

CORRUGATED STEEL PIPE AND PIPE ARCHES

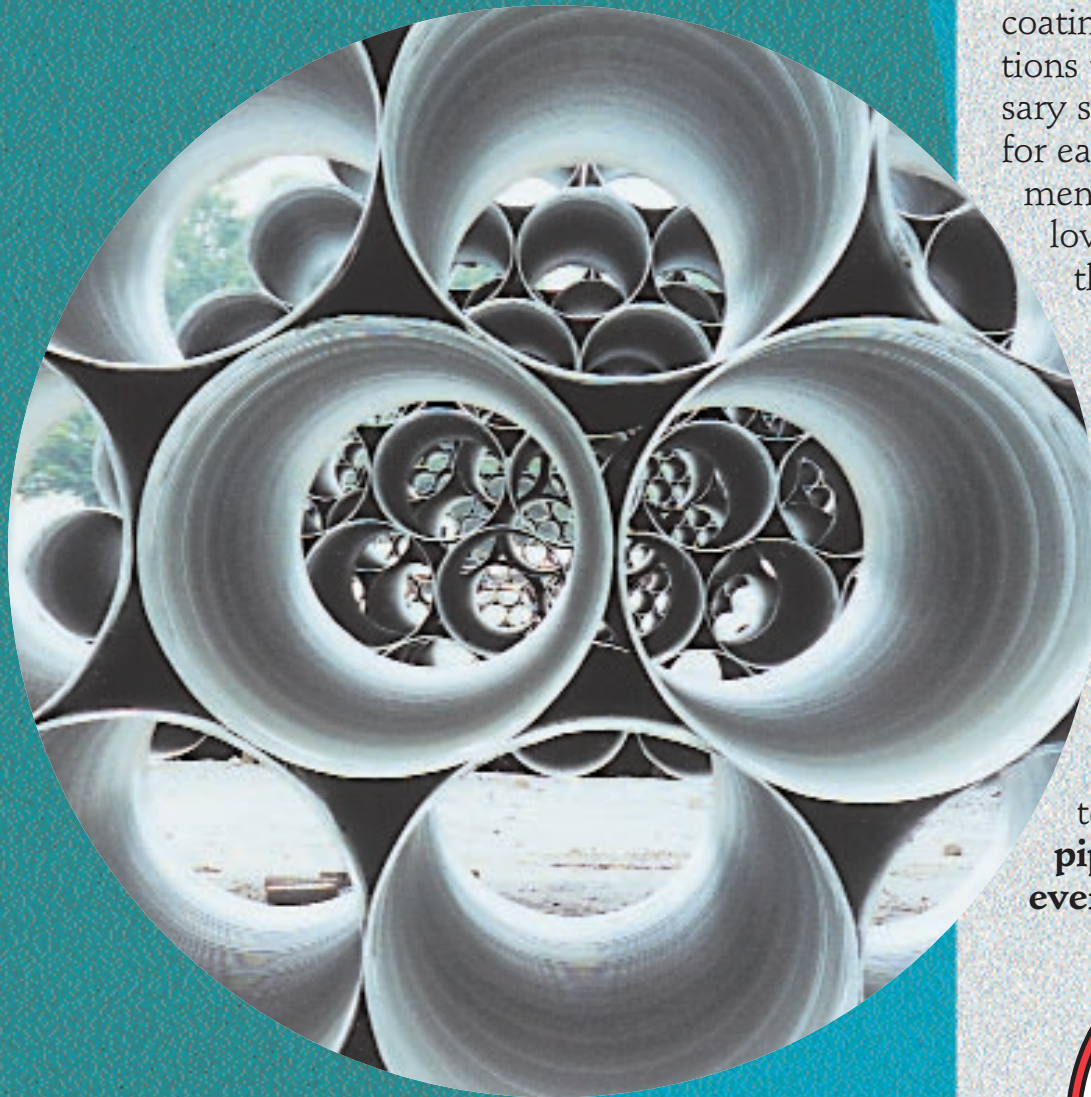
LANE FABRICATES AND STOCKS A FULL RANGE OF CORRUGATED STEEL PIPE IN A VARIETY OF MATERIALS, LININGS AND COATINGS TO MEET SPECIFIC DURABILITY AND HYDRAULIC REQUIREMENTS.

