

# Dur·A·Span™



The Lightweight Champion.

ail.ca



Atlantic Industries Limited

**We Support You.**



# Our Commitment

Atlantic Industries Limited (AIL) has built a solid reputation by providing professional support and innovative, high-quality corrugated metal products around the world.





# Dur-A-Span™

Lightweight, strong and corrosion/abrasion resistant, All's Dur-A-Span Aluminum Structural Plate has been going the distance in over 1,000 structures worldwide for many years – beating the usual heavyweight contenders, like precast concrete, on overall performance and cost. And now, thanks to our innovative reinforcing rib technology, Dur-A-Span can go even farther (and wider) to outperform all challengers. The proven strength, economy and longevity of Dur-A-Span is ideal for coastal or remote installations.

## Corrosion/Abrasion Resistant

Aluminum is well-known for its longer design service life. Proven over many years of wet/dry corrosion/abrasion cycles, its tough, self-healing, oxide surface film reforms immediately if mechanically damaged or corroded in an aggressive environment like salt water.

## Lightweight

Dur-A-Span is only 1/50 the weight of reinforced concrete pipe, so it ships for less and installs faster – especially in remote areas. Individual plates and ribs can usually be handled by one worker and bundles can be moved by light-duty lifts.

## Easy to Install

Many lightweight Dur-A-Span structures can be shipped assembled to provide obvious installation savings in time and money. If delivered unassembled, the nested components can be made in large sections with up to three different radii in the same plate, reducing the number of joints and assembly time.

## Strong

Dur-A-Span is made from the strongest non-heat treatable alloy in common use – alloy 5052. Additional hardware made from alloys 6061 and 6063 also have a proven history of excellent corrosion resistance even in salt-water environments. Their principle magnesium and chromium alloying elements offer high ultimate and yield strengths to create structures that meet AASHTO and CHBDC design requirements.

## Dur-A-Span is ideal for coastal or remote areas in:

- Stream and river crossings
- Culverts and storm drains
- Conveyor or utility line covers
- Road salt or other storage structures



Dur-A-Span Arch shown with our three types of reinforcement ribs.



### **All in a day's work and no heavy lifting!**

Many Dur-A-Span™ structures can be shipped assembled and be set in position the same day with a medium duty crane or an excavator. In this case, the headwalls were attached on arrival and, at the end of the day, everything was in position and engineered backfilling had begun.





# Light, Strong and Durable by Design.

Ever notice how it's only this type of shell that survives the pounding surf? Like the shell, Dur-A-Span™ structures are designed to withstand the harshest corrosive and abrasive coastal environments to outlast all others.



## Dur-A-Span versus Concrete

Weight	1/50 the weight of concrete pipe
Installation	Faster, easier to install than concrete, less labour and trucking costs
Site Impact	Minimal with aluminum, lighter (lower cost) equipment, less excavating
Maintenance	Very low, easy to inspect, continuous footings eliminate settling
Durability	Corrosion/abrasion resistant, mechanical joints and aluminum hardware eliminate separation issues
Versatility	Many size, shape, footing, headwall and wingwall choices
Overall Cost	Installed life cycle cost is substantially lower than concrete
Fish-Friendly Flow	Expansive opening, hydraulic profile design, open bottoms, prevent debris build up and facilitate fish movement.



Dur-A-Span



Traditional RCB

## Design

Dur-A-Span corrugation pattern of 230 mm (9") by 64 mm (2 ½") incorporates design theories confirmed by exhaustive field tests. The result is a more efficient and economical structure with a higher section modulus and moment of inertia to increase strength and stiffness. The 19 mm (¾") steel assembly bolts are hot dip galvanized and specially heat treated to meet ASTM A449 specifications. Aluminum assembly bolts (Grade 6081-T6) are also available.

## End Treatments

Standard end finishes for Dur-A-Span include square ends, step bevels, skews, partial bevels, and skew bevels. Integrated headwall and wingwall solutions are also available.

