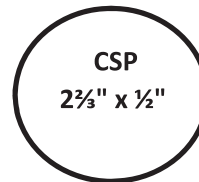


The AASHTO live load vehicle is either the **design truck** (two 32,000 pound axles spaced 14-ft apart) or the **design tandem** (two 25,000 pound axles spaced 4-ft apart). The vehicle that produces the greater pressure at the depth investigated is used for design. The design truck is commonly known as the HS20 truck.



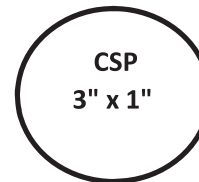
**Corrugated Steel Pipe (CSP)**  
**AASHTO LRFD Cover Heights**  
 Soil density 120 pcf



| Diameter<br>(in) | Min Cover<br>(ft) | Maximum Cover Height (ft) |      |      |      |     |
|------------------|-------------------|---------------------------|------|------|------|-----|
|                  |                   | 16ga                      | 14ga | 12ga | 10ga | 8ga |
| 12               | 1.00              | 218                       | 272  | 382  |      |     |
| 15               | 1.00              | 174                       | 218  | 305  |      |     |
| 18               | 1.00              | 145                       | 181  | 254  | 327  |     |
| 21               | 1.00              | 124                       | 155  | 218  | 280  |     |
| 24               | 1.00              | 108                       | 136  | 190  | 245  |     |
| 30               | 1.00              | 87                        | 108  | 152  | 196  |     |
| 36               | 1.00              | 72                        | 90   | 127  | 163  |     |
| 42               | 1.00              | 62                        | 77   | 108  | 140  | 171 |
| 48               | 1.00              | 54                        | 67   | 95   | 122  | 150 |
| 54               | 1.00              |                           | 60   | 84   | 109  | 133 |
| 60               | 1.00              |                           |      | 76   | 98   | 120 |
| 66               | 1.00              |                           |      |      | 89   | 109 |
| 72               | 1.00              |                           |      |      | 81   | 99  |
| 78               | 1.00              |                           |      |      |      | 88  |
| 84               | 1.00              |                           |      |      |      | 76  |



**Corrugated Steel Pipe (CSP)**  
**AASHTO LRFD Cover Heights**  
 Soil density 120 pcf

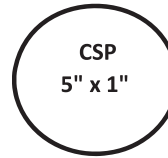


| Diameter<br>(in) | Min Cover<br>(ft) | Maximum Cover Height (ft) |      |      |      |     |
|------------------|-------------------|---------------------------|------|------|------|-----|
|                  |                   | 16ga                      | 14ga | 12ga | 10ga | 8ga |
| 48               | 1.00              | 62                        | 78   | 109  | 141  | 173 |
| 54               | 1.00              | 55                        | 69   | 97   | 125  | 153 |
| 60               | 1.00              | 49                        | 62   | 87   | 112  | 138 |
| 66               | 1.00              | 45                        | 56   | 79   | 102  | 125 |
| 72               | 1.00              | 41                        | 51   | 72   | 94   | 115 |
| 78               | 1.00              | 38                        | 47   | 67   | 86   | 106 |
| 84               | 1.00              | 35                        | 44   | 62   | 80   | 98  |
| 90               | 1.00              | 32                        | 41   | 58   | 75   | 92  |
| 96               | 1.00              |                           | 38   | 54   | 70   | 86  |
| 102              | 1.06              |                           | 36   | 51   | 66   | 81  |
| 108              | 1.13              |                           |      | 48   | 62   | 76  |
| 114              | 1.19              |                           |      | 45   | 59   | 72  |
| 120              | 1.25              |                           |      | 43   | 56   | 68  |
| 126              | 1.31              |                           |      |      | 53   | 65  |
| 132              | 1.38              |                           |      |      | 51   | 62  |
| 138              | 1.44              |                           |      |      | 48   | 59  |
| 144              | 1.50              |                           |      |      |      | 57  |

<sup>1</sup>Minimum cover for 14ga and heavier. The 16ga minimum cover for 90" is 1.1-ft.



