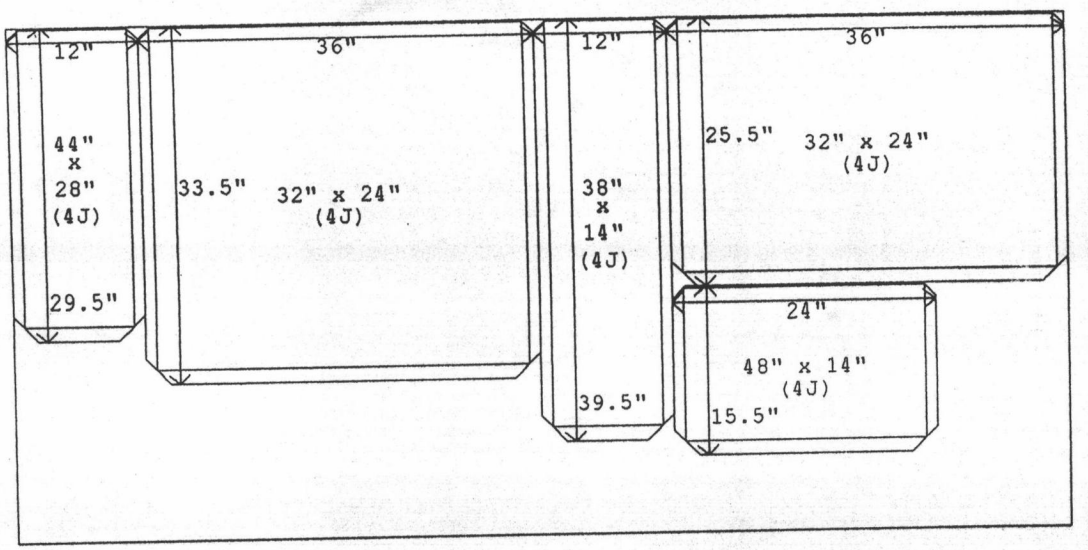
Gage #22 Amount - 1 sheet



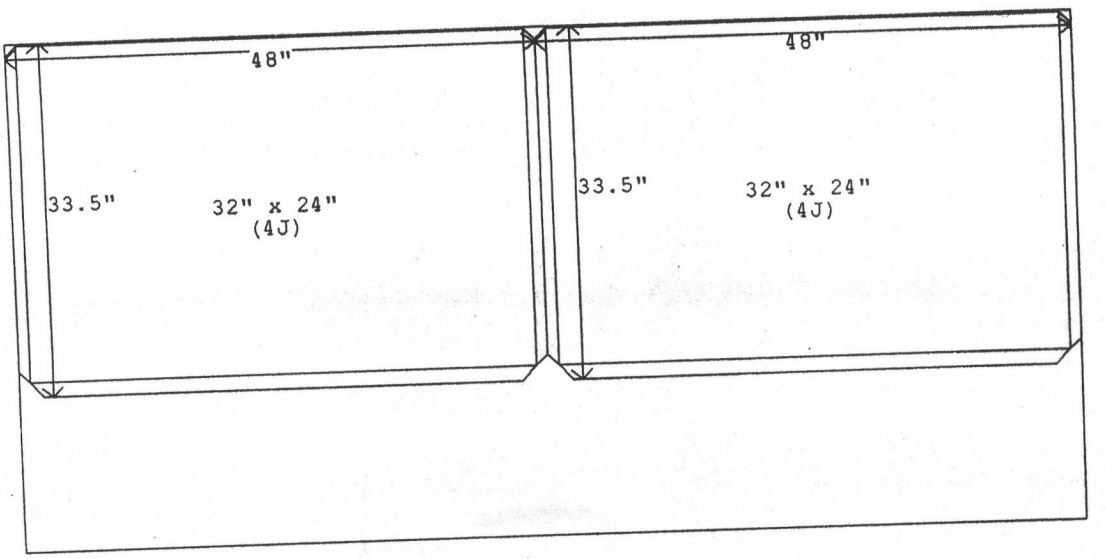
Gage #22 Amount - 1 sheet



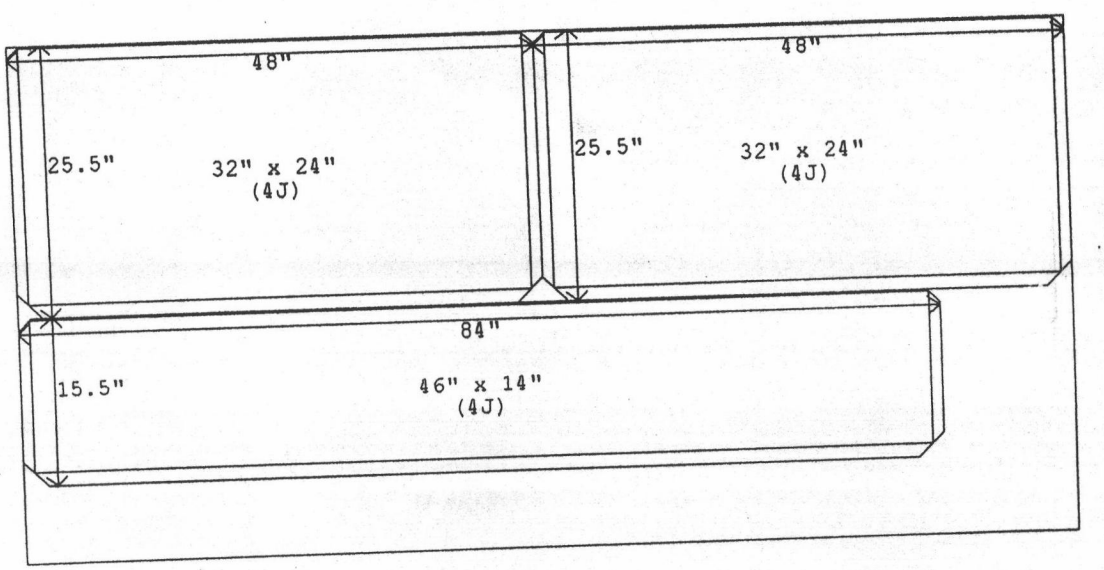
Gage #22 Amount - 1 sheet



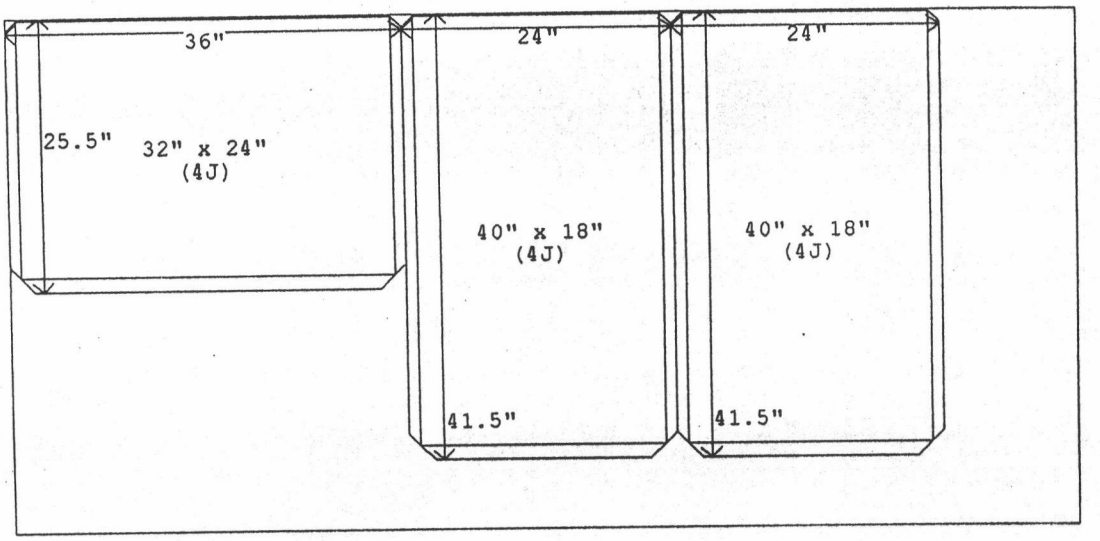
Gage #22 Amount - 1 sheet



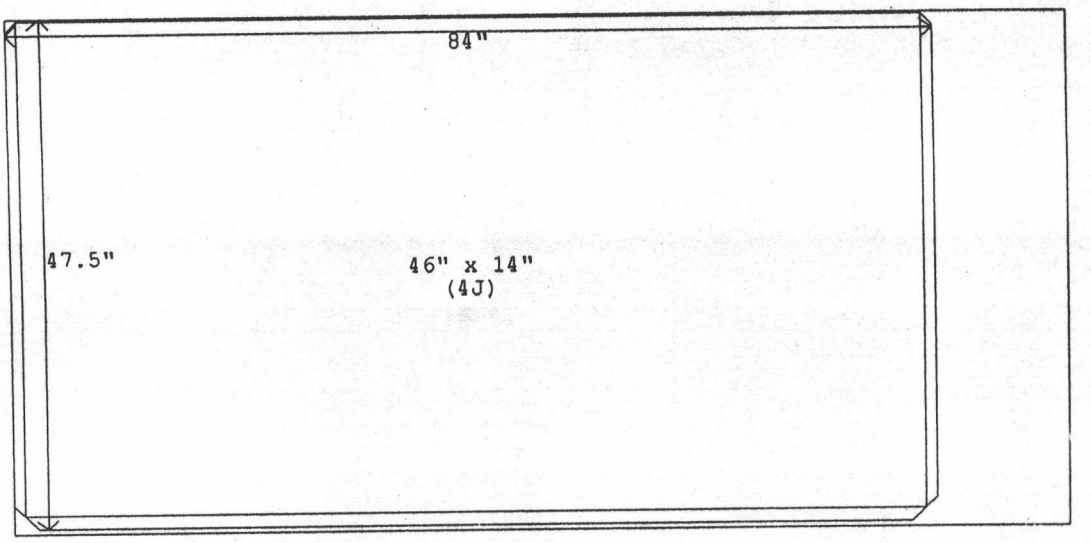
Gage #22 Amount - 1 sheet



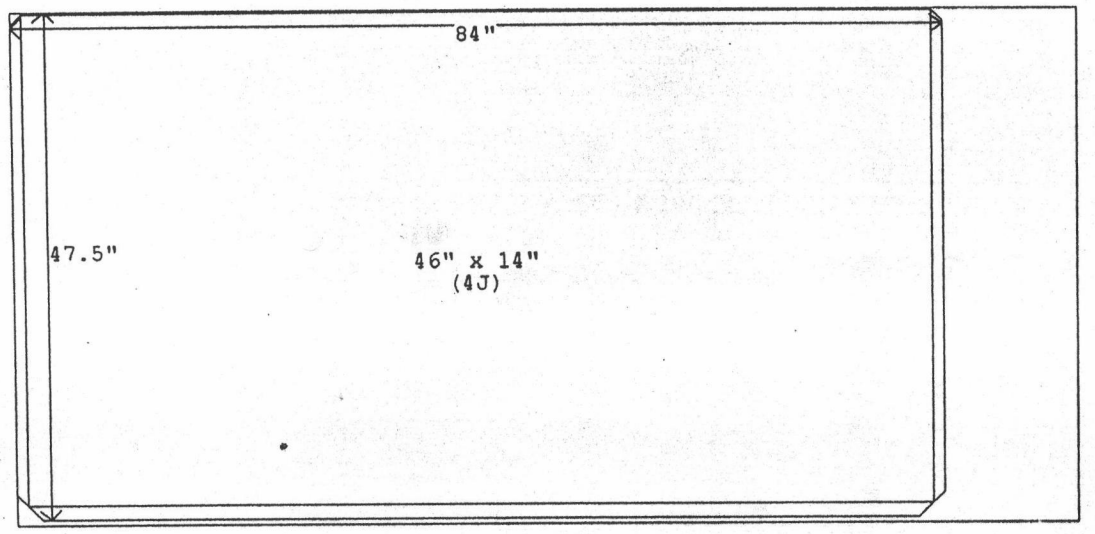
Gage #22 Amount - 1 sheet



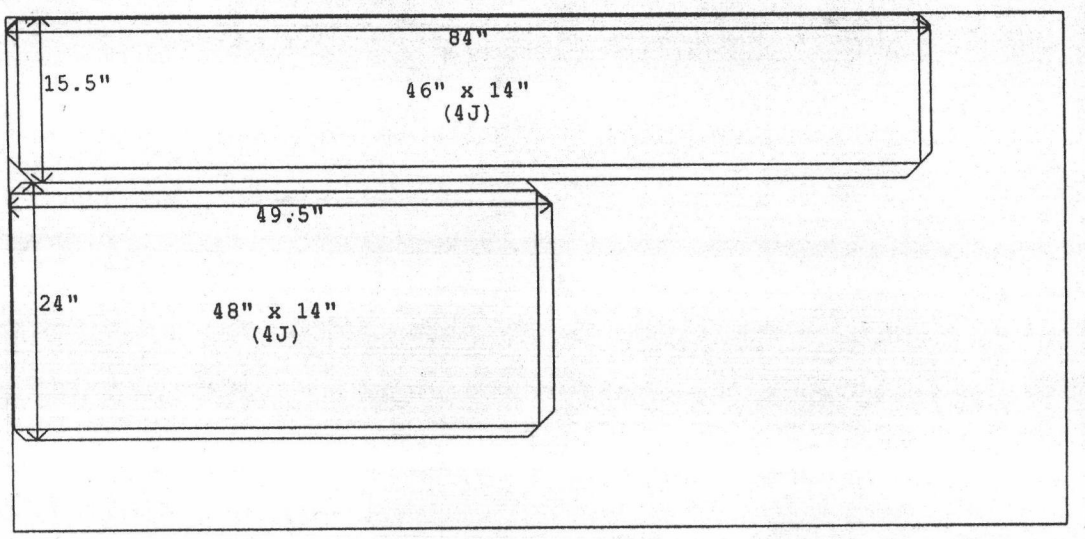
Gage #22 Amount - 1 sheet



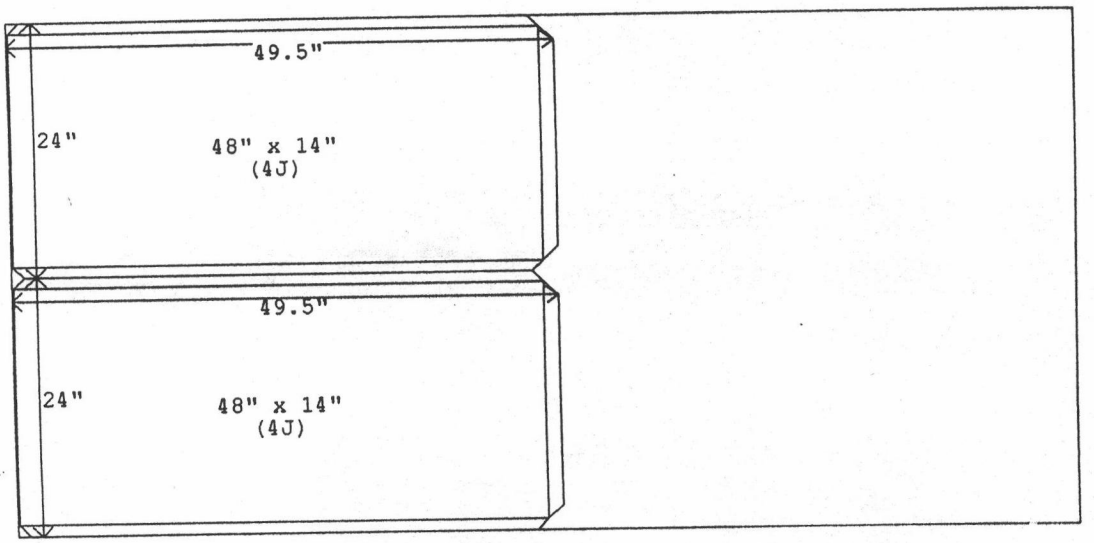
Gage #22 Amount - 1 sheet



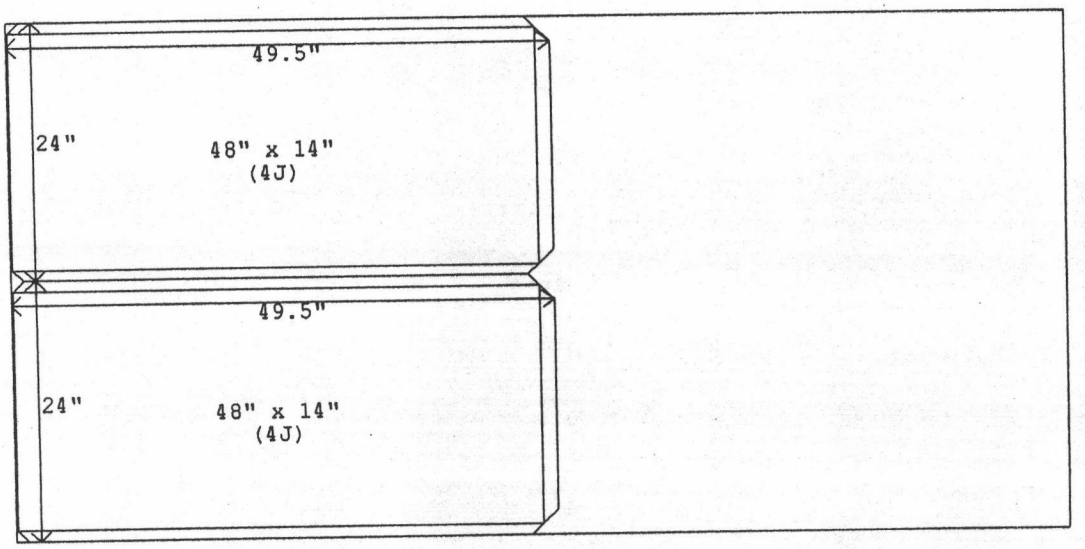
Gage #22 Amount - 1 sheet



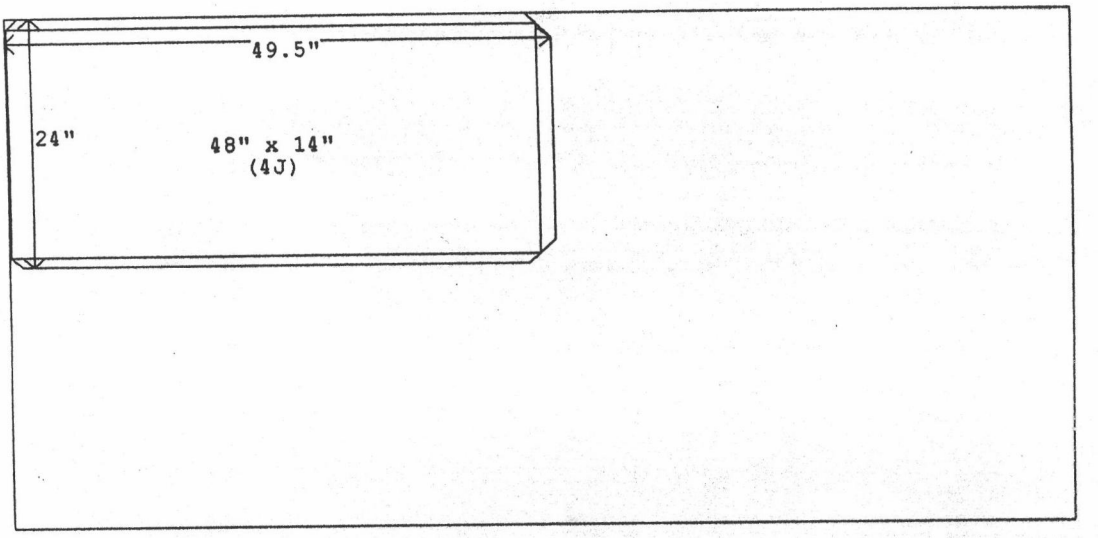
Gage #22 Amount - 1 sheet



Gage #22 Amount - 1 sheet

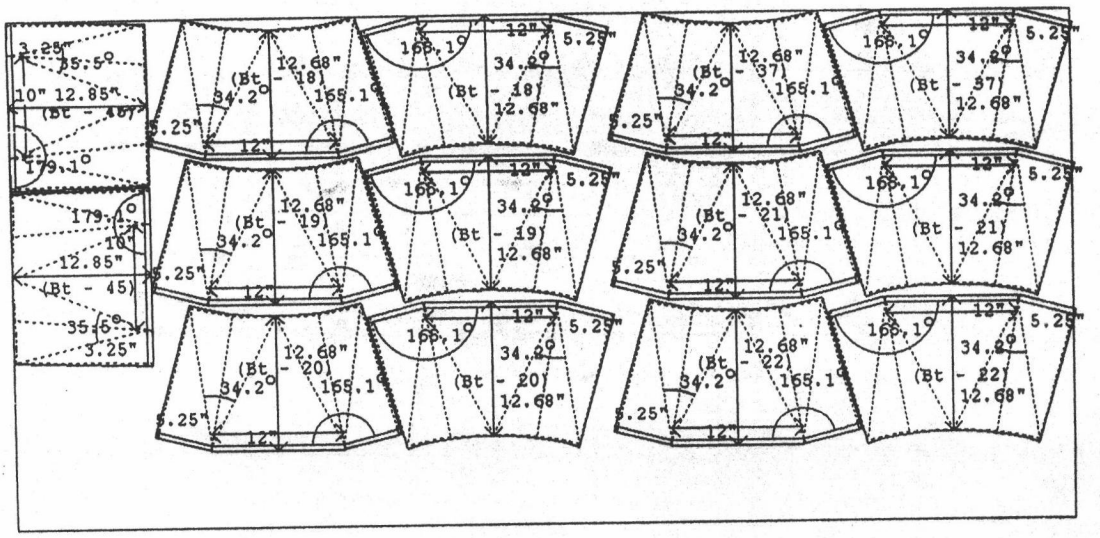


Gage #22 Amount - 1 sheet



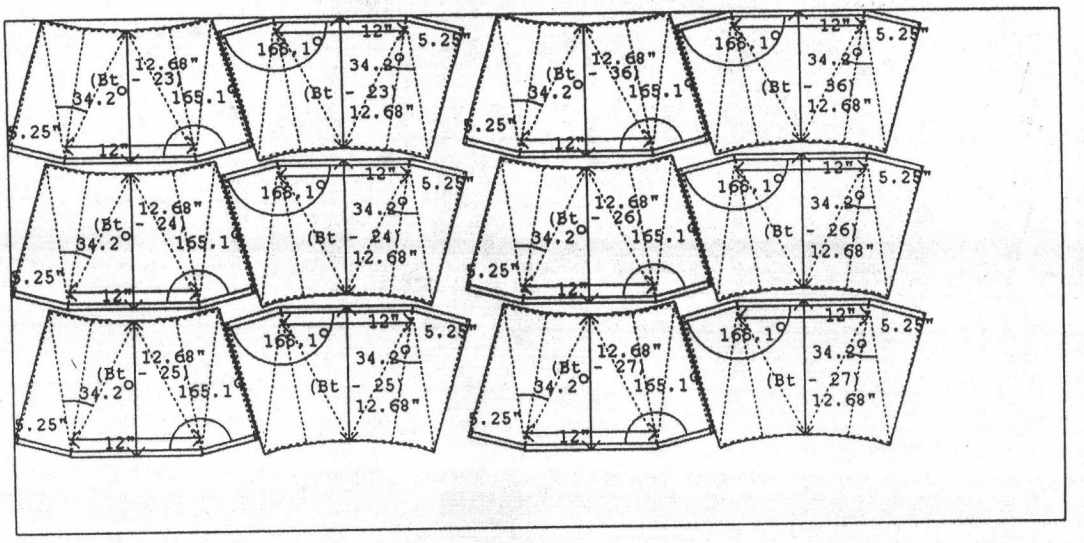
Gage #22 Amount - 1 sheet **Total Gage#22 - 43 sheets**