**Dur-A-Span structures are virtually maintenance-free with a design service life of over 75 years.**

# Box Culverts

Dur-A-Span™ corrugated aluminum structural plate box culverts combine the structural qualities of rigid box culverts with flexible metal culverts and result in a totally engineered installation. Usually supplied with an open invert, box culverts are an environmentally friendly solution to your construction needs, promoting fish passage throughout the construction period and beyond. Box culverts are used primarily when height is limited and can be used with cover heights as low as 450 mm (18"). A variety of footing options are available.

## Full Corrugated Inverts

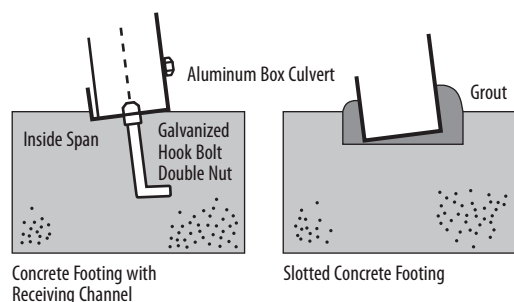
Full aluminum inverts should be used where scour is a potential problem. They are supplied with flat sheet toe walls.

## Footing Pads

Short footing pads are generally the most economical solution for sites where the stream bed is non-erodible. If the stream bed permits, footing pads should be buried a minimum of 450 mm (18").

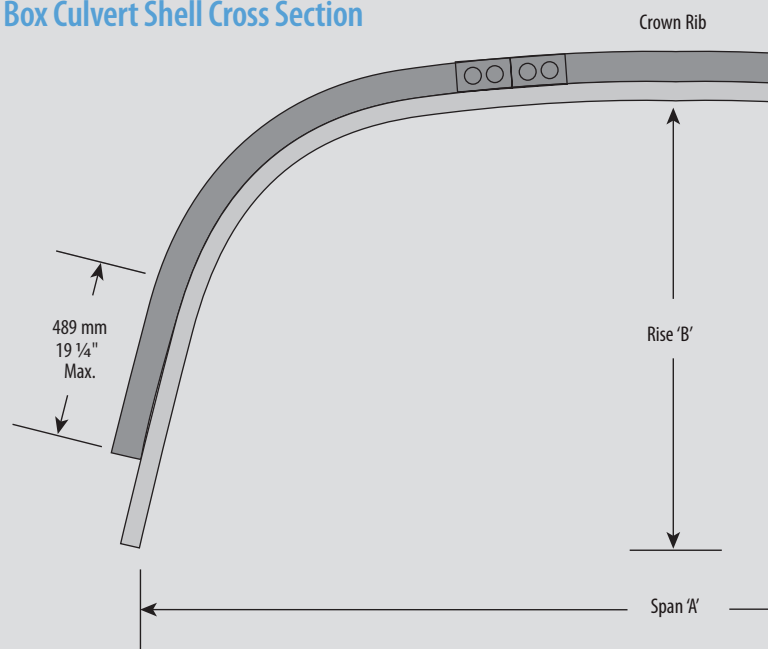
## Concrete Footings

When concrete footings or concrete inverts are required, Dur-A-Span may be placed in a receiving channel or in a pre-formed slot. AIL can also supply precast concrete footings for faster installation.



\*A minimum soil bearing capacity of 200 KPa (4000 psf) is required.