Corrugated Steel Pipe (CSP)  
AASHTO LRFD Cover Heights  
Soil density 120 pcf

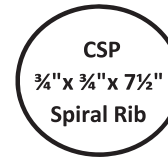


| Diameter<br>(in) | Min Cover<br>(ft) | Maximum Cover Height (ft) |      |      |      |     |
|------------------|-------------------|---------------------------|------|------|------|-----|
|                  |                   | 16ga                      | 14ga | 12ga | 10ga | 8ga |
| 48               | 1.00              | 55                        | 69   | 97   | 125  | 153 |
| 54               | 1.00              | 49                        | 61   | 86   | 111  | 136 |
| 60               | 1.00              | 44                        | 55   | 78   | 100  | 123 |
| 66               | 1.00              | 40                        | 50   | 70   | 91   | 111 |
| 72               | 1.00              | 36                        | 46   | 64   | 83   | 102 |
| 78               | 1.00              | 33                        | 42   | 59   | 77   | 94  |
| 84               | <sup>1</sup> 1.00 | 31                        | 39   | 55   | 71   | 87  |
| 90               | <sup>1</sup> 1.00 | 29                        | 36   | 51   | 66   | 81  |
| 96               | 1.00              |                           | 34   | 48   | 62   | 76  |
| 102              | 1.06              |                           | 32   | 45   | 58   | 72  |
| 108              | 1.13              |                           |      | 43   | 55   | 68  |
| 114              | 1.19              |                           |      | 40   | 52   | 64  |
| 120              | 1.25              |                           |      | 38   | 50   | 61  |
| 126              | 1.31              |                           |      |      | 47   | 58  |
| 132              | 1.38              |                           |      |      | 45   | 55  |
| 138              | 1.44              |                           |      |      | 43   | 53  |
| 144              | 1.50              |                           |      |      |      | 50  |

<sup>1</sup>Minimum covers for 14ga and heavier. The respective 16ga minimum covers for 84" and 90" are 1.1 and 1.2-ft.



Corrugated Steel Pipe (CSP)  
AASHTO LRFD Cover Heights  
Soil density 120 pcf



| Diameter<br>(in) | Min Cover<br>(ft) | Maximum Cover Height (ft) |                 |                 |                 |
|------------------|-------------------|---------------------------|-----------------|-----------------|-----------------|
|                  |                   | 16ga                      | 14ga            | 12ga            | 10ga            |
| 15               | 1.00              | 114                       | 160             |                 |                 |
| 18               | 1.00              | 95                        | 133             | 222             |                 |
| 21               | 1.00              | 81                        | 114             | 190             |                 |
| 24               | 1.00              | 71                        | 100             | 166             |                 |
| 30               | 1.00              | 57                        | 80              | 133             |                 |
| 36               | 1.00              | 47                        | 66              | 111             |                 |
| 42               | 1.00              | 40                        | 57              | 95              |                 |
| 48               | 1.00              | 35                        | 49              | 83              |                 |
| 54               | <sup>1</sup> 1.00 | <sup>2</sup> 31           | 44              | 73              |                 |
| 60               | 1.00              |                           | 39              | 66              | 96              |
| 66               | 1.00              |                           | <sup>2</sup> 36 | 60              | 87              |
| 72               | 1.00              |                           |                 | 55              | 80              |
| 78               | 1.00              |                           |                 | 50              | 74              |
| 84               | 1.00              |                           |                 | <sup>2</sup> 47 | 68              |
| 90               | 1.00              |                           |                 |                 | 64              |
| 96               | 1.00              |                           |                 |                 | <sup>2</sup> 59 |
| 102              | 1.06              |                           |                 |                 | <sup>2</sup> 52 |

<sup>1</sup>Minimum cover for 14ga and heavier. The 16ga minimum cover for 54" is 1.1-ft.  
<sup>2</sup>Trench installation only. Embankment installations may be used for the heavier gages.



Corrugated Steel Pipe (CSP)  
 AASHTO LRFD Cover Heights  
 Corner bearing capacity 4 ksf  
 Soil density 120 pcf

CSP Pipe-Arch  
 2<sup>2</sup>/<sub>3</sub>" x 1/2"

| Span x Rise<br>(in) | Equiv Dia<br>(in) | Min<br>Gage | Min Cover<br>(ft) | Max Cover<br>(ft) |
|---------------------|-------------------|-------------|-------------------|-------------------|
| 17 x 13             | 15                | 16          | 1.9               | 12                |
| 21 x 15             | 18                | 16          | 2.0               | 12                |
| 24 x 18             | 21                | 16          | 1.9               | 12                |
| 28 x 20             | 24                | 16          | 2.0               | 12                |
| 35 x 24             | 30                | 16          | 2.0               | 12                |
| 42 x 29             | 36                | 16          | 2.0               | 12                |
| 49 x 33             | 42                | 14          | 2.0               | 12                |
| 57 x 38             | 48                | 12          | 2.0               | 11                |
| 64 x 43             | 54                | 12          | 2.0               | 11                |
| 71 x 47             | 60                | 10          | 2.0               | 11                |
| 77 x 52             | 66                | 8           | 2.0               | 12                |
| 83 x 57             | 72                | 8           | 2.0               | 12                |



Corrugated Steel Pipe (CSP)  
 AASHTO LRFD Cover Heights  
 Corner bearing capacity 4 ksf  
 Soil density 120 pcf