รูปที่ ง.12 รูปแบบแผ่นคลี่ที่เหมาะสมของแผ่นสังกะสีเบอร์ 26 สำหรับคอหัวจ่ายลม ในตัวอย่างระบบท่อลมที่ 2



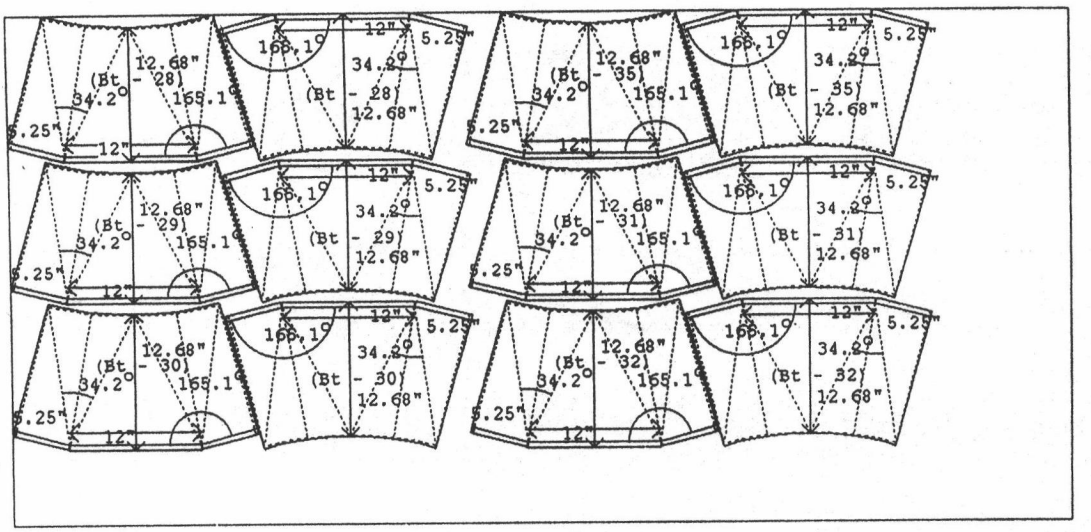
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #26 Amount - 1 sheet



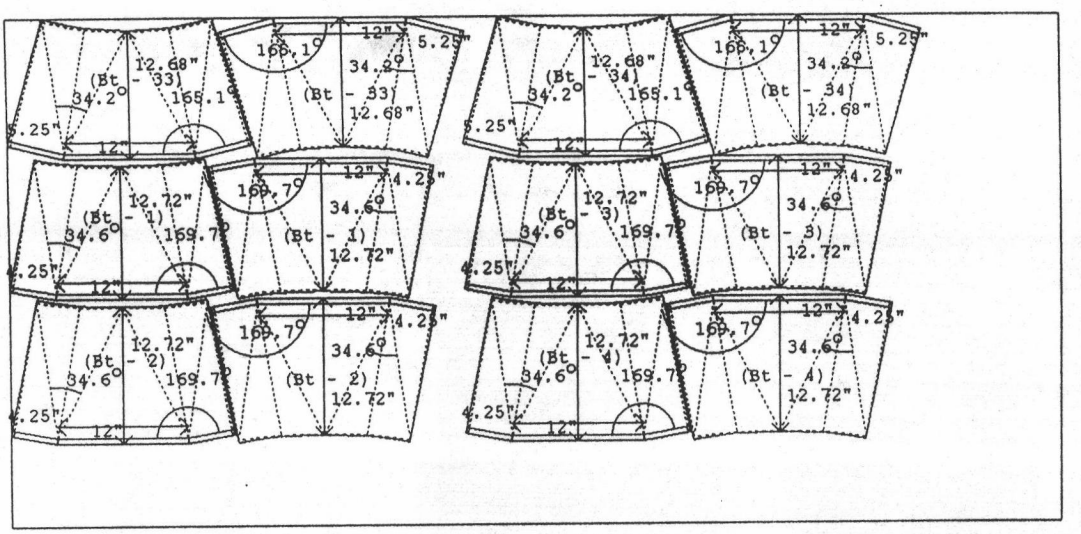
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #26 Amount - 1 sheet



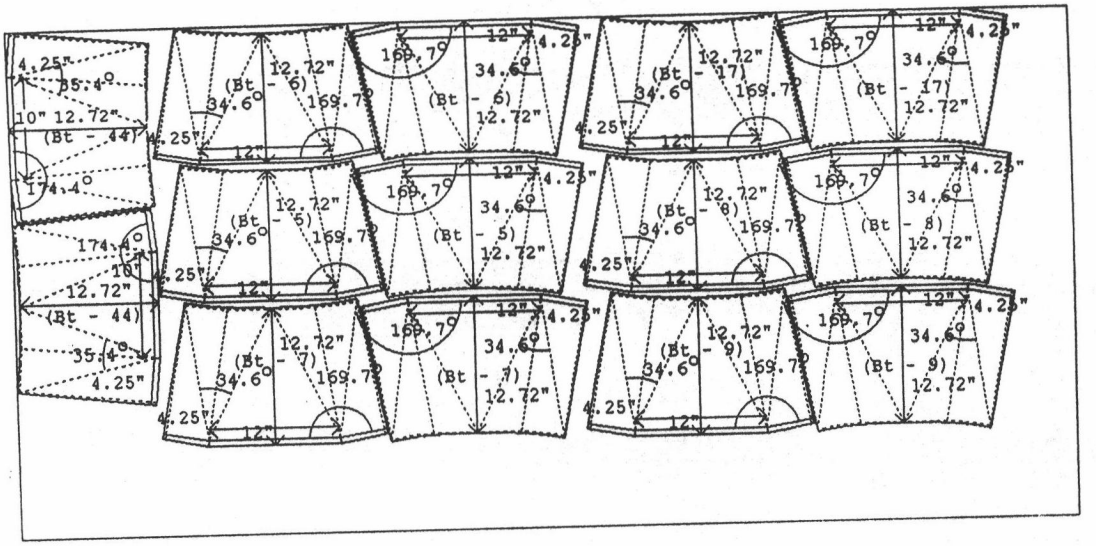
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #26 Amount - 1 sheet



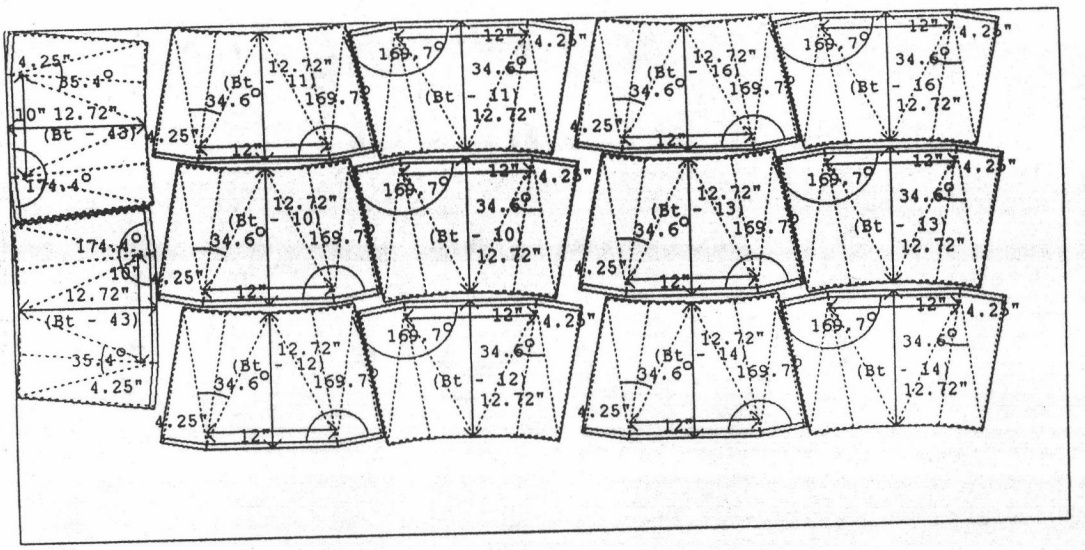
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #26 Amount - 1 sheet



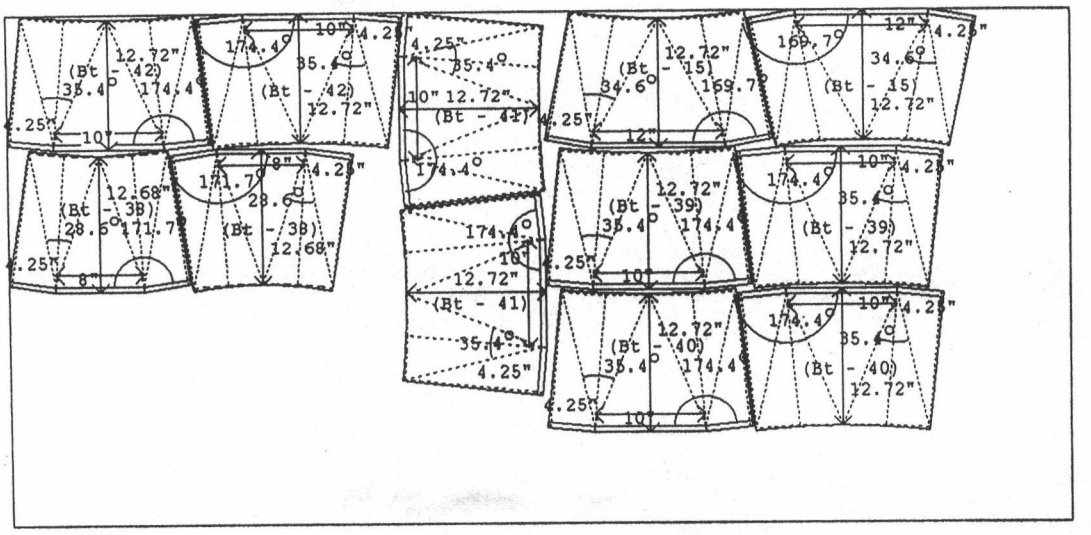
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #26 Amount - 1 sheet



Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

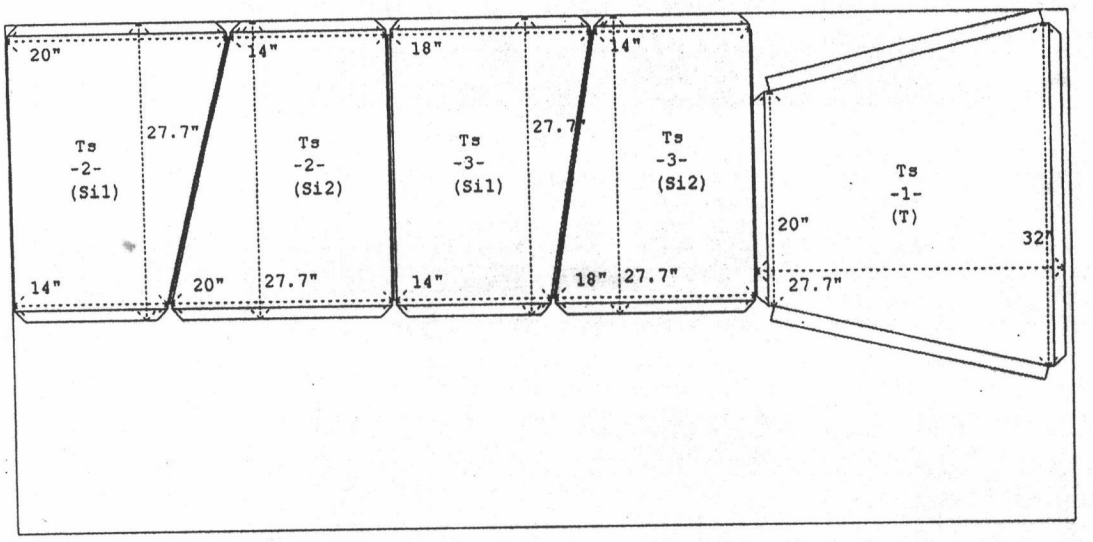
Gage #26 Amount - 1 sheet



Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

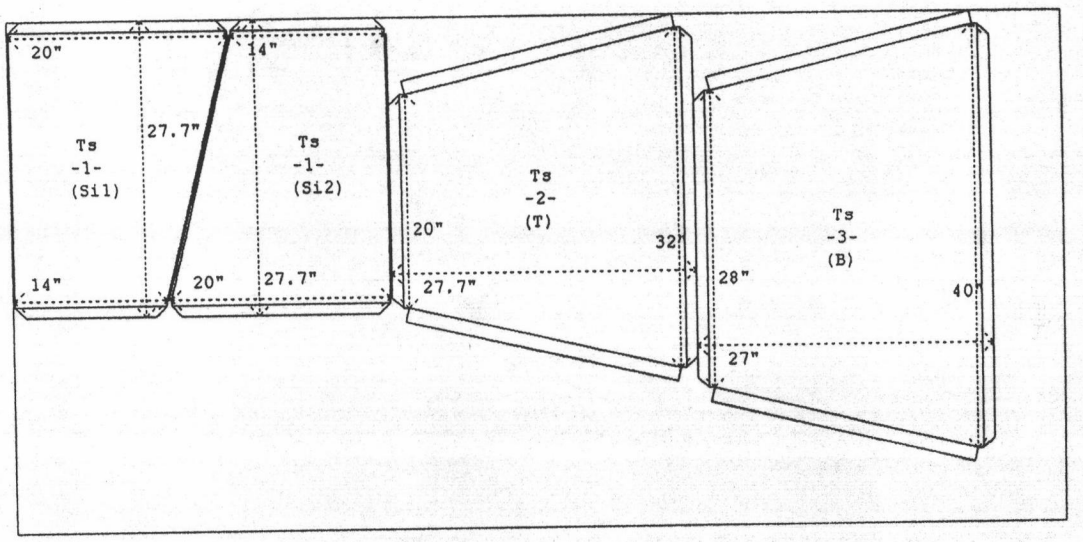
Gage #26 Amount - 1 sheet **Total Gage#26 - 7 sheets**