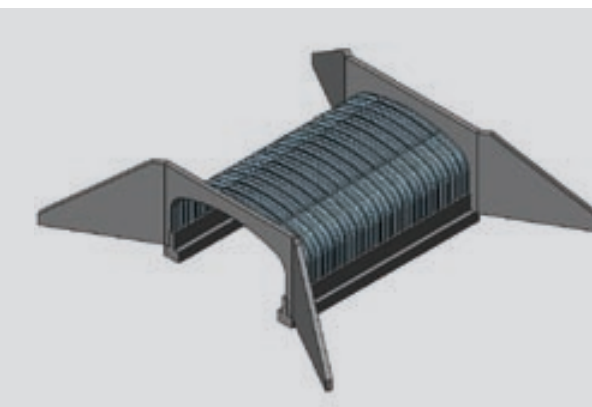
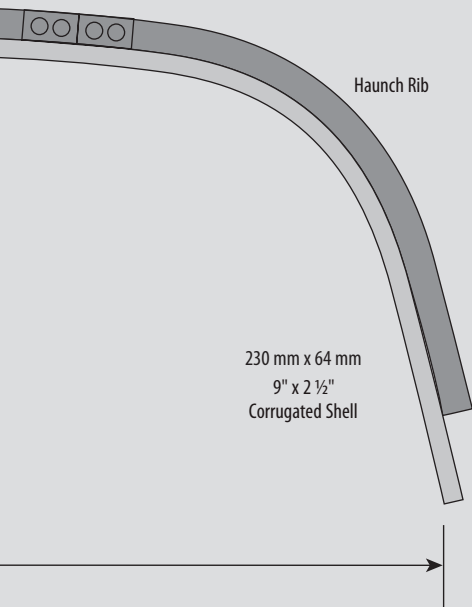
## Box Culvert Shell Cross Section



## Headwall Packages

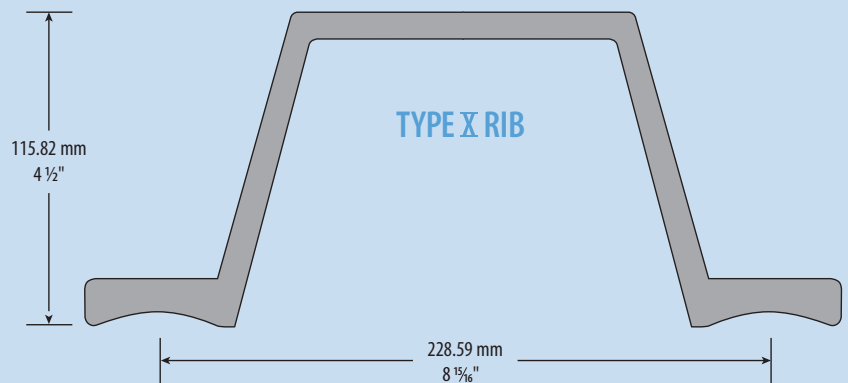
The standard headwall package features a headwall and usually two wingwalls. The headwall package results in a finished-looking structure, helps prevent scouring, and assists in channeling water flow. Other attractive headwall options include cast-in-place concrete, precast concrete, mechanically-stabilized earth walls with concrete fascia, gabion baskets or blocks.





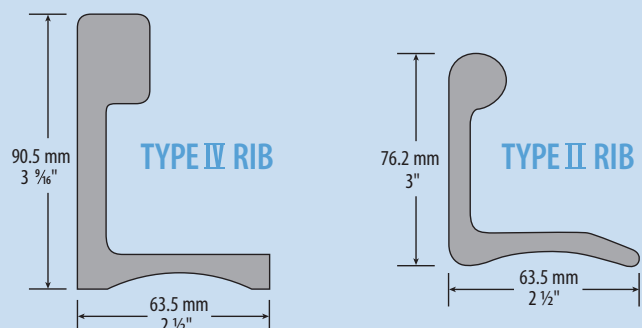
## Our new Type X Hat-Shaped Rib allows larger spans.

Our latest rib technology innovation is now taking Dur-A-Span™ to even greater spans and rises than ever before. Our Type X Hat-Shaped Rib's patented, symmetrical profile resists out-of-plane bending and makes it significantly stronger than all other available profiles in both the axial and lateral directions. It easily configures to any haunch radius and can be grout filled for even greater composite strength.



## Our Type II and Type IV ribs are ideal for smaller spans.

Maximum span width is 7.74 m (25'5").

