

RESTRAINED JOINT TABLE FOR BENDS										
Minimum length to be restrained each side of bend (Feet):										
PVC Pipe (in.)	Horizontal Bends				Vertical Bends (upper/lower)					
	90o	45o	22½o	11½o	90o	45o	22½o	11½o		
3	12	5	3	2	NOT RECOMMENDED	13/3	7/2	4/1		
4	14	6	3	2		16/3	8/2	4/1		
6	20	8	4	2		22/5	11/2	6/1		
8	26	11	5	3		26/6	14/3	7/2		
10	30	13	6	3		35/7	17/4	9/2		
12	35	15	7	4		41/8	20/4	10/2		
14	40	17	8	4		47/9	23/5	12/3		
16	45	19	9	5		53/10	26/5	13/3		
18	49	21	10	5		58/12	28/6	14/3		
20	53	22	11	6		64/13	31/6	16/3		
24	61	26	13	6		74/15	36/7	18/4		
30	72	30	15	8		89/17	43/9	22/5		
36	82	34	17	9		103/20	50/10	25/5		
D.I. Pipe (in.)	Horizontal Bends					Vertical Bends (upper/lower)				
	90o	45o	22½o	11½o		90o	45o	22½o	11½o	
3	10	4	2	1		NOT RECOMMENDED	9/3	4/1	2/1	
4	12	5	3	2	10/3		5/2	3/1		
6	16	7	4	2	14/4		7/2	4/1		
8	21	9	5	3	19/5		9/3	5/2		
10	25	11	5	3	22/6		11/3	6/2		
12	29	12	6	3	26/7		13/4	7/2		
14	33	14	7	4	30/8		15/4	7/2		
16	37	16	8	4	34/9		16/4	8/2		
18	41	17	9	4	37/10		18/5	9/3		
20	44	19	9	5	41/11		20/5	10/3		
24	51	21	11	5	47/12		23/6	12/3		
30	60	25	12	6	56/15		27/7	14/4		
36	69	29	14	7	65/17		32/8	16/4		
42	76	32	16	8	73/19		35/10	18/5		
48	83	35	17	9	81/21		39/11	20/5		

Table is based upon Class II soil type SP, trench type 4, 150 psi testing pressure, a safety factor of 1.5, and an assumed minimum cover of 3' on upper vertical bends, and 6' on lower vertical bends. This table was derived from EBAA Iron, Inc. Restrained Length Calculation Program. For evaluation of other criteria, use this or other similar programs.

COMMON PANEL 3A  
BERKELEY COUNTY WATER AND SANITATION  
POTABLE WATER & SANITARY SEWER STANDARDS  
Rev. 05/10

RESTRAINED JOINT TABLE FOR TEES																
Minimum branch length to be restrained (Feet):																
Branch Pipe Size (in.)	PVC PIPE															
	Run Pipe Size (in.)															
	3	4	6	8	10	12	14	16	18	20	24	30	36	42		
3	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	17	12	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6	39	36	26	17	8	1	1	1	1	1	1	1	1	1	1	1
8	61	58	50	42	33	26	18	11	4	1	1	1	1	1	1	1
10	78	76	69	62	54	47	40	33	26	20	7	1	1	1	1	1
12	97	95	89	82	75	68	61	54	48	41	28	12	1	1	1	1
14	115	113	107	101	95	88	81	75	68	61	48	31	16			
16	133	131	126	120	114	108	101	94	88	81	68	50	34			
18	151	149	144	139	133	127	120	114	107	100	87	69	52			
20	168	166	162	157	151	145	139	132	126	119	106	87	69			
24	203	201	197	192	187	181	175	169	163	156	143	124	104			
30	253	252	248	244	239	234	228	222	216	209	196	176	155			
36	305	304	300	296	292	287	281	275	269	263	249	229	207			
	DUCTILE IRON PIPE															
	Run Pipe Size (in.)															
Branch Pipe Size (in.)	3	4	6	8	10	12	14	16	18	20	24	30	36	42		
3	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	11	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6	26	24	17	12	5	1	1	1	1	1	1	1	1	1	1	1
8	40	38	33	28	22	17	12	7	3	1	1	1	1	1	1	1
10	52	50	46	41	36	31	27	22	17	13	5	1	1	1	1	1
12	65	63	59	55	50	46	41	36	32	27	19	8	1	1	1	1
14	76	75	71	67	63	59	54	50	45	41	32	21	11	2		
16	88	87	83	80	76	72	67	63	58	54	45	33	23			
18	100	99	95	92	88	84	80	75	71	67	58	46	34	24		
20	111	110	107	104	100	96	92	88	84	79	70	57	46	35		
24	134	133	131	127	124	120	116	112	108	104	92	82	69	57		
30	168	167	164	162	158	155	151	147	143	139	127	117	103	90		
36	202	201	199	196	193	190	186	182	178	174	165	153	138	124		
42	235	235	232	230	227	224	220	216	212	208	200	186	171	156		
48	270	269	267	264	262	258	255	251	247	243	235	221	205	190		