รูปที่ ง.13 รูปแบบแผ่นคลี่ที่เหมาะสมของแผ่นสังกะสีเบอร์ 22 สำหรับข้อต่อเปลี่ยนขนาด ในตัวอย่างระบบท่อลมที่ 2



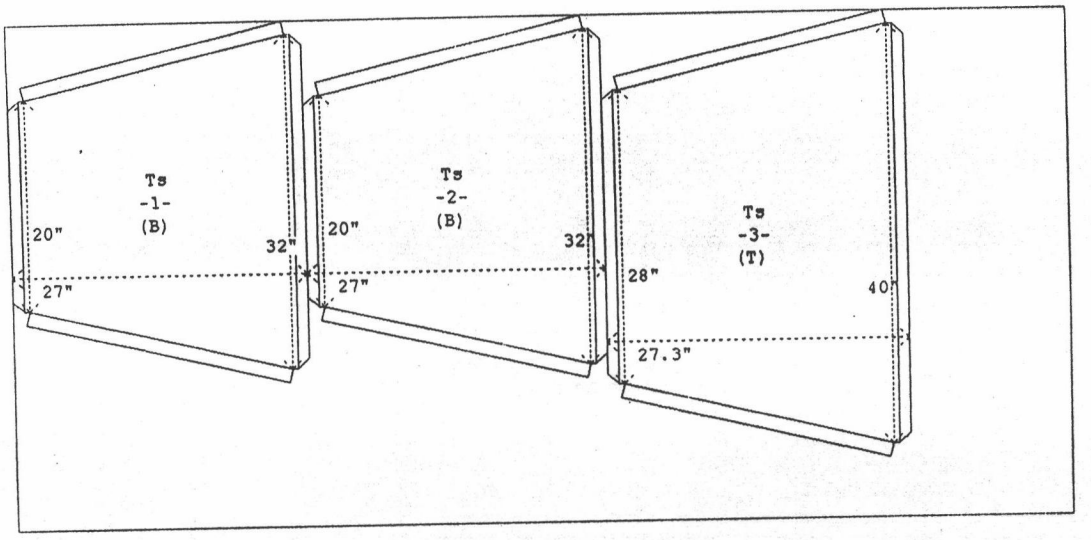
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #22 Amount - 1 sheet



Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

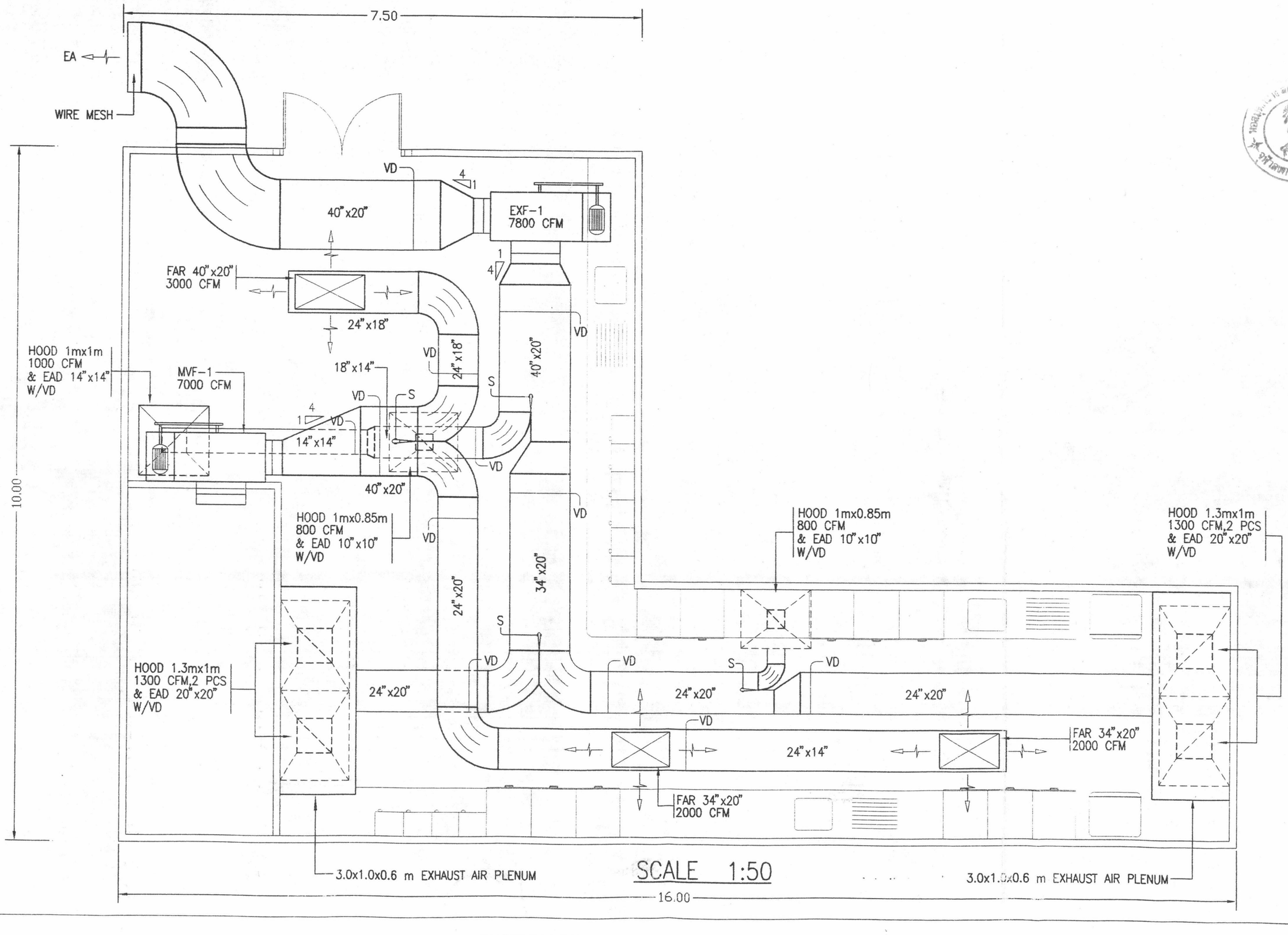
Gage #22 Amount - 1 sheet



Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #22 Amount - 1 sheet **Total Gage#22 - 3 sheets**

รูปที่ ง.14 แบบแปลนตัวอย่างระบบท่อลมที่ 3



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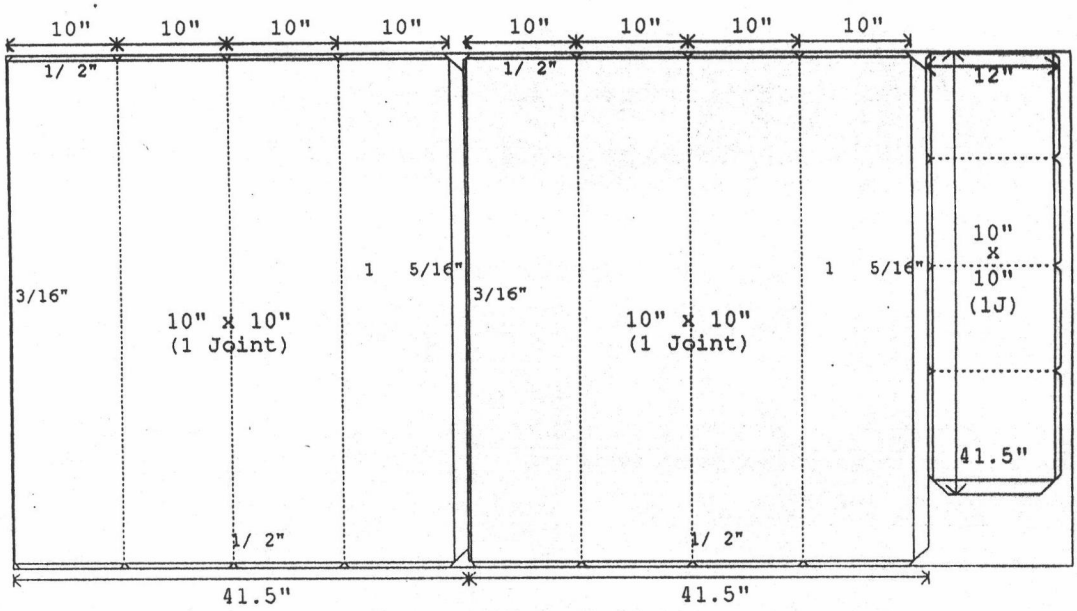
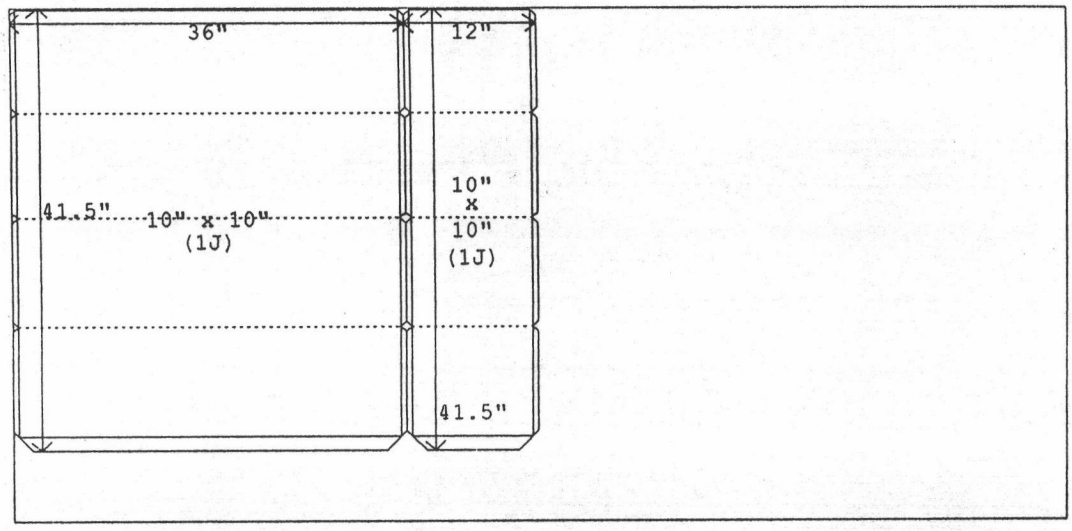
รูปที่ ง.16 รูปแบบแผ่นคลี่ที่เหมาะสมของแผ่นสังกะสีเบอร์ 26 สำหรับท่อลมตรง ในตัวอย่างระบบท่อลมที่ 3

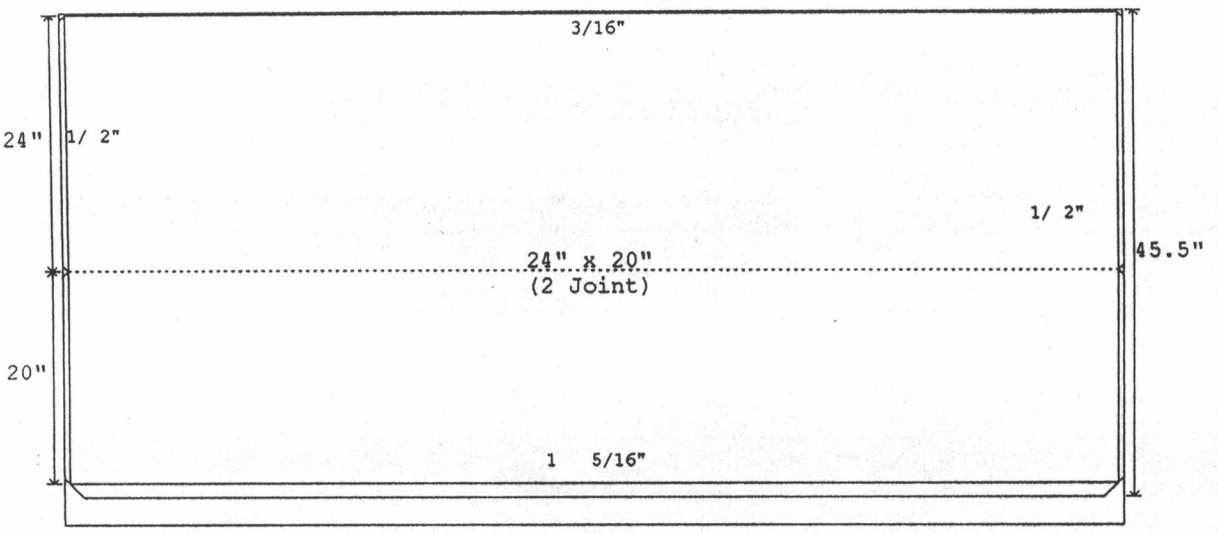


Gage #26 Amount - 1 sheet

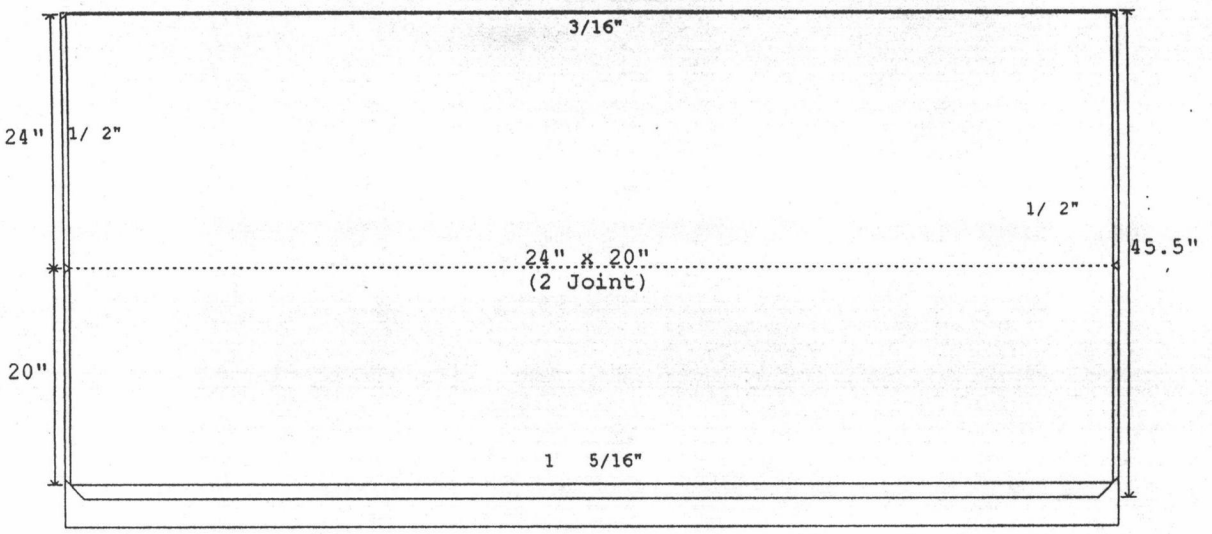


Gage #26 Amount - 1 sheet **Total Gage#26 - 2 sheets**

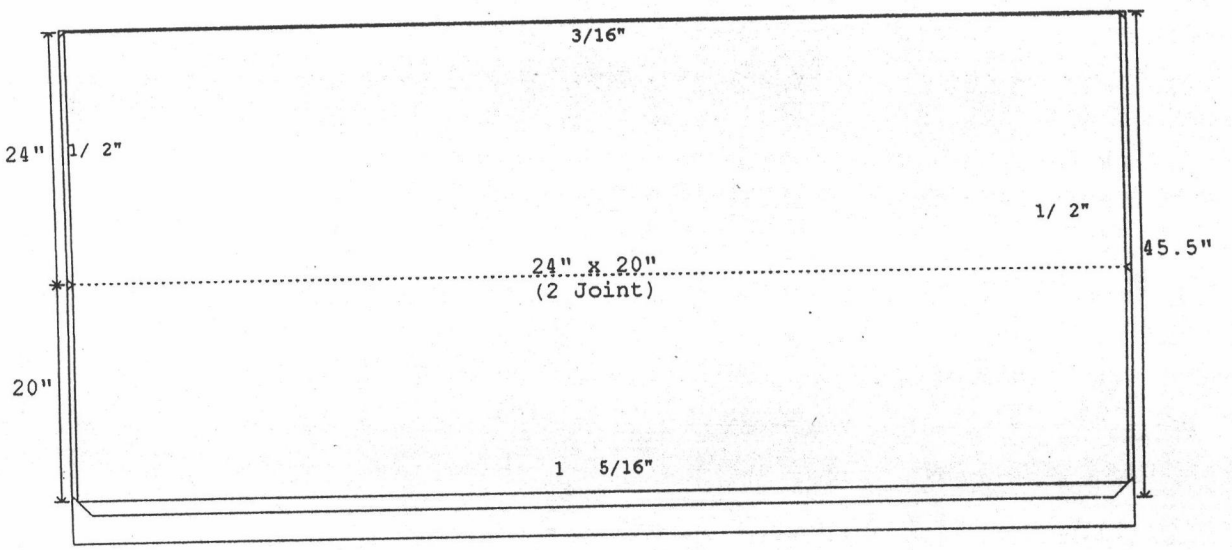
รูปที่ ง.16 รูปแบบแผ่นคลี่ที่เหมาะสมของแผ่นสังกะสีเบอร์ 24 สำหรับท่อลมตรง ในตัวอย่างระบบท่อลมที่ 3