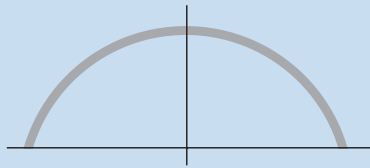




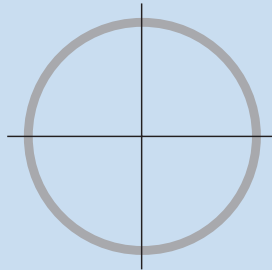
# Other Shapes

We create Dur-A-Span™ structures in a wide variety of shapes and configurations to suit many different project needs. If you don't see what you are looking for here, talk to an AIL Technical Representative about our custom sizes and shapes.

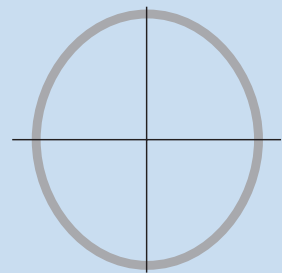
**Arch**



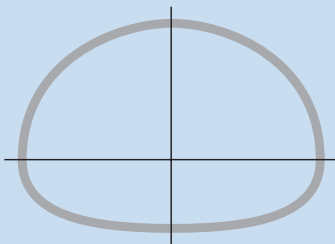
**Round**



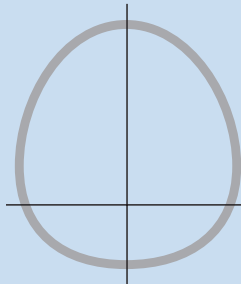
**Vertical Ellipse**



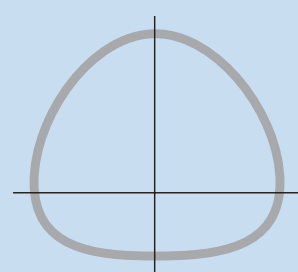
**Pipe Arch**



**Underpass  
(Pedestrian/Animal)**



**Underpass  
(Vehicular)**





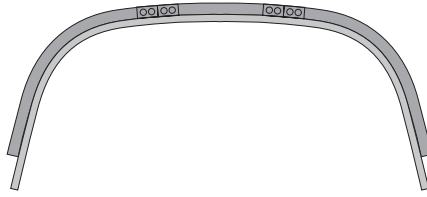


Ask your ALL Technical Representative  
about various types of fish-friendly  
flow options.





