Heights of Cover

Aluminum ULTRA FLO® HL 93 Live Load

Diameter (in.)	Minimum/Maximum Cover (ft.) Specified Thickness (in.) and Gage			
	(0.060) 16	(0.075) 14	(0.105) 12	(0.135) 10
18	1.0/43	1.0/61		
21	1.0/38	1.0/52	1.0/84	
24	1.0/33	1.0/45	1.0/73	
30	1.25/26	1.25/36	1.25/58	
36	1.5*/21*	1.50/30	1.5/49	1.5/69
42		1.75*/25*	1.75/41	1.75/59
48			2.0/36	2.0/51
54			2.0/32	2.0/46
60			2.0*/29*	2.0/41
66				2.0/37
72				2.5*/34*

Aluminum ULTRA FLO® Pipe-Arch HL 93 Live Load

Size		Minimum/Maximum Cover (ft.) Specified Thickness (in.) and Gage			
Round Equivalent (in.)	Span x Rise (in.)	(0.060) 16	(0.075) 14	(0.105) 12	(0.135) 10
18	20 x 16	1.0/16			
21	23 x 19	1.0/15			
24	27 x 21	1.25/13	1.25/13		
30	33 x 26	1.5/13	1.5/13	1.5/13	
36	40 x 31		1.75/13	1.75/13	
42	46 x 36			2.0/13	2.0/13
48	53 x 41			2.0/13	2.0/13
54	60 x 46			2.0*/13*	2.0/13
60	66 x 51				2.0/13

See previous page for height of cover notes.

Approximate Weight/Foot Contech ULTRA FLO® Pipe

Handling Weight for **ALUMINIZED STEEL Type 2** or **Galvanized Steel** ULTRA FLO®

Diameter (in.)	Weight (Pounds/Lineal Foot) Specified Thickness (in.) and Gage			
	(0.064) 16	(0.079) 14	(0.109) 12	(0.138) 10
18	15	18		
21	17	21	29	
24	19	24	36	
30	24	30	42	
36	29	36	50	
42	33	42	58	
48	38	48	66	80
54	45	54	75	90
60	48	60	83	99
66		66	91	109
72		72	99	119
78		78	108	129
84			116	139
90			124	149
96			132	158
102			141	168
108				175
114				196
120				206

Handling Weight for **ALUMINUM** ULTRA FLO®

Diameter (in.)	Weight (Pounds/Lineal Foot) Specified Thickness (in.) and Gage			
	(0.060) 16	(0.075) 14	(0.105) 12	(0.135) 10
18	5	6		
21	6	8	11	
24	7	9	13	
30	9	11	15	
36	11	13	18	23
42		15	21	26
48			24	30
54			27	34
60			30	37
66				41
72				45

Weights for polymer coated pipe are 1% to 4% higher, varying by gage.

ULTRA FLO® is available in long lengths, and its light weight allows it to be unloaded and handled with small equipment.

Reduced excavation due to the smaller outside diameter of ULTRA FLO®.

Installation of Corrugated Metal Pipe

Overview
Satisfactory site preparation, trench excavation, bedding and backfill operations are essential to develop the strength of any flexible conduit. In order to obtain proper strength while preventing settlement, it is necessary that the soil envelope around the pipe be of good granular material, properly placed and carefully compacted.

Bedding
Bedding preparation is critical to both pipe performance and service life. The bed should be constructed to uniform line and grade to avoid distortions that may create undesirable stresses in the pipe and/or rapid deterioration of the roadway. The bed should be free of rock formations, protruding stones, frozen lumps, roots and other foreign matter that may cause unequal settlement.

Placing the pipe
Corrugated metal pipe weighs much less than other commonly used drainage structures. This is due to the efficient strength of the metal, further improved with carefully designed and formed corrugations. Even the heaviest sections of Contech pipe can be handled with relatively light equipment compared with equipment required for much heavier reinforced concrete pipe.

Backfill
Satisfactory backfill material, proper placement and compaction are key factors in obtaining maximum strength and stability. Backfill should be a well-graded granular material and should be free of large stones, frozen lumps and other debris.

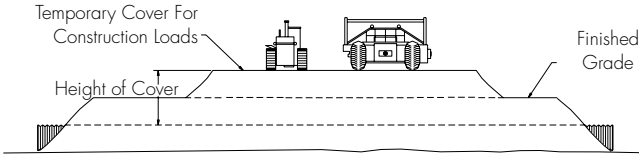
Backfill materials should be placed in layers about six inches deep, deposited alternately on opposite sides of the pipe. Each layer should be compacted carefully. Select backfill is placed and compacted until minimum cover height is reached, at which point, standard road embankment backfill procedures are used.

Installation References
For more information, see AASHTO Bridge Construction Specification Section 26, the Installation Manual of the National Corrugated Steel Pipe Association, ASTM A798 for steel and ASTM B788 for aluminum ULTRA FLO®.

Additional Considerations for ULTRA FLO® Installations
Bedding and Backfill
Typical ULTRA FLO® installation requirements are the same as for any other corrugated metal pipe installed in a trench. Bedding and backfill materials for ULTRA FLO® follow the requirements of the CMP installation specifications mentioned above, and must be free from stones, frozen lumps or other debris. When ASTM A796 (steel) or B790 (aluminum) designs are to be followed for condition III requirements, indicated by asterisk (*) in the tables on page 13 and 14, use clean, easily compacted granular backfill materials.

Embankment Conditions
ULTRA FLO® is a superior CMP storm sewer product that is normally installed in a trench condition. In those unusual embankment installation conditions, pipe sizes and gages may be restricted. Your Contech Sales Representative can provide you with further guidance.

Construction Loads
For temporary construction vehicle loads, an extra amount of compacted cover may be required over the top of the pipe. The Height of Cover shall meet minimum requirements shown in the table below. The use of heavy construction equipment necessitates greater protection for the pipe than finished grade cover minimums for normal highway traffic.



Min. Height of Cover Requirements for Construction Loads
HEL-COR® Corrugated Steel Pipe*

Diameter (in.)	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

Min. Height of Cover Requirements for Construction Loads
CORLIX® Corrugated Aluminum Pipe*

Diameter (in.)	Minimum Cover (ft.) for Indicated Axle Loads (kips)			
	18-50	50-75	75-110	110-150
12-42	3.0	3.5	4.0	4.0
48-72	4.0	4.0	5.0	5.5
78-120	4.0	5.0	5.5	5.5

Min. Height of Cover Requirements for Construction Loads
ULTRA FLO® Pipe*

Diameter (in.)	Minimum Cover (ft.) for Indicated Axle Loads (kips)			
	18-50	50-75	75-110	110-150
	Steel 3/4" x 3/4" x 7-1/2"			
15-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-108	3.0	3.5	4.0	4.5
	Aluminum 3/4" x 3/4" x 7-1/2"			
15-42	3.0	3.5	4.0	4.0

* *Minimum cover may vary depending on local conditions. The contractor must provide the additional 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.*