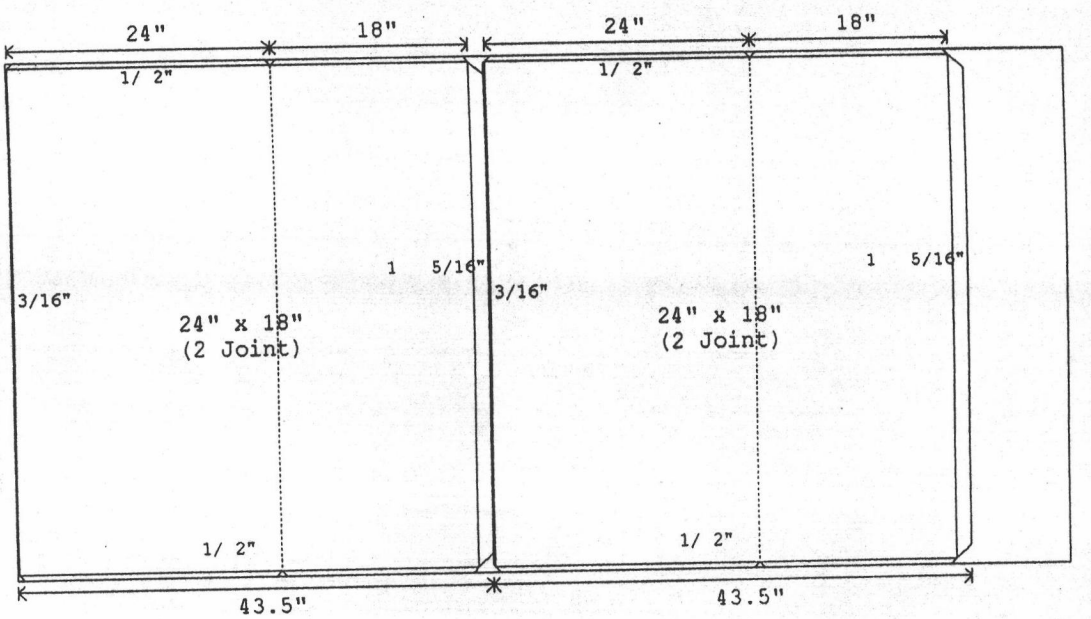
Gage #24 Amount - 4 sheets



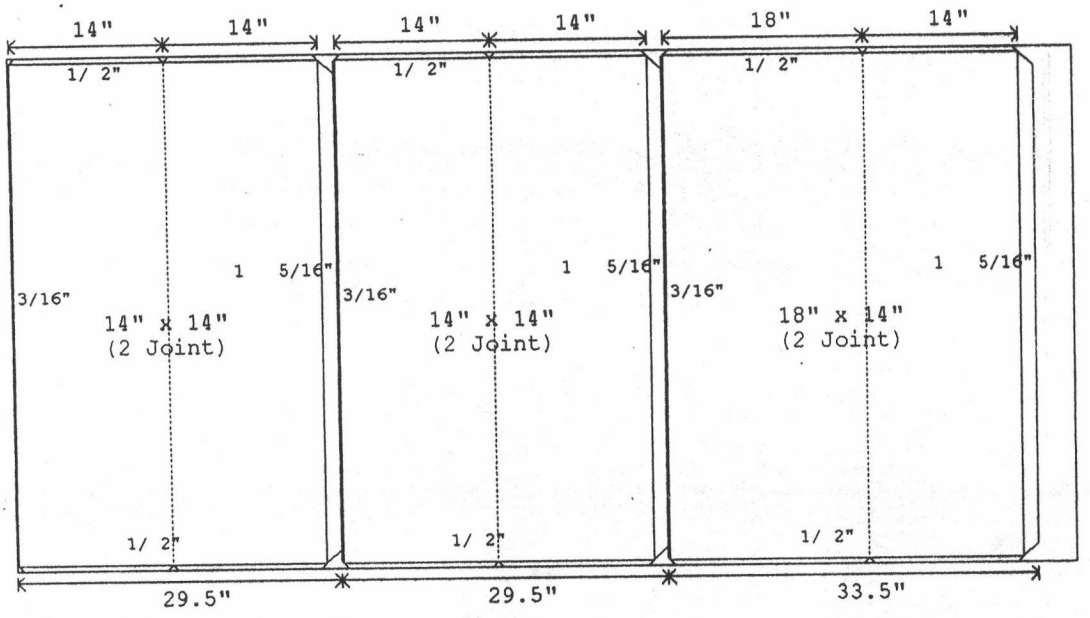
Gage #24 Amount - 2 sheets



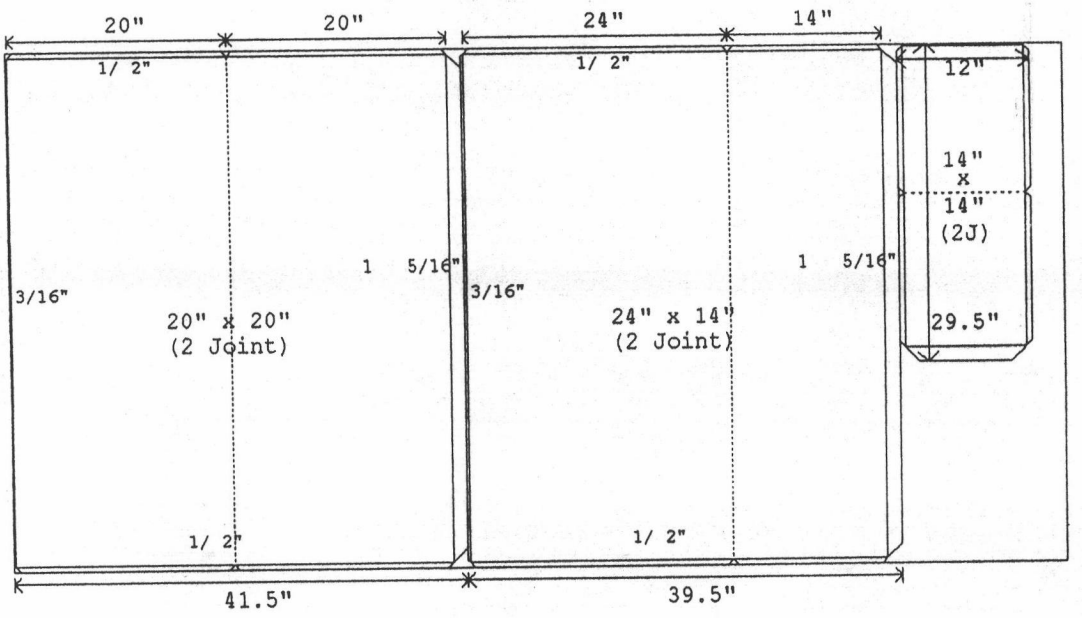
Gage #24 Amount - 2 sheets



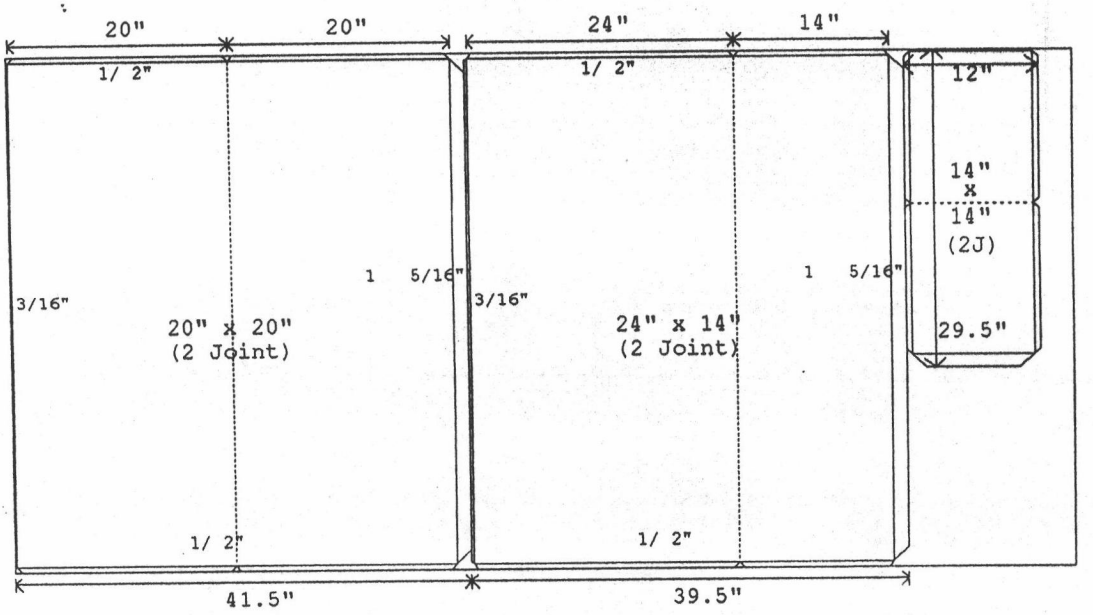
Gage #24 Amount - 1 sheet



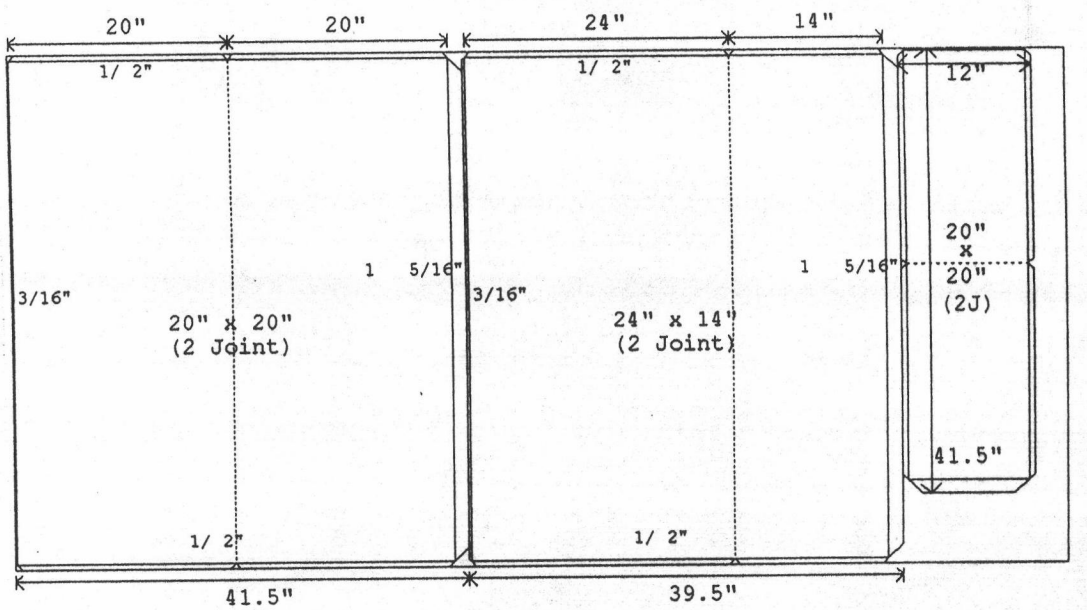
Gage #24 Amount - 2 sheets



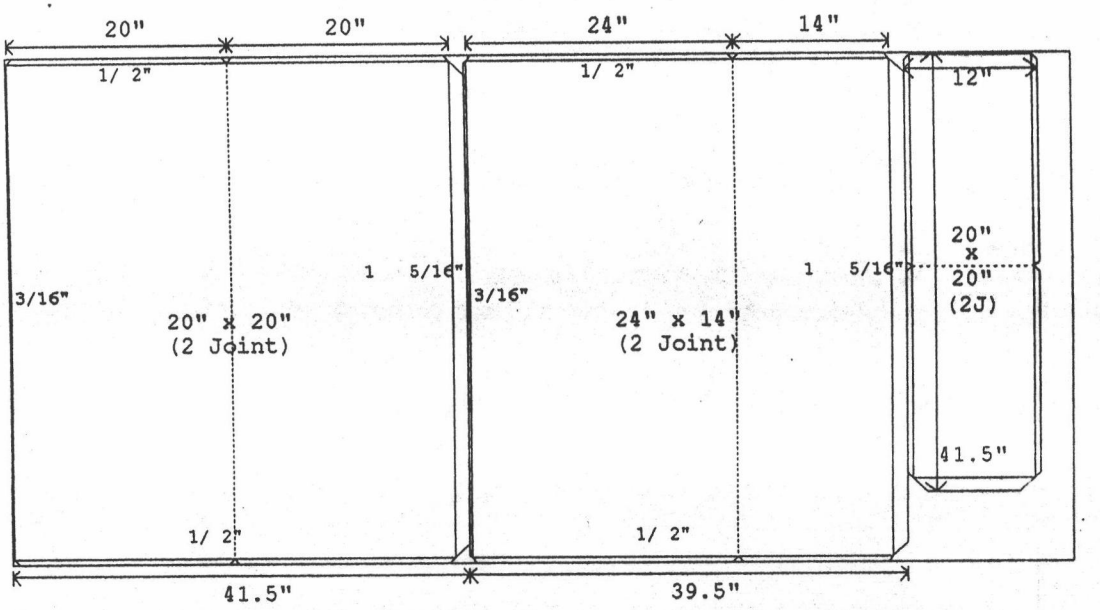
Gage #24 Amount - 1 sheet



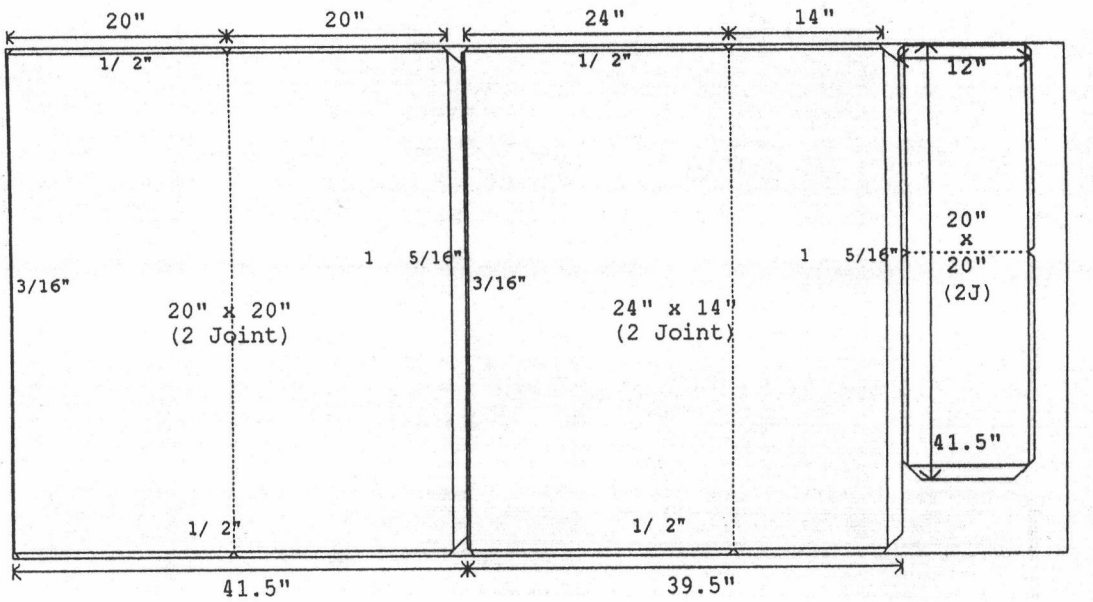
Gage #24 Amount - 1 sheet



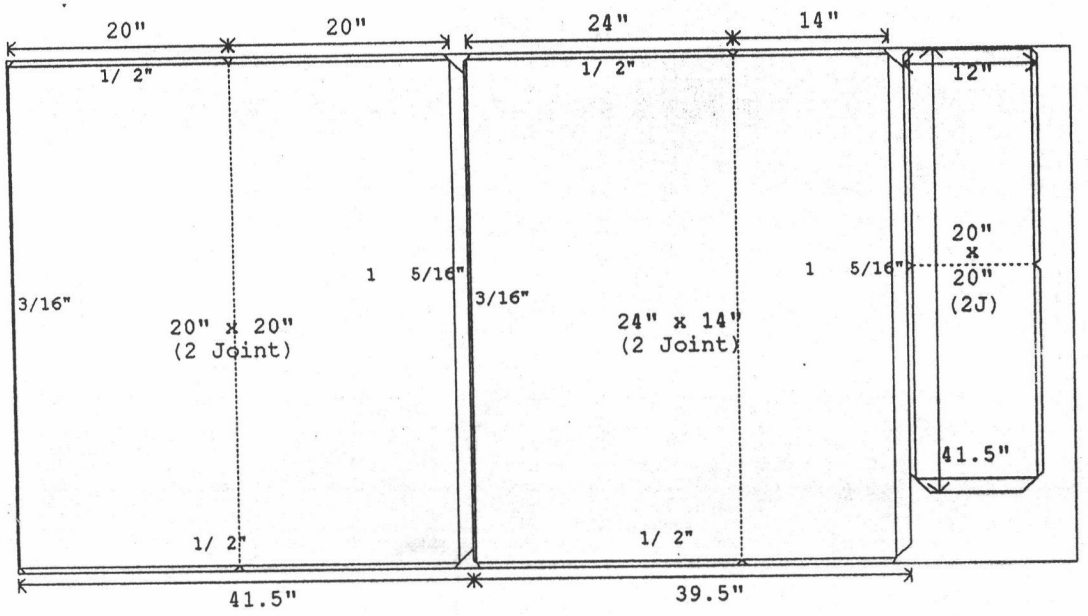
Gage #24 Amount - 1 sheet



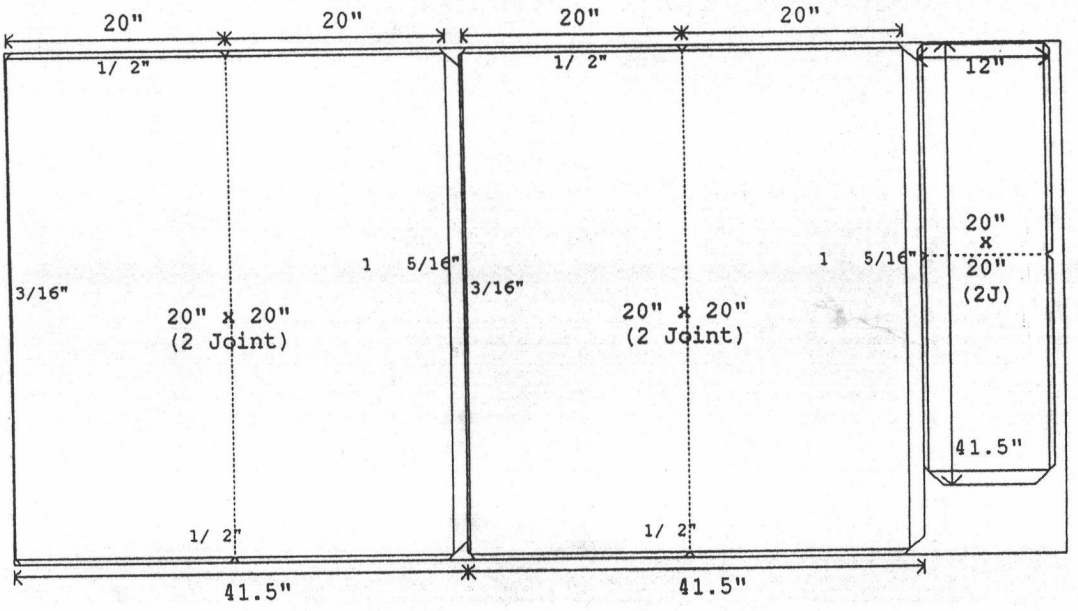
Gage #24 Amount - 1 sheet



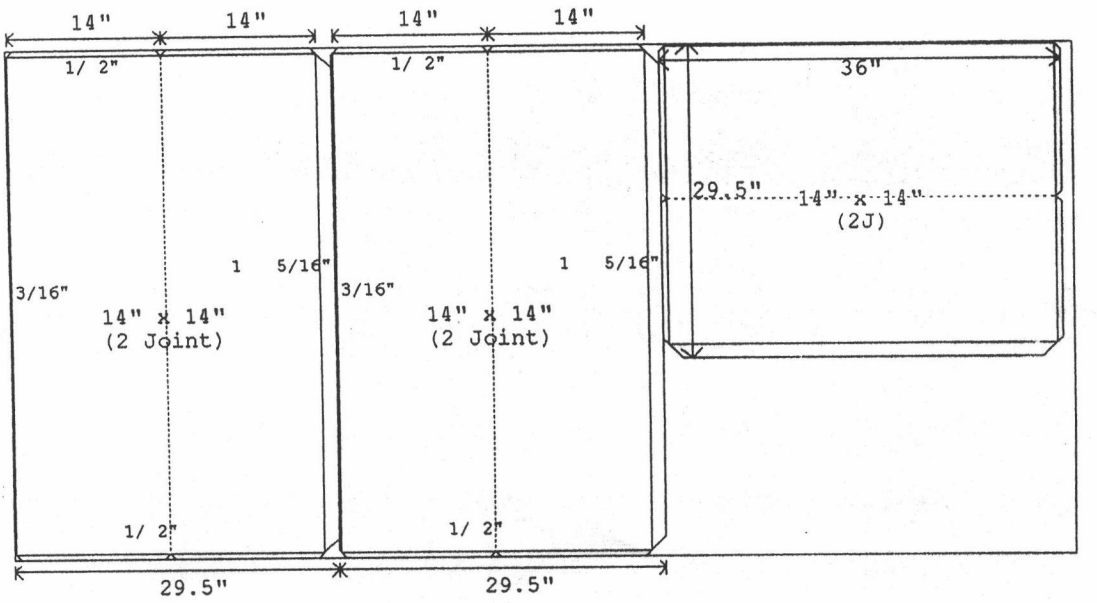
Gage #24 Amount - 1 sheet



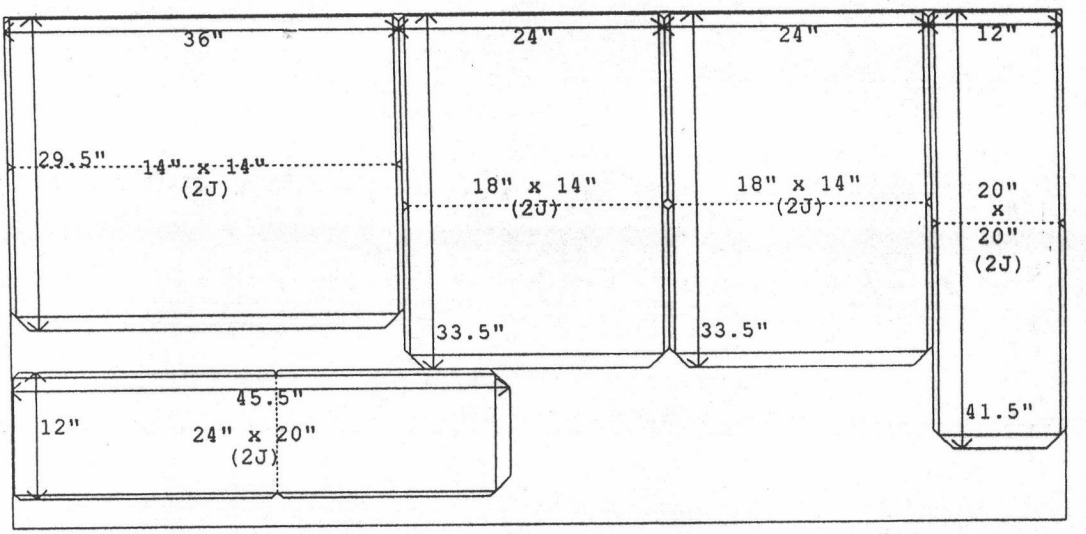
Gage #24 Amount - 1 sheet



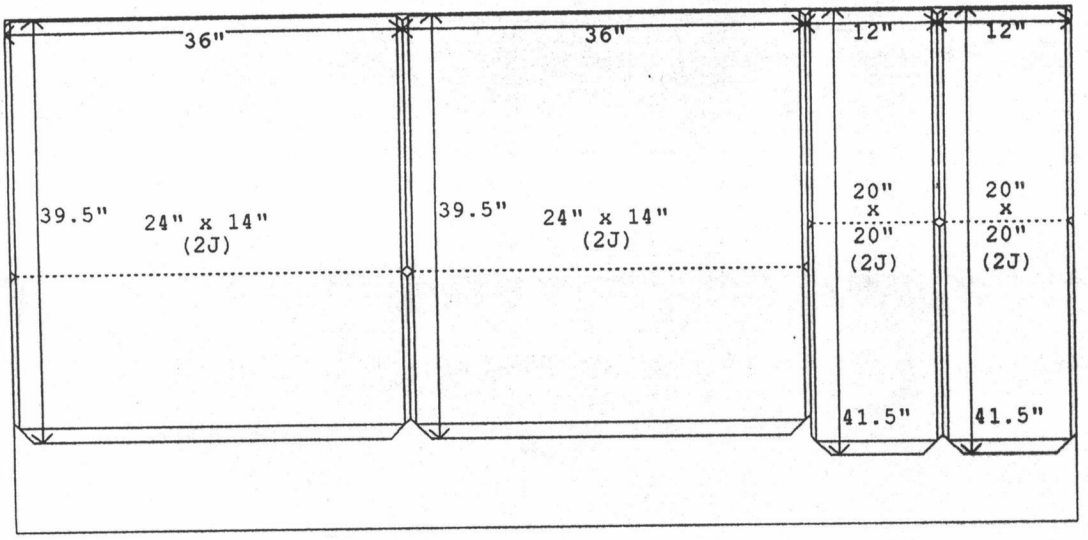