## Box Culverts

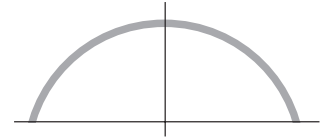


Struct. No.	Span 'A' (mm) (ft-in)		Rise 'B' (mm) (ft-in)		Approx. Area (m²) (ft²)	
DS-1B	2667	8-9	762	2-6	1.71	18.4
DS-2B	2794	9-2	991	3-3	2.36	25.4
DS-3B	2921	9-7	1245	4-1	3.03	32.6
DS-4B	3048	10-0	1473	4-10	3.73	40.2
DS-5B	3200	10-6	1702	5-7	4.47	48.1
DS-6B	3327	10-11	1930	6-4	5.24	56.4
DS-7B	3454	11-4	2184	7-2	6.04	65.0
DS-8B	3099	10-2	813	2-8	2.14	23.0
DS-9B	3226	10-7	1041	3-5	2.89	31.1
DS-10B	3327	10-11	1295	4-3	3.67	39.5
DS-11B	3454	11-4	1524	5-0	4.48	48.2
DS-12B	3556	11-8	1753	5-9	5.31	57.2
DS-13B	3683	12-1	2007	6-7	6.17	66.4
DS-14B	3785	12-5	2235	7-4	7.06	76.0
DS-15B	3531	11-7	864	2-10	2.61	28.1
DS-16B	3632	11-11	1092	3-7	3.47	37.4
DS-17B	3734	12-3	1346	4-5	4.36	46.9
DS-18B	3835	12-7	1575	5-2	5.26	56.6
DS-19B	3937	12-11	1829	6-0	6.19	66.6
DS-20B	4039	13-3	2057	6-9	7.14	76.9
DS-21B	3962	13-0	914	3-0	3.14	33.8
DS-22B	4064	13-4	1168	3-10	4.11	44.2
DS-23B	4140	13-7	1397	4-7	5.09	54.8
DS-24B	4216	13-10	1651	5-5	6.09	65.6
DS-25B	4293	14-1	1880	6-2	7.12	76.6
DS-26B	4394	14-5	991	3-3	3.72	40.0
DS-27B	4470	14-8	1245	4-1	4.78	51.5
DS-28B	4521	14-10	1473	4-10	5.87	63.2
DS-29B	4597	15-1	1727	5-8	6.98	75.1
DS-30B	4674	15-4	1956	6-5	8.10	87.2
DS-31B	4724	15-6	2210	7-3	9.23	99.4
DS-32B	4801	15-9	2438	8-0	10.39	111.8
DS-33B	4826	15-10	1067	3-6	4.35	46.8
DS-34B	4877	16-0	1295	4-3	5.53	59.5
DS-35B	4928	16-2	1549	5-1	6.72	72.3
DS-36B	4978	16-4	1803	5-11	7.92	85.2
DS-37B	5029	16-6	2032	6-8	9.13	98.3
DS-38B	5080	16-8	2286	7-6	10.36	111.5
DS-39B	5131	16-10	2515	8-3	11.59	124.8
DS-40B	5410	17-9	1168	3-10	5.05	54.4
DS-41B	5537	18-2	1397	4-7	6.35	68.3
DS-42B	5664	18-7	1626	5-4	7.66	82.5
DS-43B	5791	19-0	1854	6-1	9.02	97.1
DS-44B	5918	19-5	2108	6-11	10.40	111.9

Struct. No.	Span 'A' (mm) (ft-in)		Rise 'B' (mm) (ft-in)		Approx. Area (m²) (ft²)	
DS-45B	6045	19-10	2337	7-8	11.81	127.1
DS-46B	6172	20-3	2565	8-5	13.25	142.6
DS-47B	5817	19-1	1270	4-2	5.88	63.3
DS-48B	5918	19-5	1499	4-11	7.27	78.3
DS-49B	6020	19-9	1727	5-8	8.70	93.6
DS-50B	6121	20-1	1981	6-6	10.15	109.2
DS-51B	6248	20-6	2210	7-3	11.61	125.0
DS-52B	6350	20-10	2464	8-1	13.12	141.2
DS-53B	6452	21-2	2692	8-10	14.64	157.6
DS-54B	6198	20-4	1372	4-6	6.79	73.1
DS-55B	6274	20-7	1600	5-3	8.29	89.2
DS-56B	6375	20-11	1854	6-1	9.80	105.5
DS-57B	6477	21-3	2083	6-10	11.34	122.1
DS-58B	6553	21-6	2337	7-8	12.91	139.0
DS-59B	6655	21-10	2565	8-5	14.49	156.0
DS-60B	6731	22-1	2819	9-3	16.10	173.3
DS-61B	6579	21-7	1499	4-11	7.79	83.8
DS-62B	6655	21-10	1727	5-8	9.38	101.0
DS-63B	6731	22-1	1981	6-6	11.00	118.4
DS-64B	6782	22-3	2210	7-3	12.63	135.9
DS-65B	6858	22-6	2464	8-1	14.28	153.7
DS-66B	6934	22-9	2692	8-10	15.94	171.6
DS-67B	7010	23-0	2946	9-8	17.63	189.8
DS-68B	6934	22-9	1626	5-4	8.87	95.5
DS-69B	7010	23-0	1854	6-1	10.56	113.7
DS-70B	7061	23-2	2108	6-11	12.27	132.1
DS-71B	7112	23-4	2337	7-8	13.99	150.6
DS-72B	7163	23-6	2591	8-6	15.73	169.3
DS-73B	7214	23-8	2819	9-3	17.48	188.1
DS-74B	7264	23-10	3073	10-1	19.23	207.0
DS-75B	7315	24-0	1753	5-9	10.05	108.2
DS-76B	7341	24-1	1981	6-6	11.85	127.5
DS-77B	7391	24-3	2235	7-4	13.64	146.8
DS-78B	7417	24-4	2489	8-2	15.44	166.2
DS-79B	7442	24-5	2718	8-11	17.25	185.7
DS-80B	7493	24-7	2972	9-9	19.07	205.3
DS-81B	7518	24-8	3200	10-6	20.90	225.0
DS-82B	7671	25-2	1880	6-2	11.33	122.0
DS-83B	7671	25-2	2134	7-0	13.21	142.2
DS-84B	7696	25-3	2362	7-9	15.09	162.4
DS-85B	7722	25-4	2616	8-7	16.96	182.6
DS-86B	7722	25-4	2870	9-5	18.85	202.9
DS-87B	7747	25-5	3099	10-2	20.75	223.3