Table is based upon Class II soil type SP, trench type 4, 150 psi testing pressure, a safety factor of 1.5, an assumed minimum cover of 3', and the minimum attached length of pipe (Lr) to extend beyond the tee is 5'. This table was derived from EBAA Iron, Inc. Restrained Length Calculation Program. For evaluation of other criteria, use this or other similar programs.

COMMON PANEL 3B  
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RESTRAINED JOINT TABLE FOR REDUCERS																
Minimum length to be restrained on large size side of reducer (Feet):																
PVC Pipe (in.)	Reducer Small Size (in.)															
	3	4	6	8	10	12	14	16	18	20	24	30	36	42		
3																
4	13															
6	36	28														
8	57	50	30													
10	73	68	52	28												
12	90	86	72	52	29											
14	105	101	90	73	53	29										
16	120	117	107	93	75	54	29									
18	134	132	123	110	95	76	54	29								
20	148	146	138	126	113	96	77	54	29							
24	175	173	168	157	148	132	114	92	71	54						
30	211	209	204	197	186	176	158	135	117	92	75					
36	245	244	240	234	227	216	200	197	184	169	138	75				
D.I. Pipe (in.)	Reducer Small Size (in.)															
	3	4	6	8	10	12	14	16	18	20	24	30	36	42		
3																
4	8															
6	23	19														
8	36	32	19													
10	47	44	33	18												
12	57	55	46	34	19											
14	67	64	57	47	34	19										
16	76	74	68	59	48	34	19									
18	85	84	78	70	60	48	34	19								
20	94	92	87	80	72	61	49	34	19							
24	111	109	105	99	92	84	74	62	46	34						
30	134	133	129	125	119	113	105	96	85	74	48					
36	155	154	152	148	144	138	132	125	116	107	86	48				
42	175	174	172	169	165	161	155	149	142	135	117	85	46			
48	193	193	191	188	185	182	177	172	166	160	145	118	84	46		

Table is based upon Class II soil types SP, trench type 4, 150 psi testing pressure, a safety factor of 1.5, and an assumed minimum cover of 3'. This table was derived from EBAA Iron, Inc. Restrained Length Calculation Program. For evaluation of other criteria, use this or other similar programs.