Gage #24 Amount - 1 sheet



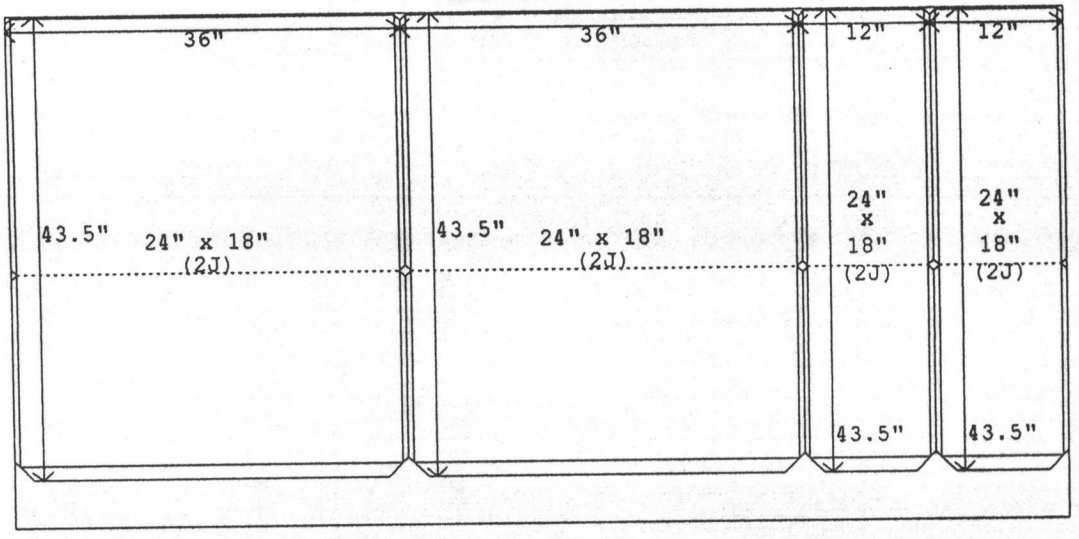
Gage #24 Amount - 1 sheet



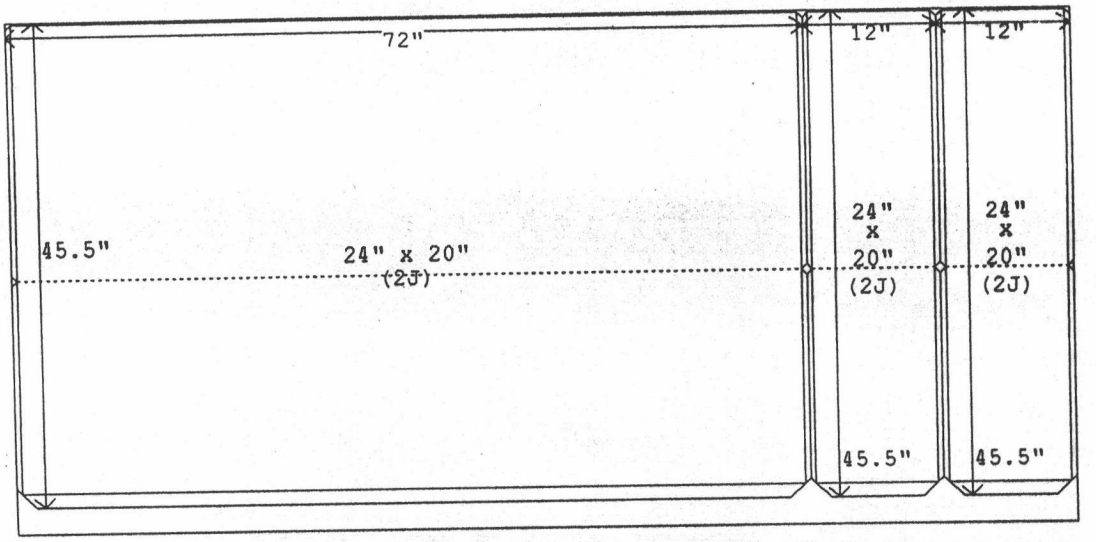
Gage #24 Amount - 1 sheet



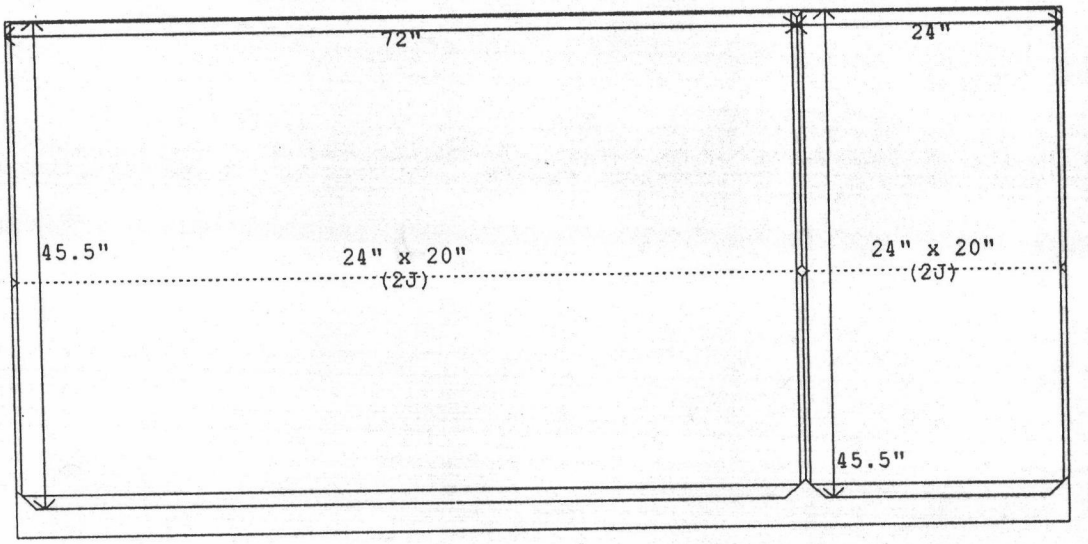
Gage #24 Amount - 1 sheet



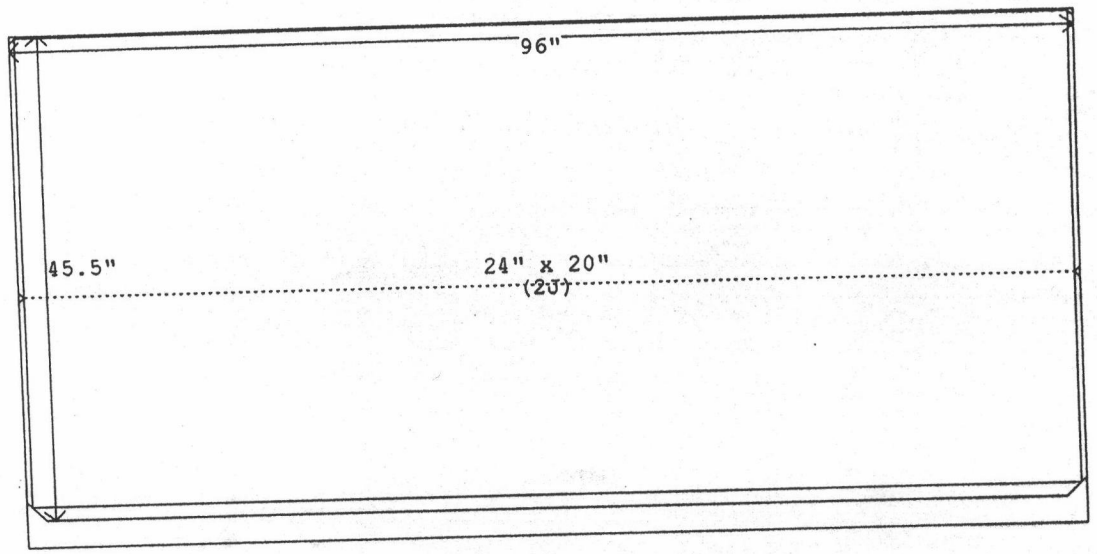
Gage #24 Amount - 1 sheet



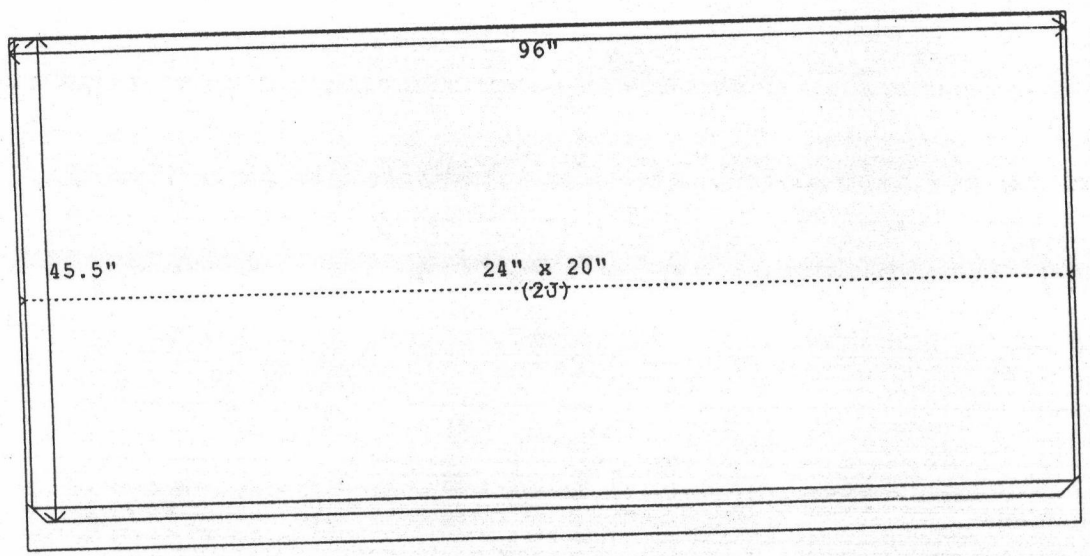
Gage #24 Amount - 1 sheet



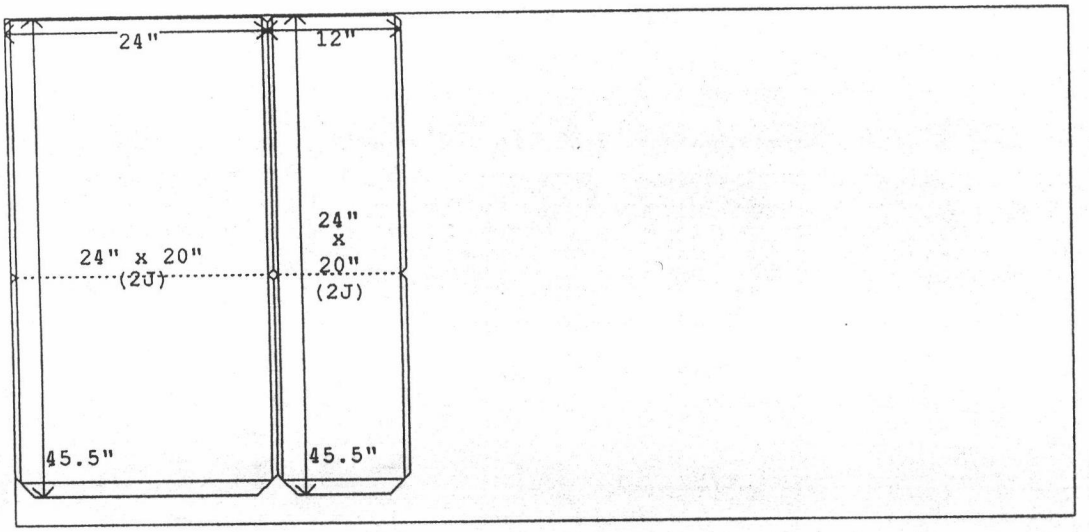
Gage #24 Amount - 1 sheet



Gage #24 Amount - 1 sheet

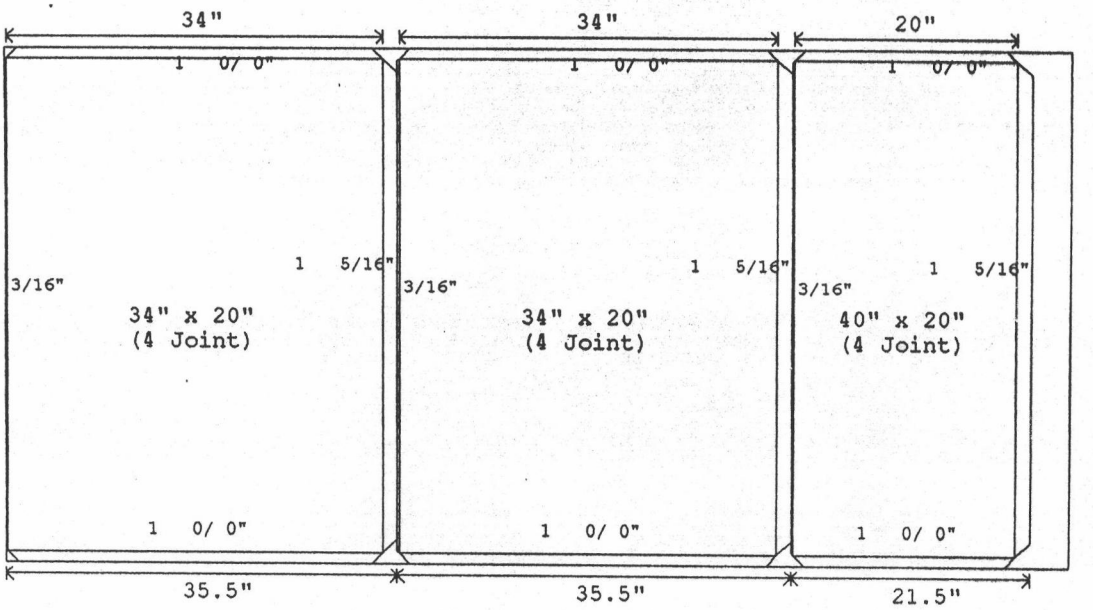


Gage #24 Amount - 1 sheet

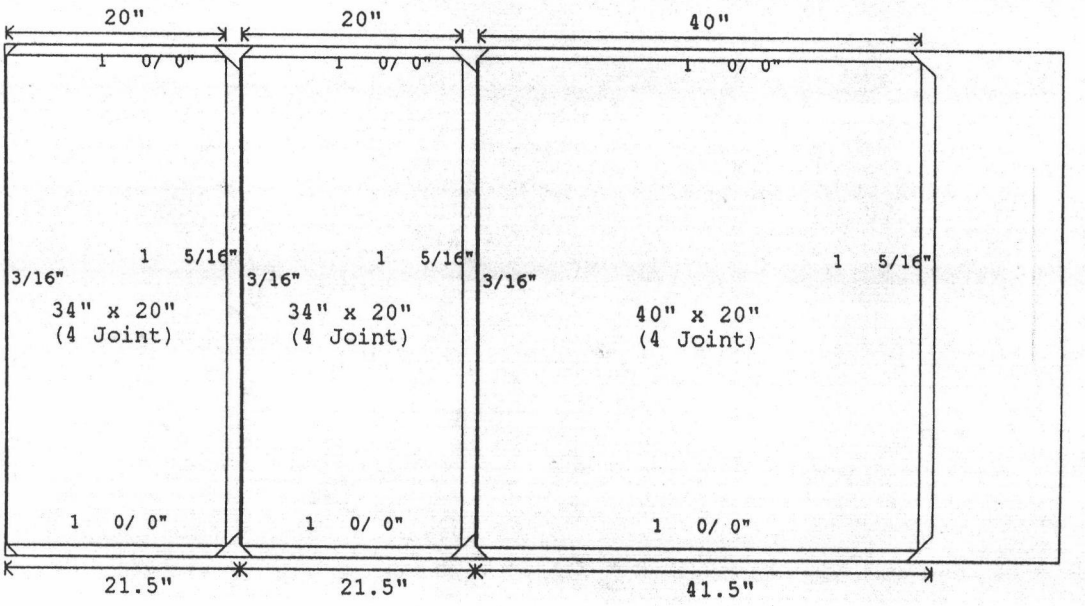


Gage #24 Amount - 1 sheet **Total Gage#24 - 27 sheets**

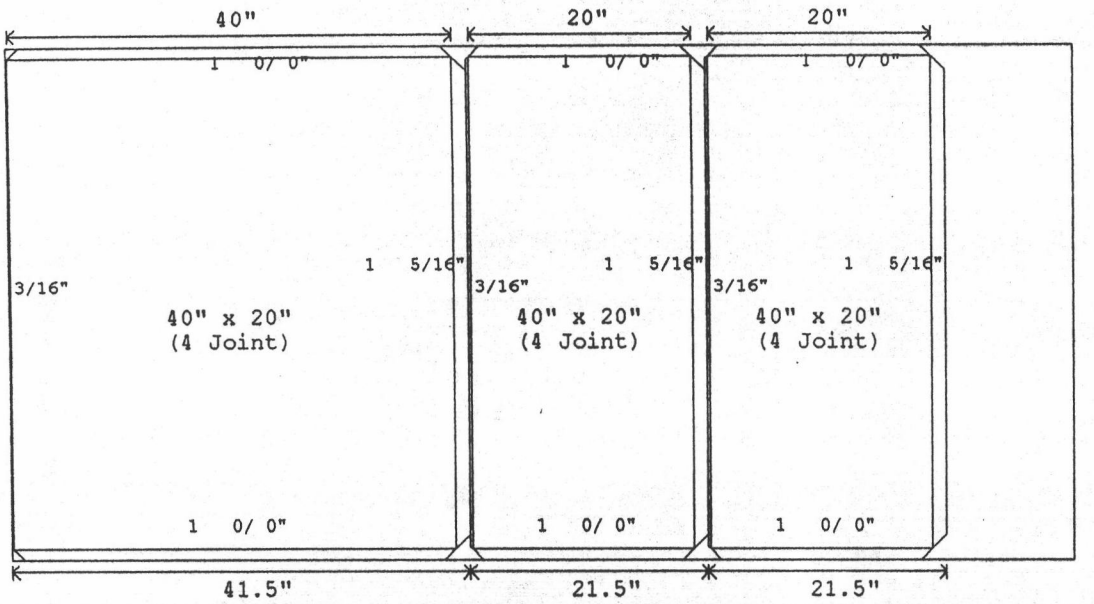
รูปที่ ง.17 รูปแบบแผ่นคลี่ที่เหมาะสมของแผ่นสังกะสีเบอร์ 22 สำหรับท่อลมตรง ในตัวอย่างระบบท่อลมที่ 3