Standard Structure Listing

## Arch



Span (mm) (ft-in)		Rise (mm) (ft-in)		Approx. Area (m²) (ft²)	
1524	5-0	533	1-9	0.60	6.5
		686	2-3	0.79	8.5
		787	2-7	0.97	10.4
1829	6-0	559	1-10	0.72	7.8
		711	2-4	0.95	10.2
		838	2-9	1.17	12.6
		965	3-2	1.38	14.9
2134	7-0	711	2-4	1.11	12.0
		864	2-10	1.37	14.8
		991	3-3	1.63	17.5
		1118	3-8	1.89	20.3
2438	8-0	889	2-11	1.58	17.0
		1016	3-4	1.88	20.2
		1270	4-2	2.45	26.4
2743	9-0	889	2-11	1.77	19.1
		1168	3-10	2.44	26.3
		1422	4-8	3.10	33.4
3048	10-0	1067	3-6	2.35	25.3
		1346	4-5	3.09	33.3
		1575	5-2	3.83	41.2
3353	11-0	1067	3-6	2.58	27.8
		1372	4-6	3.42	36.8
		1727	5-8	4.63	49.8
3658	12-0	1245	4-1	3.28	35.3
		1524	5-0	4.18	45.0
		1905	6-3	5.51	59.3
3962	13-0	1245	4-1	3.54	38.1
		1549	5-1	4.54	48.9
		1803	5-11	5.51	59.3
		2057	6-9	6.46	69.5
4267	14-0	1422	4-8	4.36	46.9
		1702	5-7	5.43	58.4
		1956	6-5	6.46	69.5
		2210	7-3	7.49	80.6
4572	15-0	1422	4-8	4.65	50.0
		1727	5-8	5.82	62.6
		2007	6-7	6.94	74.7
		2261	7-5	8.04	86.5
		2362	7-9	8.59	92.5
4877	16-0	1600	5-3	5.57	60.0
		1880	6-2	6.81	73.3
		2159	7-1	8.01	86.2
		2413	7-11	9.19	98.9
		2515	8-3	9.77	105.2
5182	17-0	1600	5-3	5.90	63.5
		1905	6-3	7.24	77.9
		2184	7-2	8.52	91.7
		2438	8-0	9.77	105.2
		2692	8-10	11.03	118.7
5486	18-0	1753	5-9	6.95	74.8
		2057	6-9	8.35	89.9
		2337	7-8	9.71	104.5
		2591	8-6	11.04	118.8
		2718	8-11	11.70	125.9
5791	19-0	1930	6-4	8.07	86.9
		2235	7-4	9.54	102.7
		2489	8-2	10.96	118.0
		2743	9-0	12.37	133.2
		2870	9-5	13.07	140.7

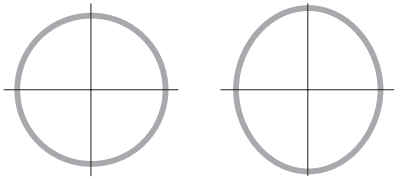
Standard Structure Listing

**Spans of 12.2 m (40 ft) and greater are available.**

Depending upon your application, Box Culvert or Arch spans may be designed in excess of 12.2 m (40 ft). Please consult with an AIL Technical Representative for further information.