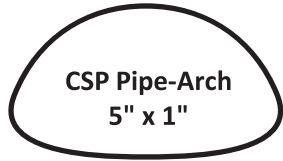
CSP Pipe-Arch  
 3" x 1"

| Span x Rise<br>(in) | Equiv Dia<br>(in) | Min<br>Gage | Min Cover<br>(ft) | Max Cover<br>(ft) |
|---------------------|-------------------|-------------|-------------------|-------------------|
| 53 x 41             | 48                | 14          | 2.0               | 11                |
| 60 x 46             | 54                | 14          | 2.0               | 20                |
| 66 x 51             | 60                | 14          | 1.2               | 20                |
| 73 x 55             | 66                | 14          | 1.2               | 20                |
| 81 x 59             | 72                | 14          | 1.5               | 16                |
| 87 x 63             | 78                | 14          | 1.5               | 16                |
| 95 x 67             | 84                | 14          | 1.5               | 16                |
| 103 x 71            | 90                | 14          | 1.5               | 16                |
| 112 x 75            | 96                | 12          | 1.5               | 16                |
| 117 x 79            | 102               | 12          | 1.5               | 16                |
| 128 x 83            | 108               | 10          | 1.5               | 16                |
| 137 x 87            | 114               | 10          | 1.6               | 16                |
| 142 x 91            | 120               | 10          | 1.6               | 16                |

<sup>1</sup>Manufacturing limitations include a 14 gage minimum for 3" x 1" Pipe-Arch



Corrugated Steel Pipe (CSP)  
 AASHTO LRFD Cover Heights  
 Corner bearing capacity 4 ksf  
 Soil density 120 pcf

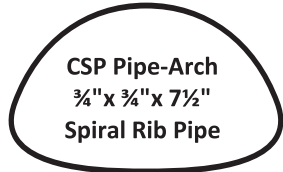


| Span x Rise<br>(in) | Equiv Dia<br>(in) | <sup>1</sup> Min<br>Gage | Min Cover<br>(ft) | Max Cover<br>(ft) |
|---------------------|-------------------|--------------------------|-------------------|-------------------|
| 53 x 41             | 48                | 12                       | 2.0               | 11                |
| 60 x 46             | 54                | 12                       | 1.2               | 20                |
| 66 x 51             | 60                | 12                       | 1.2               | 20                |
| 73 x 55             | 66                | 12                       | 1.2               | 20                |
| 81 x 59             | 72                | 12                       | 1.5               | 16                |
| 87 x 63             | 78                | 12                       | 1.5               | 16                |
| 95 x 67             | 84                | 12                       | 1.5               | 16                |
| 103 x 71            | 90                | 12                       | 1.5               | 16                |
| 112 x 75            | 96                | 12                       | 1.5               | 16                |
| 117 x 79            | 102               | 12                       | 1.5               | 16                |
| 128 x 83            | 108               | 10                       | 1.5               | 16                |
| 137 x 87            | 114               | 10                       | 1.6               | 16                |
| 142 x 91            | 120               | 10                       | 1.6               | 16                |

<sup>1</sup>Manufacturing limitations include a 12 gage minimum for 5"x 1" Pipe-Arch



Corrugated Steel Pipe (CSP)  
 AASHTO LRFD Cover Heights  
 Corner bearing capacity 4 ksf  
 Soil density 120 pcf



| <sup>1</sup> Span x Rise<br>(in) | Equiv Dia<br>(in) | Min<br>Gage     | Min Cover<br>(ft) | Max Cover<br>(ft) |
|----------------------------------|-------------------|-----------------|-------------------|-------------------|
| 20 x 16                          | 18                | 16              | 1.6               | 15                |
| 23 x 19                          | 21                | 16              | 1.7               | 14                |
| 27 x 21                          | 24                | 16              | 1.8               | 13                |
| 33 x 26                          | 30                | 16              | 1.8               | 13                |
| 40 x 31                          | 36                | 16              | 1.9               | 13                |
| 46 x 36                          | 42                | 16              | 1.8               | 13                |
| 53 x 41                          | 48                | <sup>2</sup> 16 | 1.9               | 13                |
| 60 x 46                          | 54                | 14              | 1.3               | 20                |
| 66 x 51                          | 60                | <sup>2</sup> 14 | 1.3               | 20                |
| 73 x 55                          | 66                | 12              | 1.3               | 20                |
| 81 x 59                          | 72                | <sup>2</sup> 12 | 1.5               | 16                |
| 87 x 63                          | 78                | 10              | 1.5               | 16                |
| 95 x 67                          | 84                | 10              | 1.5               | 16                |
| 103 x 71                         | 90                | <sup>2</sup> 10 | 1.5               | 16                |

<sup>1</sup>ASTM A760 makes provisions for two additional sizes: 112"x 75" and 117"x 79".  
<sup>2</sup>Trench installation only. Embankment installations may be used for the heavier gages.