CSP is manufactured in a variety of thicknesses and coatings in several corrugations to provide the necessary strength and flexibility for each jobsite requirement. Together with lower installation costs than are typical for rigid pipe, CSP is the economical choice.

Available in 6" through 144", round or arched, CSP is unparalleled in its ability to be fabricated to meet demanding site requirements, especially in larger diameters. **Lane has a pipe to fit your every need.**



Drain with Lane





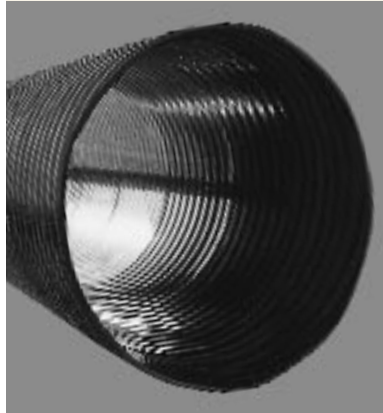
LANE CORRUGATED STEEL PIPE

Lane offers a choice of pipe coatings to satisfy the durability requirements for each installation.



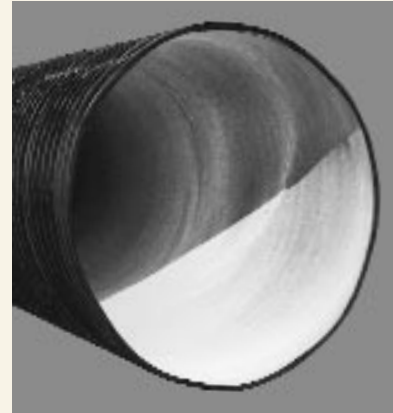
Plain Galvanized

Fabricated from ASTM A444 steel for maximum service life.



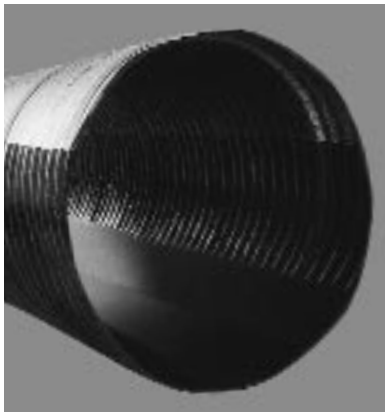
Fully Asphalt Coated

For installations where corrosive elements are present in the water or earth and where abrasion is minimal.



Smooth Interior

Sewer pipe with maximum flow capacity. The interior coating of asphalt completely fills the corrugations providing a smooth lining for maximum hydraulic efficiency.



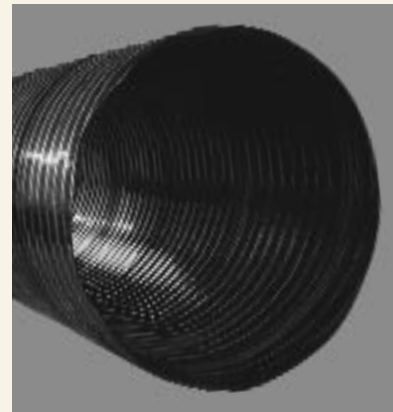
Half Asphalt Coated with Paved Invert

Used where corrosion and abrasion of the effluent are of moderate levels. Lower half of pipe is coated and the invert is paved.



Fully Asphalt Coated with Paved Invert

For use where both soil and effluent are severely corrosive and abrasion is severe. Pipe is fully coated and the invert is paved.