COMMON PANEL 3C  
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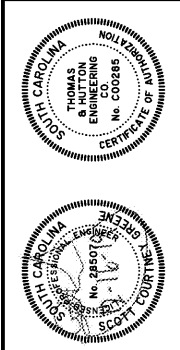
DESCRIPTION OF BACKFILL MATERIAL CLASSIFICATION UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)		
SOIL CLASS	SOIL TYPE (USCS)	DESCRIPTION OF MATERIAL CLASSIFICATION
CLASS I SOILS		MANUFACTURED ANGULAR, GRANULAR MATERIAL, 1/4 TO 1-1/2 INCHES (6 TO 40 mm) SIZE, INCLUDING MATERIALS HAVING REGIONAL SIGNIFICANCE SUCH AS CRUSHED STONE OR ROCK, BROKEN CORAL, CRUSHED SLAB, CINDERS, OR CRUSHED SHELLS.
CLASS II SOILS**	GW	WELL-GRADED GRAVELS AND GRAVEL-SAND MIXTURES, LITTLE OR NO FINES, 50% OR MORE RETAINED ON NO. 4 SIEVE, MORE THAN 95% RETAINED ON NO. 200 SIEVE, CLEAN.
	GP	POORLY GRADED GRAVELS AND GRAVEL-SAND MIXTURES, LITTLE OR NO FINES, 50% OR MORE RETAINED ON NO. 4 SIEVE, MORE THAN 95% RETAINED ON NO. 200 SIEVE, CLEAN.
	SP	WELL-GRADED SANDS AND GRAVELY SANDS, LITTLE OR NO FINES, MORE THAN 50% PASSES NO. 4 SIEVE, MORE THAN 95% RETAINED ON NO. 200 SIEVE, CLEAN.
CLASS III SOILS***	GM	SILTY GRAVELS, GRAVEL-SAND MIXTURES, 50% OR MORE RETAINED ON NO. 4 SIEVE, MORE THAN 50% RETAINED ON NO. 200 SIEVE.
	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, 50% OR MORE RETAINED ON NO. 4 SIEVE, MORE THAN 50% RETAINED ON NO. 200 SIEVE.
	SM	SILTY SANDS, SAND-SILT MIXTURES, MORE THAN 50% PASSES NO. 4 SIEVE, MORE THAN 50% RETAINED ON NO. 200 SIEVE.
CLASS IV SOILS	SC	CLAYEY SANDS, SAND-CLAY MIXTURES, MORE THAN 50% PASSES NO. 4 SIEVE, MORE THAN 50% RETAINED ON NO. 200 SIEVE.
	ML	INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILT, AND CLAYEY FINE SANDS, LIQUID LIMIT 50% OR LESS, 50% OR MORE PASSES NO. 200 SIEVE.
	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAPEY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS, LIQUID LIMIT 50% OR MORE, MORE THAN 50% PASSES NO. 200 SIEVE.
CLASS V SOILS	MH	INORGANIC SILTS, MICACEOUS OR DIATOMEAL FINE SANDS, OR SILTS, ELASTIC SILTS, LIQUID LIMIT GREATER THAN 50%, 50% OR MORE PASSES NO. 200 SIEVE.
	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FINE CLAYS, LIQUID LIMIT GREATER THAN 50%, 50% OR MORE PASSES NO. 200 SIEVE.
	OH	ORGANIC CLAYS AND ORGANIC SILTS OF LOW PLASTICITY, LIQUID LIMIT 50% OR LESS, 50% OR MORE PASSES NO. 200 SIEVE.
	PT	PEAT, MUCK AND OTHER HIGHLY ORGANIC SOILS.

\*\*SOILS DEFINED AS CLASS I MATERIALS ARE NOT DEFINED IN ASTM D2487.  
\*\*\*MIN ACCORDANCE WITH ASTM D2487, LESS THAN 5% PAS NO. 200 SIEVE.  
\*\*\*\*MIN ACCORDANCE WITH ASTM D2487, MORE THAN 15% PASS NO. 200 SIEVE. SOILS WITH 5% TO 15% NO. 200 SIEVE FALL INTO ORGANIC CLASSIFICATION, E.G., SP-15.

RESTRAINED JOINT TABLE FOR DEAD ENDS				
Minimum length to be restrained from dead end (Feet):				
PVC Pipe (in.)	Restraintment Length (ft.)	D.I. Pipe (in.)	Restraintment Length (ft.)	
3	32	3	20	
4	38	4	24	
6	53	6	34	
8	70	8	45	
10	84	10	53	
12	99	12	63	
14	112	14	71	
16	127	16	80	
18	140	18	89	
20	153	20	97	
24	179	24	113	
30	214	30	136	
36	248	36	157	
		42	176	
		48	195	

Table is based upon Class II soil types SP, trench type 4, 150 psi testing pressure, a safety factor of 1.5, and an assumed minimum cover of 3'. This table was derived from EBAA Iron, Inc. Restrained Length Calculation Program. For evaluation of other criteria, use this or other similar programs.

COMMON PANEL 3D  
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Rev. 05/10



NO.	REVISIONS	BY	DATE

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