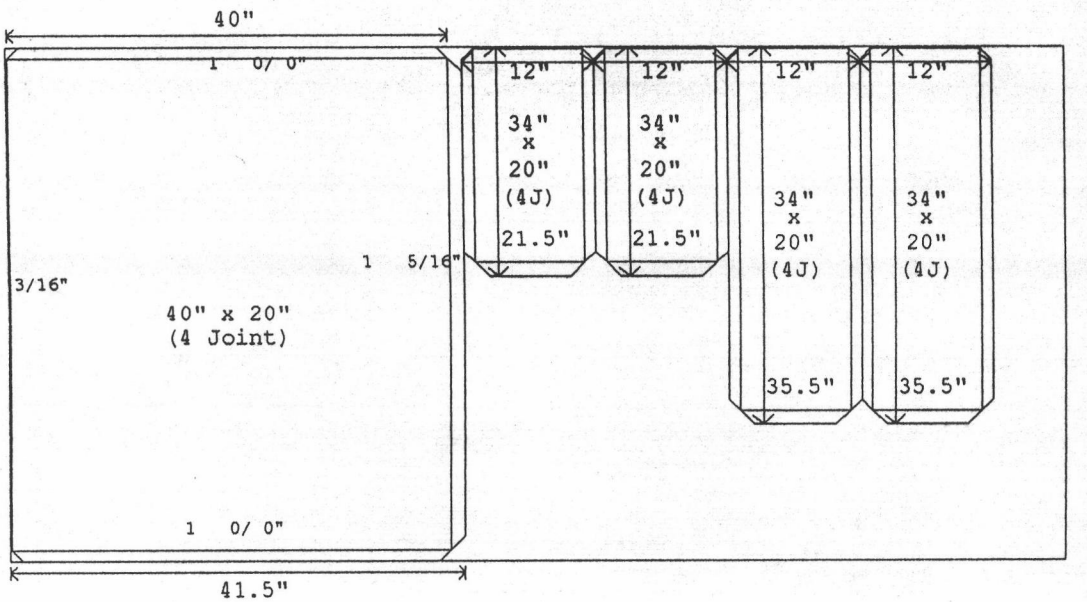
Gage #22 Amount - 2 sheets



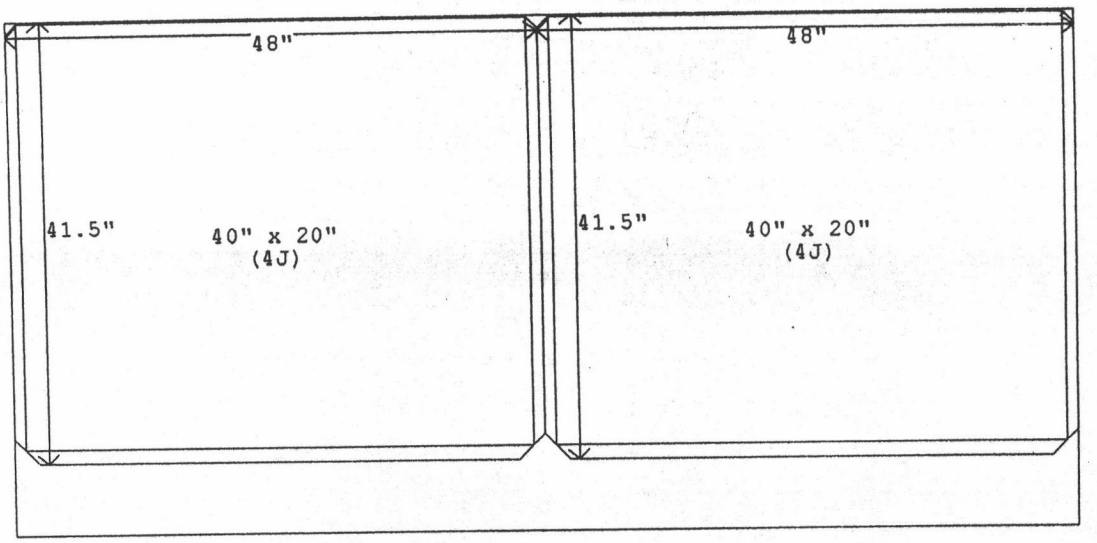
Gage #22 Amount - 2 sheets



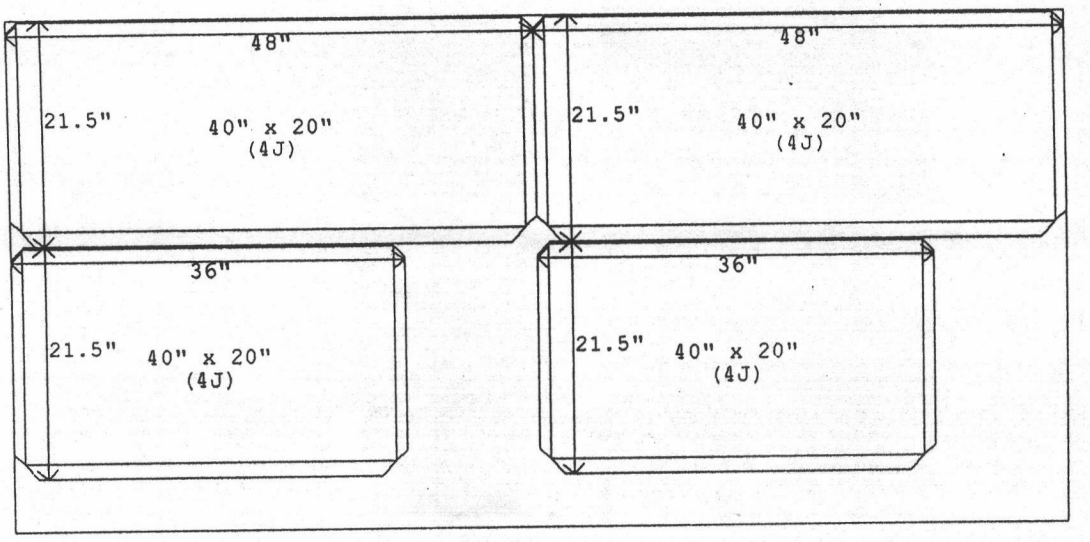
Gage #22 Amount - 1 sheet



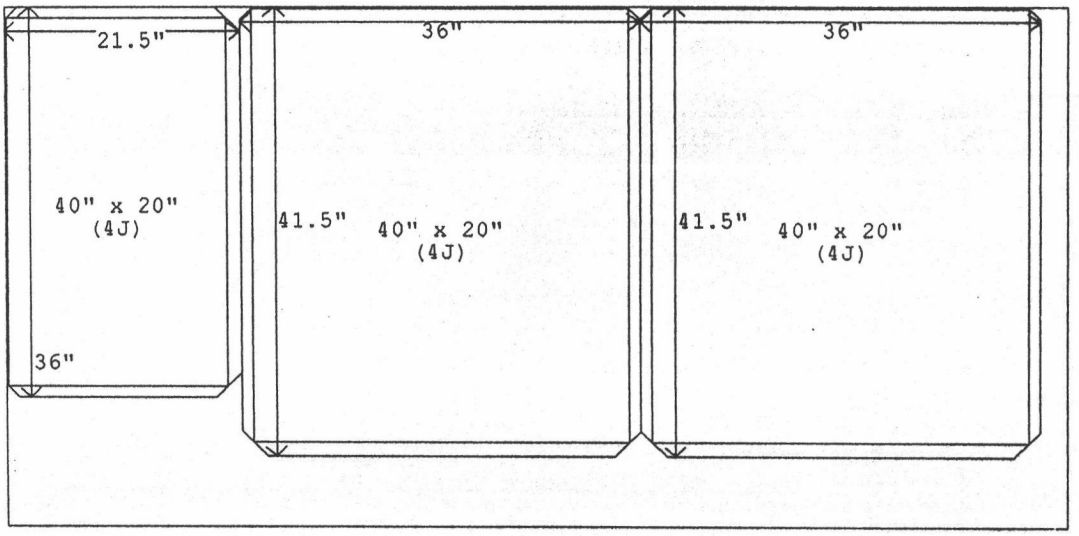
Gage #22 Amount - 1 sheet



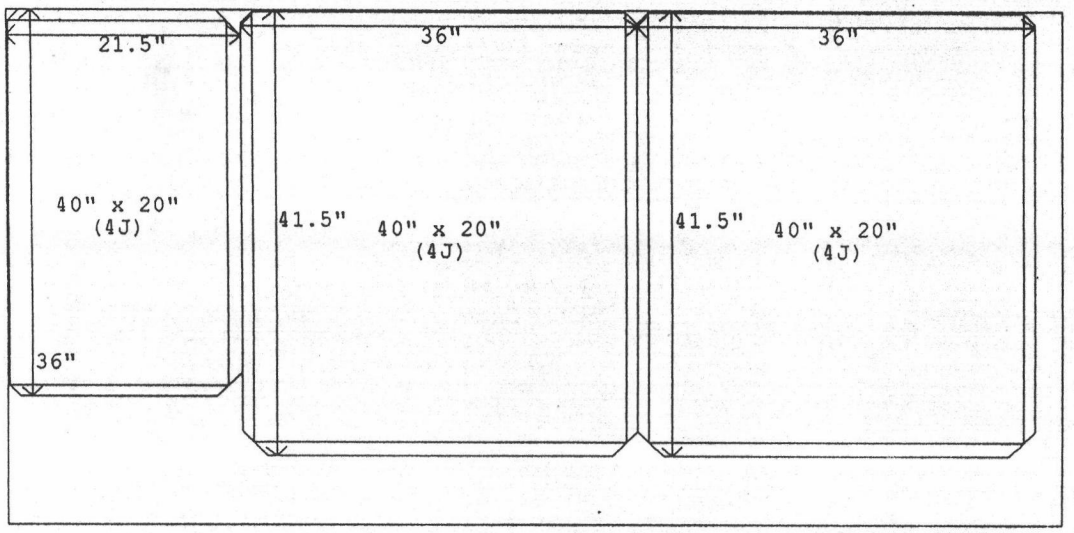
Gage #22 Amount - 1 sheet



Gage #22 Amount - 1 sheet

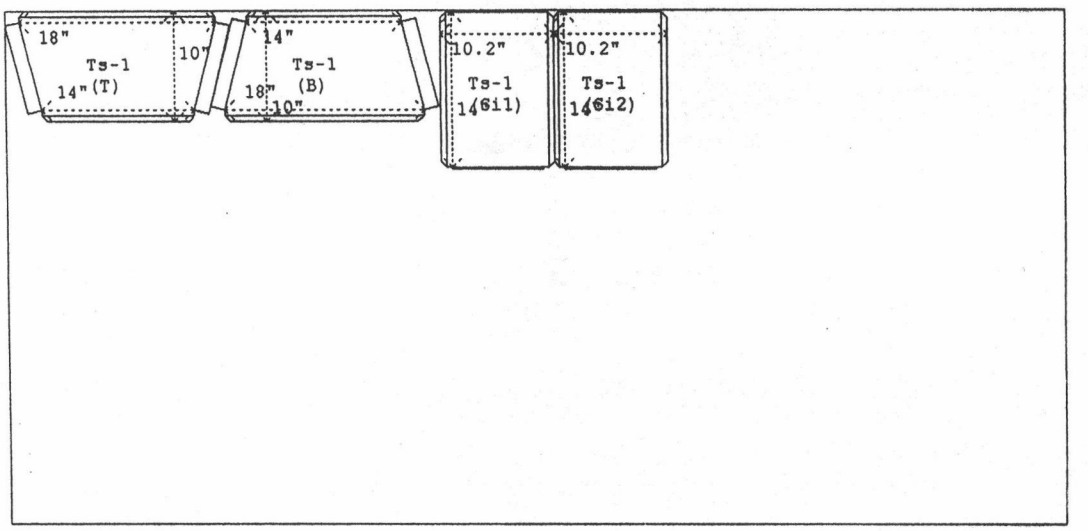


Gage #22 Amount - 1 sheet



Gage #22 Amount - 1 sheet **Total Gage#22 - 10 sheets**

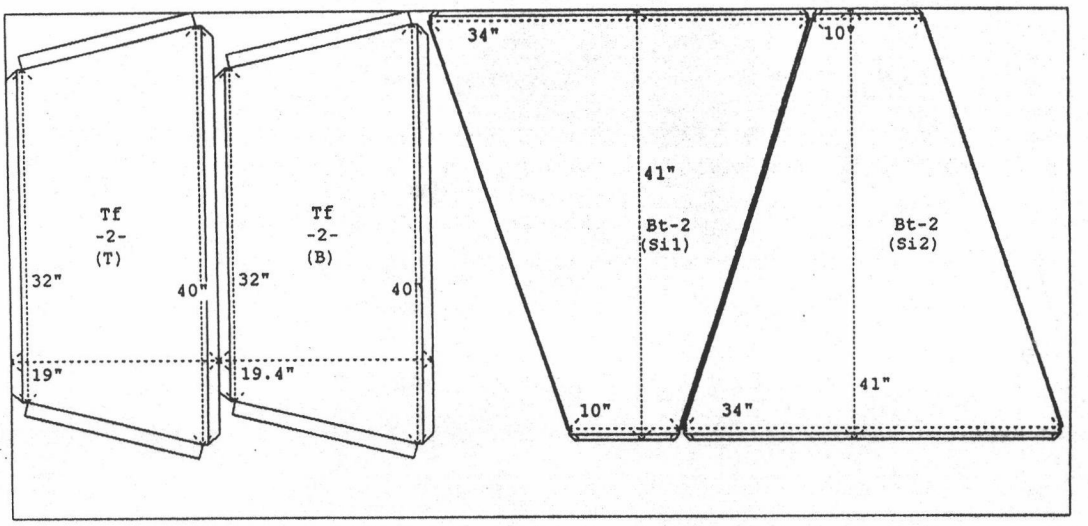
รูปที่ ง.18 รูปแบบแผ่นคลี่ที่เหมาะสมของแผ่นสังกะสีเบอร์ 24 สำหรับข้อต่อเปลี่ยนขนาด ในตัวอย่างระบบท่อลมที่ 3



Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

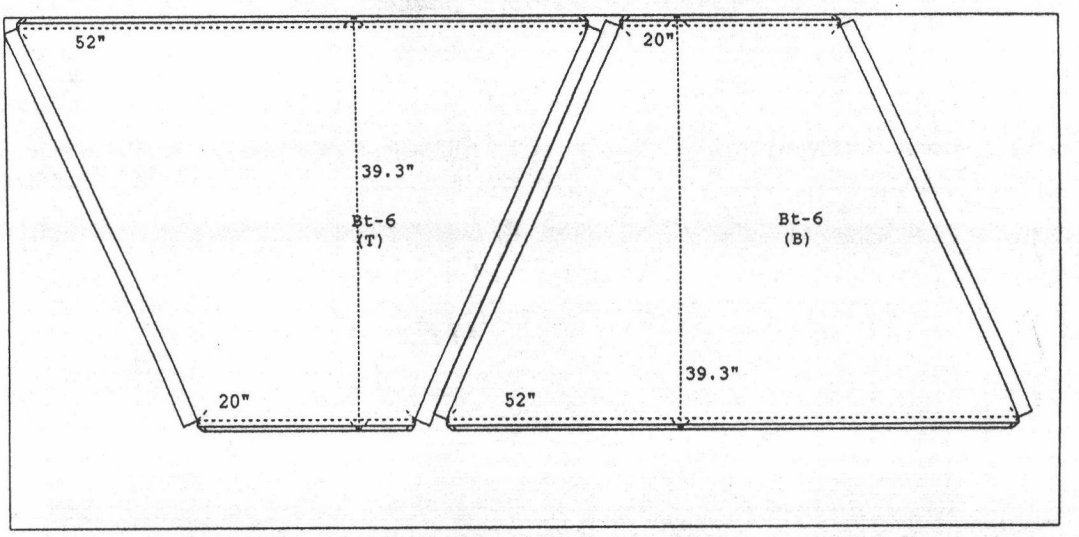
Gage #24 Amount - 1 sheet **Total Gage#24 - 1 sheets**