Polymer Coated

Combats corrosion, abrasion, microbiological attack, and extreme acid conditions. For extreme abrasive conditions, asphalt paving over the polymer coating should be used. (Available in .064 through .138 inch thicknesses only).

Values of Coefficient of Roughness (n) for Helically Corrugated Steel Pipe (Manning's Formula)

Corrugation:		1 1/2 x 1/4		2 2/3 x 1/2							
Diameter (in.):	8	10	12	15	18	24	30	36	42	48	54 & Over
Unpaved	0.012	0.014	0.011	0.012	0.013	0.015	0.017	0.018	0.019	0.020	0.021
Paved						0.014	0.016	0.017	0.018	0.020	0.019
Corrugation:		5 x 1									
Diameter (in.):	54		60		66		72		78 & Over		
Unpaved	0.022		0.023		0.024		0.024		0.025		
Paved	0.019		0.020		0.021		0.021		0.022		

Note: All pipe with smooth interiors has 0.012 "n" value. Consult AISI, Modern Sewer Design for additional hydraulic design data.

General Guidelines for Minimum Cover Required for Heavy Off-Road Construction Equipment

Pipe Diameter/Span – Inches	Minimum Cover (ft.) for Indicated Axle Loads (kips)*			
	18-50	50-75	75-110	110-150
12 – 42	2.0	2.5	3.0	3.0
48 – 72	3.0	3.0	3.5	4.0
78 – 120	3.0	3.5	4.0	4.0
126 – 144	3.5	4.0	4.5	4.5

*Minimum cover may vary, depending on local conditions. The contractor must provide the additional compacted cover required to avoid damage to the pipe. Minimum cover is measured from the top of the pipe to the top of the maintained construction roadway surface.

Installation Specifications

Agency	Reference
AASHTO	Standard Specifications for Highway Bridges – Division II, Section 26
ASTM	Standard Practice for Installing Factory Made Corrugated Steel Pipe for Sewers and Other Applications – ASTM A798
AREMA	Section 4.12

Material Specifications

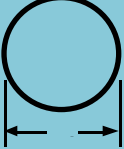
Material	Specification	
	AASHTO	ASTM
Galvanized Steel, 2 oz/ft ² Coating	M-218	A929
Corrugated Steel Pipe	M-36	A760
Asphalt Coated or Paved Pipe	M-190	A849
Polymer Precoated for CSP	M-246	A742
Polymer Coated Pipe	M-245	A762
Gaskets	–	D1056

Design Specifications

Agency	Reference
AASHTO	Standard Specification for Highway Bridges – Division I, Section 12
ASTM	Standard Practice for Structural Design of Corrugated Steel Pipe, Pipe Arches, and Arches for Storm and Sanitary Sewers and Other Buried Applications – ASTM A796
AREMA	Section 4.9

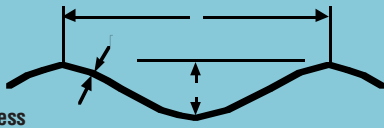


EIGHT-OF-COVER LIMITS FOR CORRUGATED STEEL PIPE H20, H25 AND E80 LOADING



ROUND PIPE – Minimum covers are for H20, H25 and E80 loadings only, and are measured from the top of the pipe to the bottom of the flexible pavement, or top of the reinforced rigid pavement. For E80 loads, cover is measured to the bottom of the tie.