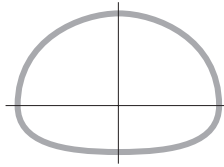
## Round and Vertical Ellipse



Round Dia.		Ellipse Dimensions				Approx. Area	
(mm)	(in)	Span (mm)	(in)	Rise (mm)	(in)	(m²)	(ft²)
1524	60	1422	56	1575	62	1.77	19
1676	66	1575	62	1727	68	2.14	23
1829	72	1702	67	1905	75	2.51	27
1981	78	1854	73	2057	81	2.97	32
2134	84	2007	79	2235	88	3.53	38
2286	90	2159	85	2388	94	4.09	44
2438	96	2311	91	2565	101	4.65	50
2591	102	2464	97	2718	107	5.20	56
2743	108	2616	103	2896	114	5.85	63
2896	114	2769	109	3048	120	6.60	71
3048	120	2921	115	3226	127	7.34	79
3200	126	3048	120	3378	133	8.08	87
3353	132	3200	126	3531	139	8.83	95
3505	138	3353	132	3708	146	9.66	104
3658	144	3505	138	3861	152	10.59	114
3810	150	3607	142	3988	157	11.52	124
3962	156	3759	148	4166	164	12.45	134
4115	162	3886	153	4318	170	13.47	145
4267	168	4039	159	4470	176	14.49	156
4420	174	4191	165	4648	183	15.51	167
4572	180	4343	171	4801	189	16.63	179
4724	186	4496	177	4953	195	17.74	191
4877	192	4623	182	5131	202	18.95	204
5029	198	4801	189	5309	209	20.16	217
5182	204	4953	195	5461	215	21.46	231
5334	210	5080	200	5639	222	22.76	245
5486	216	5232	206	5791	228	24.06	259
5639	222	5385	212	5969	235	25.46	274
5791	228	5512	217	6121	241	26.85	289
5944	234	5690	224	6274	247	28.34	305

Standard Structure Listing

## Pipe Arch



Span		Rise		Approx. Area	
(mm)	(ft-in)	(mm)	(ft-in)	(m²)	(ft²)
2007	6-7	1727	5-8	2.75	29.6
2108	6-11	1753	5-9	2.96	31.9
2210	7-3	1803	5-11	3.19	34.3
2362	7-9	1829	6-0	3.42	36.8
2464	8-1	1854	6-1	3.65	39.3
2565	8-5	1905	6-3	3.89	41.9
2692	8-10	1930	6-4	4.13	44.5
2819	9-3	1956	6-5	4.38	47.1
2921	9-7	1981	6-6	4.64	49.9
3023	9-11	2032	6-8	4.90	52.7
3124	10-3	2057	6-9	5.16	55.5
3277	10-9	2083	6-10	5.43	58.4
3378	11-1	2134	7-0	5.70	61.4
3480	11-5	2159	7-1	5.98	64.4
3581	11-9	2184	7-2	6.27	67.5
3734	12-3	2210	7-3	6.55	70.5
3835	12-7	2261	7-5	6.85	73.7
3937	12-11	2286	7-6	7.15	77.0
3988	13-1	2489	8-2	7.71	83.0
3988	13-1	2540	8-4	8.06	86.8
4242	13-11	2565	8-5	8.39	90.3
4267	14-0	2616	8-7	8.75	94.2
4242	13-11	2870	9-5	9.43	101.5
4343	14-3	2921	9-7	9.82	105.7
4470	14-8	2946	9-8	10.21	109.9
4547	14-11	2997	9-10	10.61	114.2
4674	15-4	3048	10-0	11.02	118.6
4750	15-7	3099	10-2	11.44	123.1
4902	16-1	3150	10-4	11.85	127.6
4978	16-4	3200	10-6	12.29	132.3