รูปที่ ง.19 รูปแบบแผ่นคลี่ที่เหมาะสมของแผ่นสังกะสีเบอร์ 22 สำหรับข้อต่อเปลี่ยนรูป และ หน้ากากดูดควัน ในตัวอย่างระบบท่อลมที่ 3



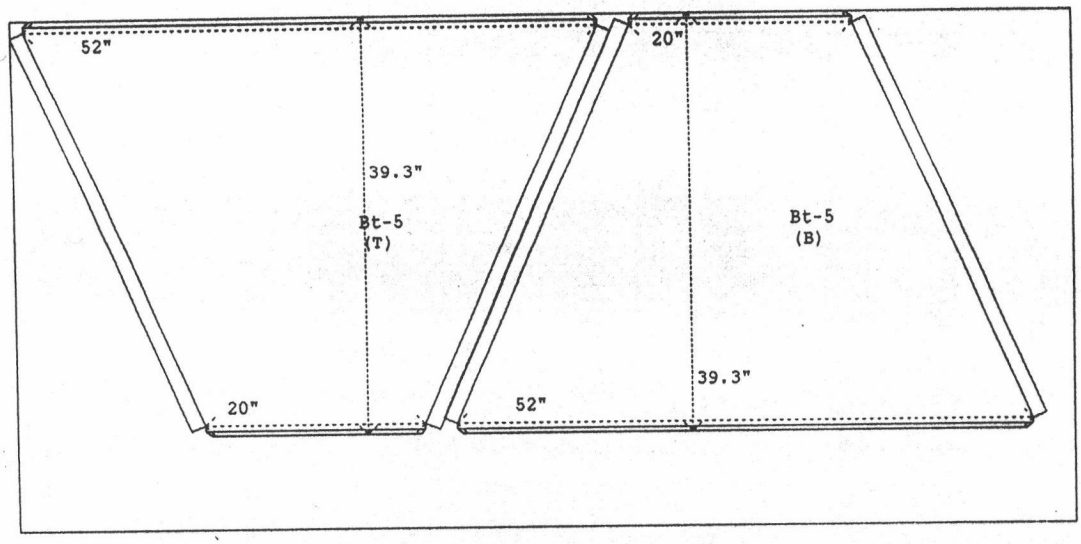
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #22 Amount - 1 sheet



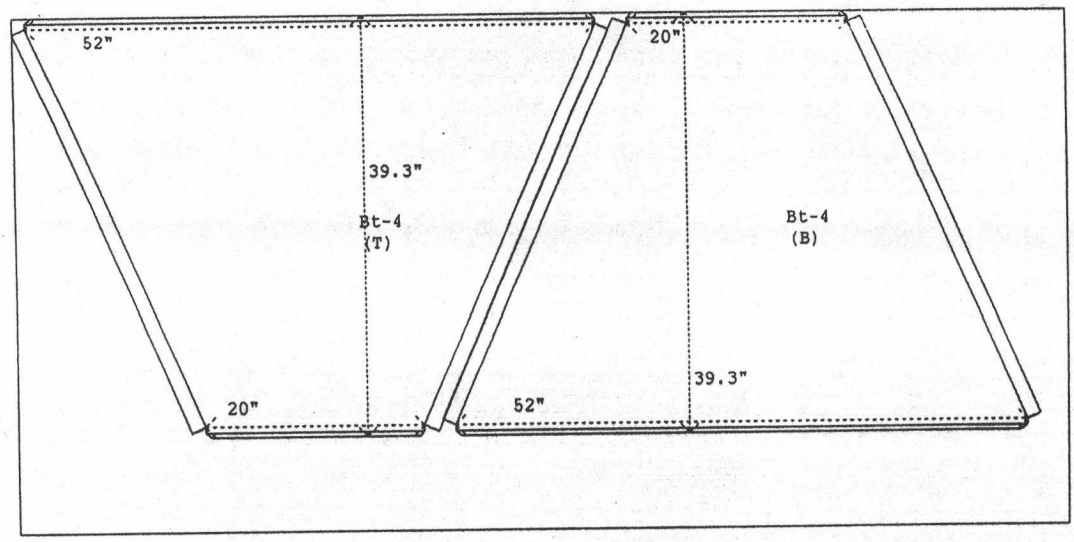
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #22 Amount - 1 sheet



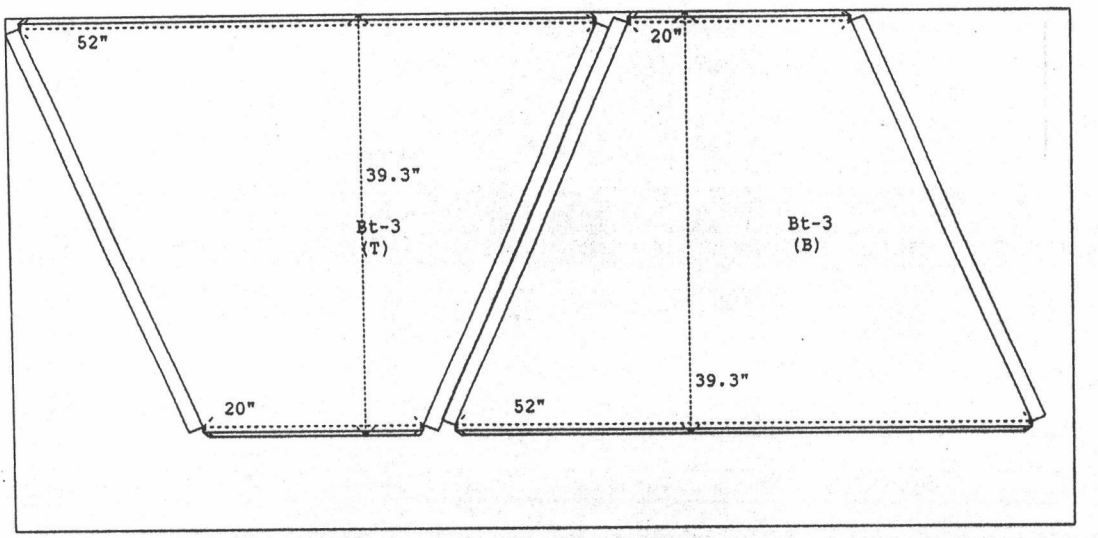
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #22 Amount - 1 sheet



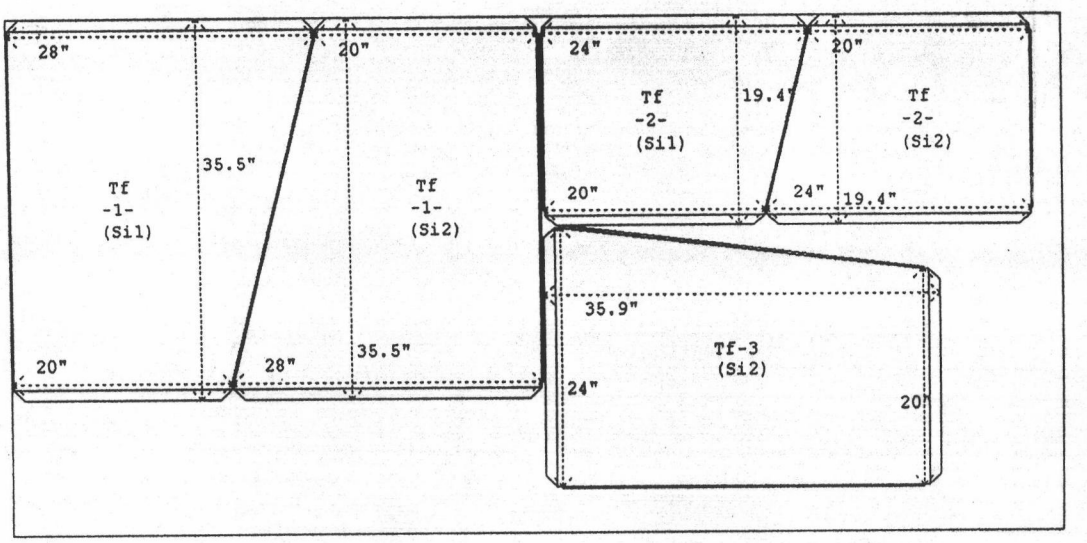
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #22 Amount - 1 sheet



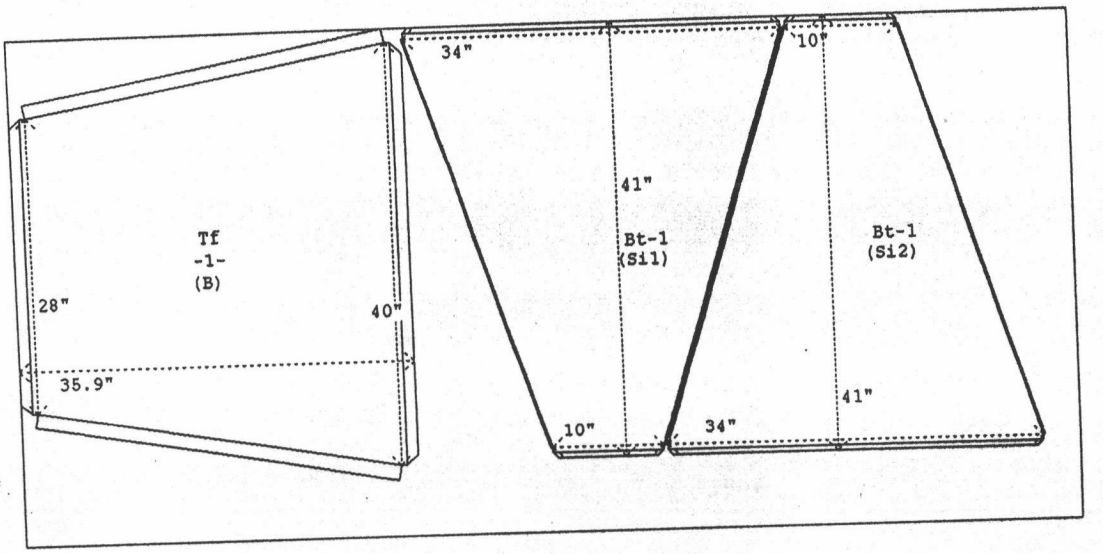
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #22 Amount - 1 sheet



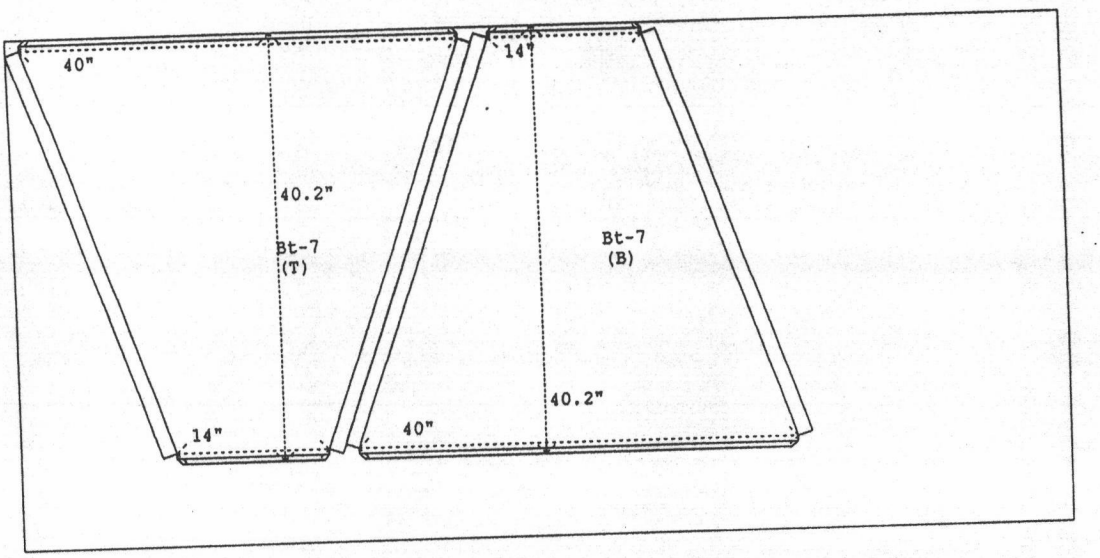
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #22 Amount - 1 sheet