P=Pitch
D=Depth
T=Thickness

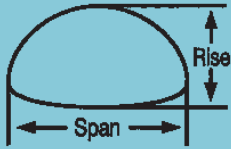


Corrugation (P x D)	Diameter, Inches	Area Square Feet	Minimum Cover Inches		Maximum Cover in Feet Specified Thickness in Inches (T)						
					Gage		16	14	12	10	8
					18	.052					
			H20/25	E80	.052	.064	.079	.109	.138	.168	
1 1/2 x 1/4	6	0.20	12	12	X	X					
	8	0.35	12	12	X	X					
	10	0.55	12	12	X	X					
2 2/3 x 1/2	12	0.79	12	12	199	248	310				
	15	1.23	12	12	159	199	248				
	18	1.77	12	12	132	166	207				
	21	2.41	12	12	113	142	178	249			
	24	3.14	12	12	99	124	155	218			
	27	3.98	12	12		111	138	193			
	30	4.91	12	12		99	124	174			
	36	7.07	12	12		83	103	145	186		
	42	9.62	12	12		71	88	124	160	195	
	48	12.57	12	12		62	77	109	140	171	
	54	15.90	12	18			66	93	122	150	
	60	19.64	12	18				79	104	128	
	66	23.76	12	18				68	88	109	
72	28.27	12	18					75	93*		
5 x 1	54	15.90	12	18		56	70	98	126	155	
	60	19.64	12	18		50	63	88	114	139	
	66	23.76	12	18		46	57	80	103	126	
	72	28.27	12	18		42	52	73	95	116	
	78	33.18	12	24		39	48	68	87	107	
	84	38.49	12	24		36	45	63	81	99	
	90	44.18	12	24		33*	42	59	76	93	
	96	50.27	12	24		*	39	55	71	87	
	102	56.75	18	30			37	52	67	82	
	108	63.62	18	30			35	49	63	77	
	114	70.88	18	30			*	45	58	71	
	120	78.54	18	30				*	54	66	
	126	86.59	18	36					50	62	
	132	95.03	18	36					47	57	
138	103.87	18	36					43	53		
144	113.10	18	36					39	49		

These height-of-cover tables are based on the following design parameters: Unit weight of soil – 120 lbs. per cubic ft.; Backfill compacted to AASHTO T-99 density of 90%; Yield point of steel – 33,000 psi.

X= 6, 8 and 10" pipes are mainly used for underdrain. 052", 18 gage has a maximum cover height of 40'.

*These pipes require additional cover for E80 loading. Consult the AISI Handbook of Steel Drainage & Highway Construction Products for data and additional sizes in these gages.



PIPE ARCHES – Manufactured from standard round pipe sizes, pipe arches are typically used where headroom is at a minimum. Where cover heights permit, consideration should be given to using round pipe.

Corrugation	Sizes in Inches		Area Square Feet	Minimum Specified Thickness Required in Inches	H20 or H25 Live Loads		Minimum Specified Thickness Required in Inches	E80 Live Loads	
	Span x Rise	Equiv. Pipe Diam.			Min. Cover (Inches)	Max. Cover* (Feet)		Min. Cover (Inches)	Max. Cover* (Feet)
2 2/3 x 1/2	14 x 9***	12	0.7	0.064	12	16	0.079	24	22
	17 x 13	15	1.1	0.064	12	16	0.079	24	22
	21 x 15	18	1.6	0.064	12	15	0.079	24	22
	24 x 18	21	2.2	0.064	12	15	0.109	24	22
	28 x 20	24	2.9	0.064	12	15	0.109	24	22
	35 x 24	30	4.5	0.064	12	15	0.138	24	22
	42 x 29	36	6.5	0.064	12	15	0.138	24	22
	49 x 33	42	8.9	0.079	12	15	0.168	24	22
	57 x 38	48	11.6	0.109	12	15	0.168	24	22
	64 x 43	54	14.7	0.109	12	15	0.168	24	22
	71 x 47	60	18.1	0.138	12	15	0.168	–	–
	77 x 52	66	21.9	0.168	12	15	–	–	–
83 x 57	72	26.0	0.168	12	15	–	–	–	
5 x 1	60 x 46	54	15.6	0.109**	15	25	0.109**	24	25
	66 x 51	60	19.3	0.109**	15	25	0.109**	24	25
	73 x 55	66	23.2	0.109**	18	24	0.109**	30	24
	81 x 59	72	27.4	0.109	18	21	0.109	30	21
	87 x 63	78	32.1	0.109	18	20	0.109	30	18
	95 x 67	84	37.0	0.109	18	20	0.109	30	18
	103 x 71	90	42.4	0.109	18	20	0.109	36	18
	112 x 75	96	48.0	0.109	21	20	0.109	36	18
	117 x 79	102	54.2	0.109	21	19	0.109	36	17
	128 x 83	108	60.5	0.109	24	19	0.109	42	17
	137 x 87	114	67.4	0.109	24	19	0.109	42	17
	142 x 91	120	74.5	0.138	24	19	0.138	42	17