Standard Structure Listing



## Relines – infrastructure renewal made easy.

AIL's reline packages can help salvage failing structures and avoid the time, cost, safety and environmental issues inherent in full replacement. Various shapes of Dur-A-Span™ structures can be made for insertion into the existing openings with minimal environmental impact. Grout is placed in the annulus between the structures and new headwall and wingwall packages are available in a variety of finishes. Ask your AIL Technical Representative for more details.

### Notes:

Typical cover ranges from 450 mm to 1500 mm (18" to 5'). The maximum cover for aluminum box culverts with full inverts and footing pads should not exceed 1.3 m (4').

N = 244 mm (9 5/8")

Dimensions are to inside corrugation crests and are subject to manufacturing tolerances.

Other sizes and custom shapes are available upon request.

### Standard Specifications:

AASHTO M219M  
(corrugated aluminum structural plate)

ASTM B746/B746M  
(corrugated aluminum structural plate)

ASTM B209  
(specification for Imperial plate)

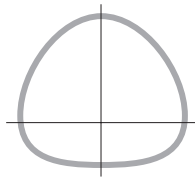
ASTM B209M  
(specification for Metric plate)

ASTM B789/B789M  
(installation of structural plate)

ASTM B790/B790M  
(design of aluminum pipe and structural plate)

AASHTO Standard Specifications for Highway Bridges (design)

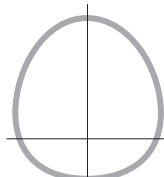
## Underpass (Vehicular)



Span		Rise		Approx. Area	
(mm)	(ft-in)	(mm)	(ft-in)	(m²)	(ft²)
3683	12-1	3353	11-0	9.85	106
3912	12-10	3404	11-2	10.59	114
3962	13-0	3658	12-0	11.52	124
4166	13-8	3759	12-4	12.36	133
4267	14-0	3937	12-11	13.29	143
4420	14-6	4089	13-5	14.40	155
4470	14-8	4293	14-1	15.33	165
4699	15-5	4394	14-5	16.44	177
4724	15-6	4623	15-2	17.65	190
4928	16-2	4724	15-6	18.58	200
5029	16-6	4877	16-0	19.32	208
5080	16-8	4978	16-4	19.97	215

Standard Structure Listing

## Underpass (Pedestrian/Animal)



Span		Rise		Approx. Area	
(mm)	(ft-in)	(mm)	(ft-in)	(m²)	(ft²)
1854	6-1	1753	5-9	2.60	28
1905	6-3	1854	6-1	2.79	30
1905	6-3	1956	6-5	2.97	32
1880	6-2	2108	6-11	3.16	34
1930	6-4	2210	7-3	3.44	37
1905	6-3	2362	7-9	3.62	39
1956	6-5	2464	8-1	3.90	42

Standard Structure Listing

## PRODUCTS AND SERVICES

- Bolt-A-Plate®
- Corrugated Steel Pipe
- Corrugated Steel Pipe Arch
- Corrugated Aluminum Pipe
- Corrugated Aluminum Arch
- Super-Cor® Structures
- Guiderail Systems
- Bolt-A-Bin®
- Hi-Flo Pipe
- Galvanized Spiral Duct
- Window Wells
- Construction Services
- General Fabrication
- Hot Dip Galvanizing
- Geotextiles
- Erosion Control Products
- Water Control Gates
- Gabion Baskets
- Dur-A-Span® Aluminum Structures
- Aluminized Type II
- MSE Structural Walls
- Atlantic Precast Walls



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