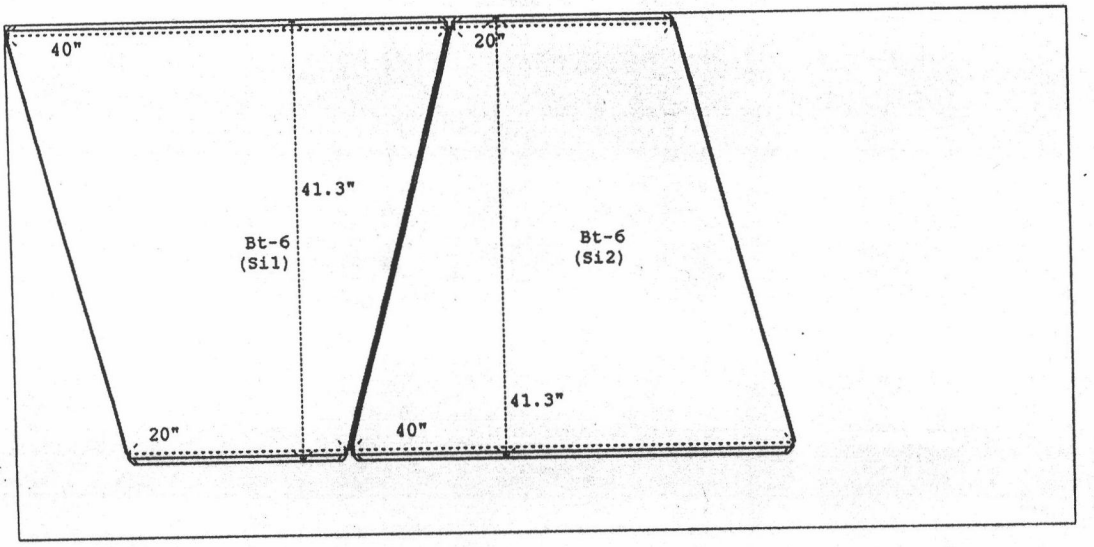
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #22 Amount - 1 sheet



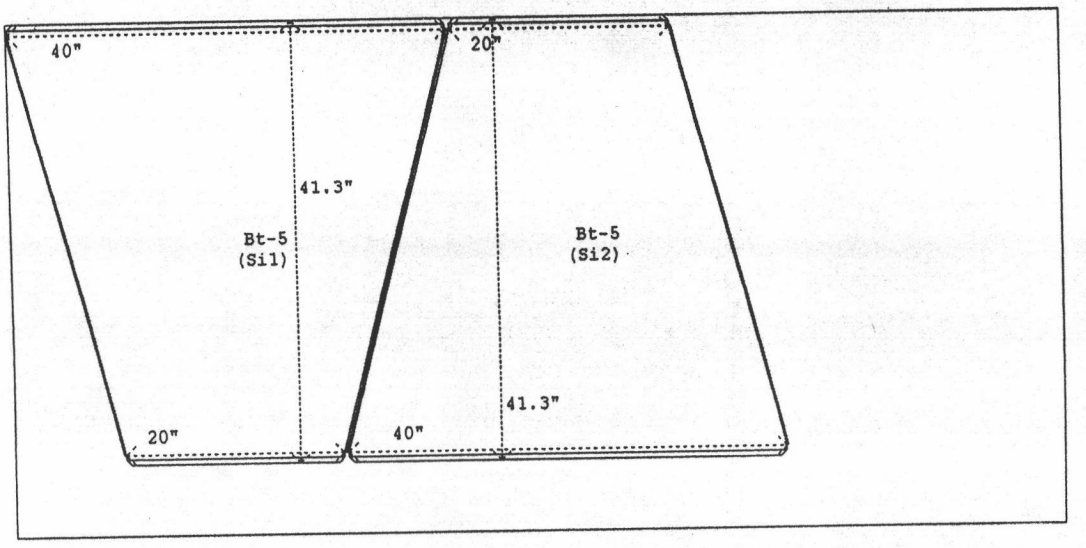
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #22 Amount - 1 sheet



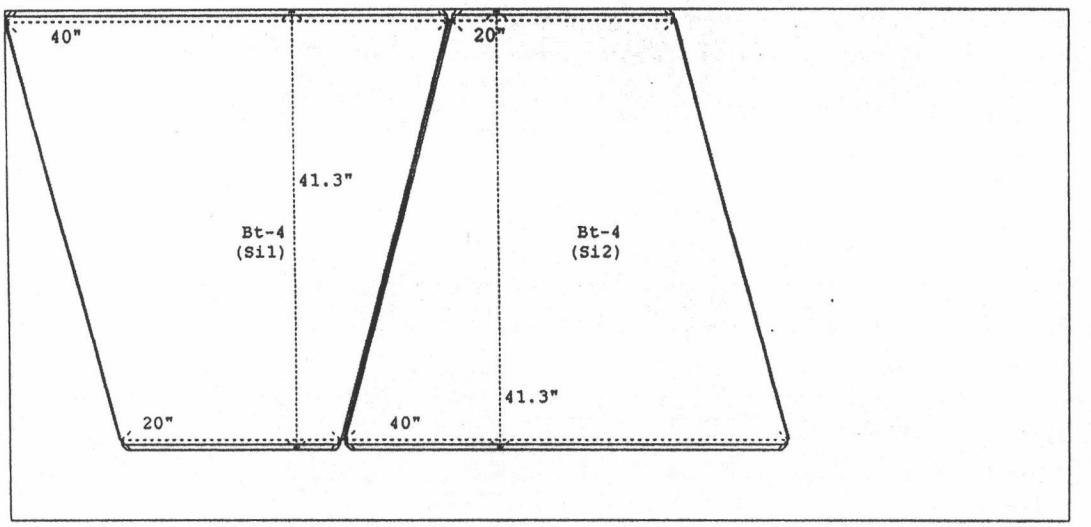
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #22 Amount - 1 sheet



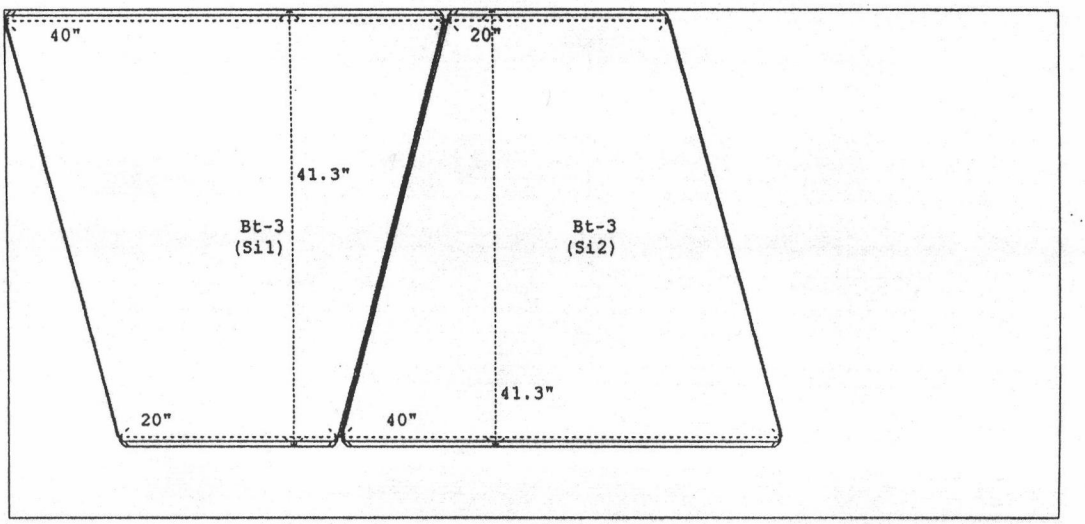
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #22 Amount - 1 sheet



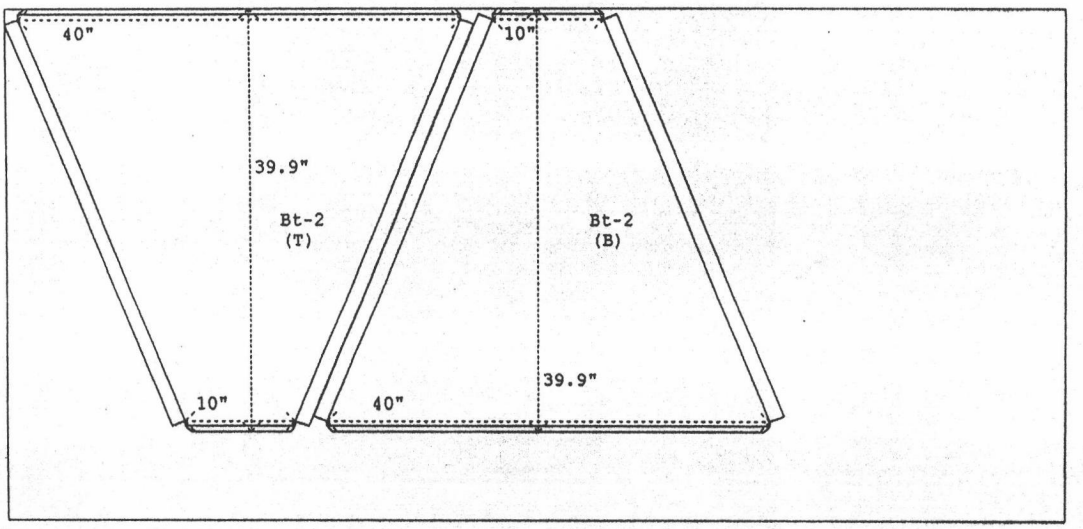
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #22 Amount - 1 sheet



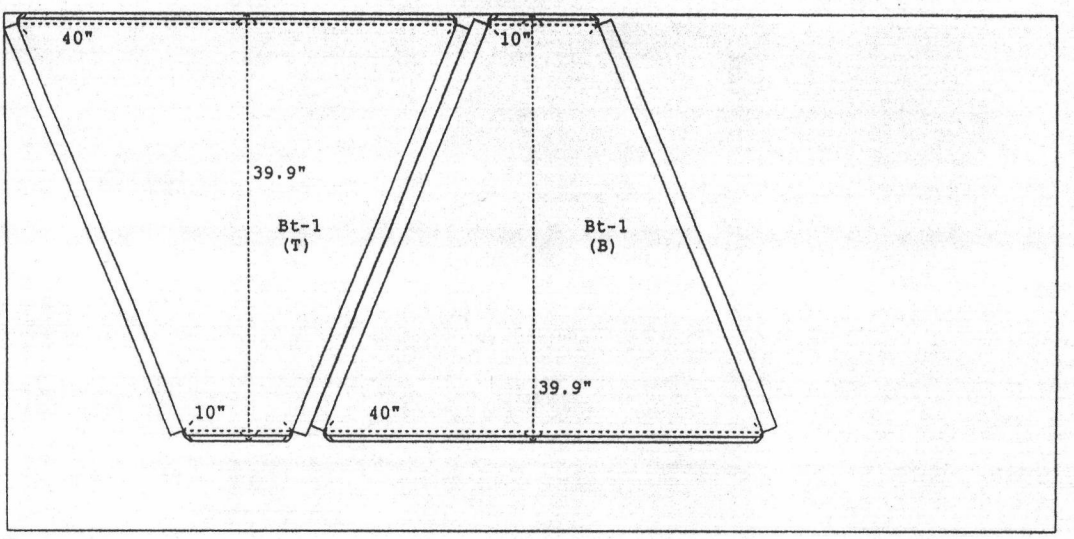
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #22 Amount - 1 sheet



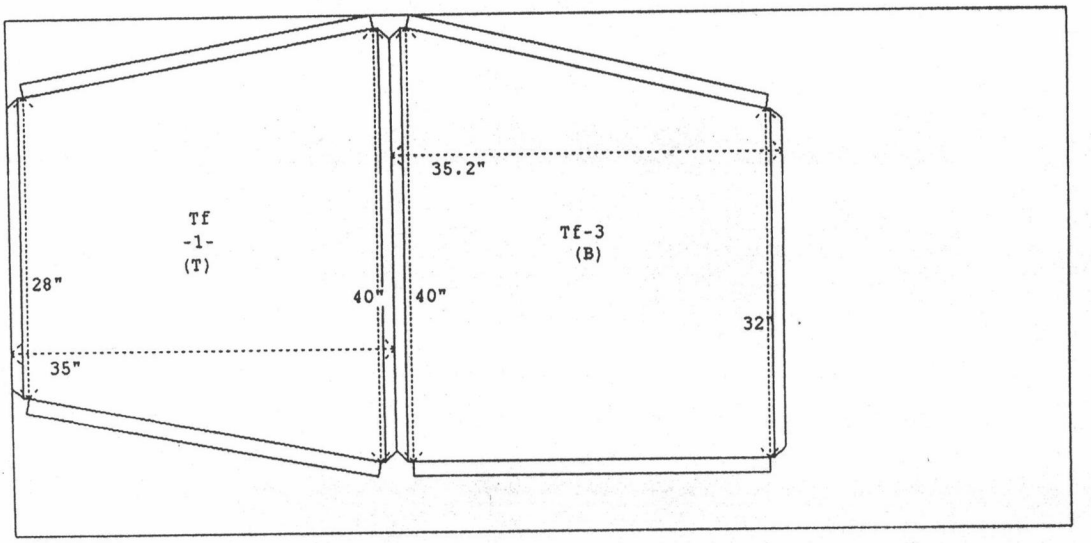
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #22 Amount - 1 sheet



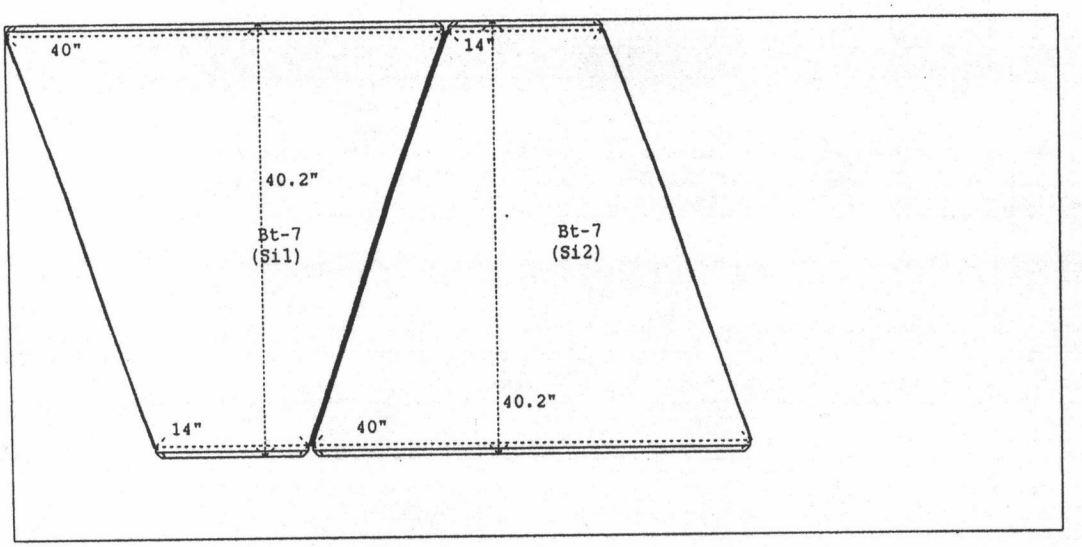
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #22 Amount - 1 sheet



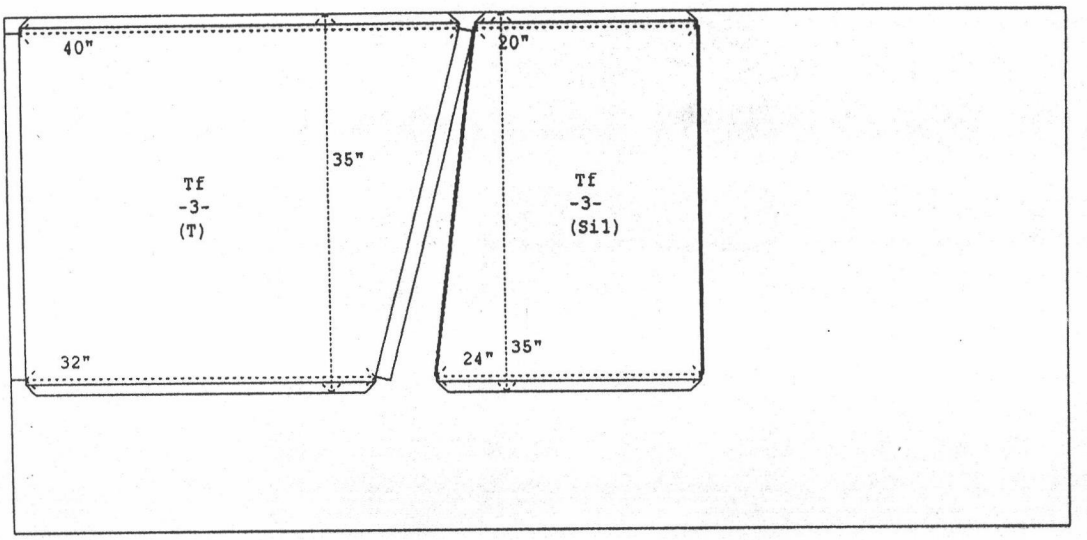
Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #22 Amount - 1 sheet



Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #22 Amount - 1 sheet



Ts-Transition, Tf-Transformer, Bt-Booting : (T)-Top, (B)-Bottom, (Si)-Side

Gage #22 Amount - 1 sheet **Total Gage#22 - 17 sheets**

ประวัติผู้เขียน

นาย กิตติ ลีลาวณิชไชย เกิดวันที่ 8 กรกฎาคม พ.ศ. 2515 ที่อำเภอบางรัก จังหวัดกรุงเทพมหานคร สำเร็จการศึกษาปริญญาตรีวิศวกรรมศาสตรบัณฑิต ภาควิศวกรรมเครื่องกล จากมหาวิทยาลัยเกษตรศาสตร์ ในปีการศึกษา 2536 และ เข้าศึกษาต่อในหลักสูตรวิศวกรรมศาสตรมหาบัณฑิต ภาควิชาวิศวกรรมเครื่องกล ที่จุฬาลงกรณ์มหาวิทยาลัย ในปีเดียวกัน