These height-of-cover tables are based on the following design parameters: Unit weight of soil – 120 lbs. per cubic ft.; Backfill compacted to AASHTO T-99 density of 90%; Yield point of steel – 33,000 psi.

*Maximum height-of-cover is based on 2 tons per sq. ft. soil corner bearing capacity for all loadings, except 2 2/3 x 1/2 E80 loading which is 3 tons per sq. ft.

**Thickness indicated due to manufacturing requirements.

***Not available in all areas.



SHIPPING AND HANDLING

Lane delivers corrugated steel pipe, bands, fittings and accessories securely and in the quantities required to the job site. Proper unloading equipment, slings and safe unloading practices should always be followed. **It is not recommended to push or dump pipe directly from the truck bed.**

Approximate Shipping Weights											
Plain Galvanized Corrugated Steel Pipe								Added Weight of Asphalt (Lbs./ft.)			
Corrugation	Pipe Diam. Inches	Pipe Weight (Lbs. per ft.) by Gage/Thickness						Fully Coated	Fully Coated with Paved Invert	Smooth Interior 100% Paved	
		Gage									
		18	16	14	12	10	8				
		.052	.064	.079	.109	.138	.168				
1 1/2 x 1/4	6	4	5					2			
	8	5	6					2			
	10	7	8					2			
2 2/3 x 1/2	12	8	10	12	16			2	5		
	15	10	12	15	20			3	6		
	18	12	15	18	24			4	7		
	21	14	17	21	29			5	9		
	24	15	19	24	33	41		5	11	26	
	27		22	27	37	47		6	12	28	
	30		24	30	41	52		6	12	31	
	36		29	36	49	62	75	7	15	36	
	42		34	42	57	72	87	8	17	43	
	48		38	48	65	82	100	9	19	47	
	54			54	73	92	112	10	22	51	
	60				81	103	124	11	25	59	
	66				89	113	137	12	29	65	
72					123	149	14	31	71		
5 x 1	60		55	67	92	118	143	18	38	98	
	66		60	74	101	129	157	20	42	108	
	72		66	81	110	140	171	22	45	117	
	78		71	87	119	152	185	24	50	127	
	84		77	94	128	164	199	25	53	136	
	90		82	100	137	175	213	27	58	146	
	96			107	147	188	228	29	62	155	
	102			114	155	198	241	31	65	165	
	108			120	165	211	256	33	68	175	
	114				174	222	271	35	72	185	
	120					234	284	37	76	195	
	126					247	300				
	132					259	314				
	138					270	328				
	144					282	344				



LANE CONNECTING BANDS

Lane bands are manufactured to AASHTO and ASTM requirements. CSP bands positively engage the ends of each pipe section and only require simple hand tools. Optional gasket material is available when required.



Annular

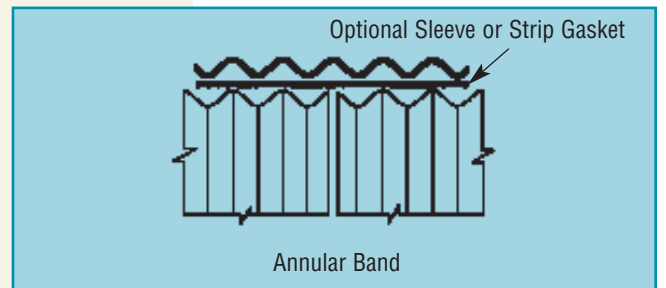
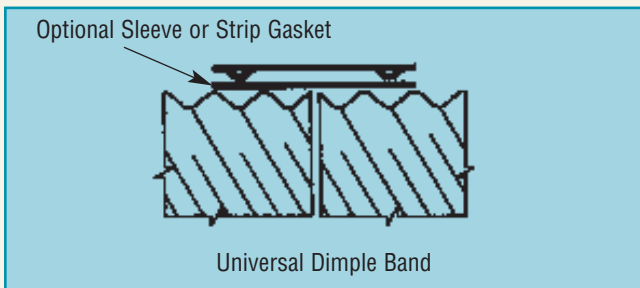


Universal Dimple

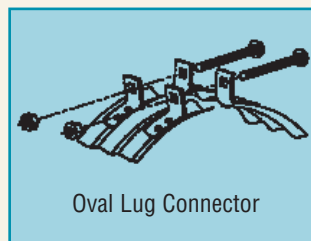
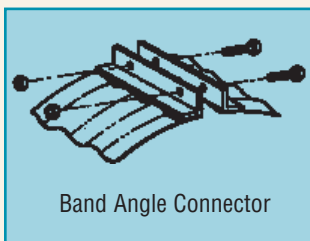


Sleeve (6", 8", 10")

Standard Reformed End Details



Standard Connecting Band Detail and Optional Gaskets



Perforations

Standard perforation pattern per AASHTO M-36 is available through 54" diameter. Fully perforated pipe is available in all diameters of 2 2/3 x 1/2 and 5 x 1 corrugations. Holes are 3/8" diameter to a maximum of 30 holes (3.3 sq. in.) per sq. ft. of pipe surface.

Fittings

Standard fittings such as tees, elbows, laterals and reducers are available in all sizes; special items such as manifolds and manholes can be custom-designed and easily fabricated.



WHAT YOU WANT...WHERE YOU WANT IT...WHEN YOU WANT IT.

From consultation to installation, you can depend on Lane for your drainage product needs. As a full-line manufacturer of metal and HDPE plastic drainage products, Lane is able to provide the right product for your particular need. Regardless of the application, you can be assured a Lane product brings you the best in strength, durability and economy.

Spiral Rib Pipe ... Offers a smooth interior that provides excellent flow characteristics, while the specially designed exterior ribs assure strength. Available up to 120" in diameter.



High Density Polyethylene Pipe (HDPE) ... Highly resistant to abrasion, chemical attack, soil and effluent conditions, Lane HDPE pipe has 100% annular corrugations, eliminating structural vulnerability at spiral seams. Single wall, smooth interior, perforated with fittings and accessories. AASHTO approved.

Specialty Fabrications ... Particularly those for storm water retention/detention systems, are all done in-house by experienced craftsmen. These include custom manifolds, control outlets, water quality structures, manholes, storm water management trash racks and risers. End sections in a variety of sizes and materials are available, and all standard connecting bands and fittings are kept in stock.

Open Top Slotted Drain ... The ability to accept high water volume (1.8" deep flow per 20 ft. section) makes this product perfect for roadside drainage, cross drains of intersections or driveways, interceptor drains at loading docks and interior drains at plants and factories.

Structural Plate Pipe ... Lane manufacturers plate products in five basic shapes—pipe, pipe arches, arches, underpasses and box culverts. They are used in a variety of installations such as stream enclosures, underpasses, conveyor covers, tunnels and mine overcasts.

Low Profile Box Culvert ... Ideal for fast, economical bridge replacement where low headroom presents a problem. DOT tested and approved.

Welded Wire Mesh Gabions ... Engineered for superior erosion control in tough, demanding applications. Spiral binders reduce assembly labor by up to 50%.

Rebar & Custom Powder Coating ... The Lane Technical Coatings Division operates three high volume coating lines that can apply epoxy, polyester or hybrid coating to parts up to 120" high by 48" wide by 100' long.

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