Corrugated Aluminum Alloy Pipe (CAAP)  
 For Alclad Alloy 3004-H32 ( $F_u = 27$  ksi,  $F_y = 20$  ksi)  
 AASHTO LRFD Cover Heights  
 Soil density 120 pcf

CAAP  
 $2\frac{3}{8}" \times \frac{1}{2}"$

| Diameter<br>(in) | Min Cover<br>(ft) | Maximum Cover Height (ft) |      |      |      |     |
|------------------|-------------------|---------------------------|------|------|------|-----|
|                  |                   | 16ga                      | 14ga | 12ga | 10ga | 8ga |
| 12               | 1.00              | 132                       |      |      |      |     |
| 15               | 1.00              | 105                       | 132  |      |      |     |
| 18               | 1.00              | 88                        | 110  | 154  |      |     |
| 21               | 1.00              | 75                        | 94   | 132  |      |     |
| 24               | 1.00              | 65                        | 82   | 115  |      |     |
| 30               | 1.00              |                           | 65   | 92   |      |     |
| 36               | 1.00              |                           | 54   | 76   | 99   | 121 |
| 42               | 1.00              |                           |      | 65   | 84   | 103 |
| 48               | 1.00              |                           |      | 57   | 74   | 90  |
| 54               | 1.00              |                           |      | 50   | 65   | 80  |
| 60               | 1.00              |                           |      |      | 54   | 68  |
| 66               | 1.00              |                           |      |      |      | 56  |
| 72               | 1.00              |                           |      |      |      | 45  |



Corrugated Aluminum Alloy Pipe (CAAP)  
 For Alclad Alloy 3004-H32 ( $F_u = 27$  ksi,  $F_y = 20$  ksi)  
 AASHTO LRFD Cover Heights  
 Soil density 120 pcf

CAAP  
 $3" \times 1"$

| Diameter<br>(in) | Min Cover<br>(ft) | Maximum Cover Height (ft) |      |      |      |     |
|------------------|-------------------|---------------------------|------|------|------|-----|
|                  |                   | 16ga                      | 14ga | 12ga | 10ga | 8ga |
| 30               | 1.00              | 60                        | 76   |      |      |     |
| 36               | 1.00              | 50                        | 63   | 88   |      |     |
| 42               | 1.00              | 43                        | 54   | 75   |      |     |
| 48               | 1.00              | 37                        | 47   | 66   | 88   | 104 |
| 54               | 1.00              | 33                        | 42   | 58   | 78   | 93  |
| 60               | 1.00              | 29                        | 37   | 52   | 71   | 83  |
| 66               | 1.00              | 27                        | 34   | 48   | 64   | 76  |
| 72               | 1.00              | 24                        | 31   | 44   | 59   | 69  |
| 78               | 1.00              |                           | 28   | 40   | 54   | 64  |
| 84               | 1.00              |                           |      | 37   | 50   | 59  |
| 90               | 1.00              |                           |      | 35   | 47   | 55  |
| 96               | 1.00              |                           |      | 32   | 44   | 52  |
| 102              | 1.06              |                           |      |      | 41   | 49  |
| 108              | 1.13              |                           |      |      | 38   | 46  |
| 114              | 1.19              |                           |      |      |      | 42  |
| 120              | 1.25              |                           |      |      |      | 38  |

<sup>1</sup>Minimum cover for 14ga and heavier. The 16ga minimum covers for 54", 60" and 66" are 1.1, 1.2 and 1.3-ft, respectively.  
<sup>2</sup>Minimum cover for 12ga and heavier. The 16ga and 14ga minimum covers are 1.4 and 1.1-ft, respectively.  
<sup>3</sup>Minimum cover for 12ga and heavier. The 14ga minimum cover is 1.2-ft.



Corrugated Aluminum Alloy Pipe (CAAP)  
 For Alclad Alloy 3004-H32 ( $F_u = 27$  ksi,  $F_y = 20$  ksi)  
 AASHTO LRFD Cover Heights  
 Soil density 120 pcf

CAAP  
 $\frac{3}{8}" \times \frac{3}{4}" \times 7\frac{1}{2}"$   
 Spiral Rib

| Diameter<br>(in) | Min Cover<br>(ft) | Maximum Cover Height (ft) |                 |                 |                 |
|------------------|-------------------|---------------------------|-----------------|-----------------|-----------------|
|                  |                   | 16ga                      | 14ga            | 12ga            | 10ga            |
| 15               | 1.00              | 56                        | 77              |                 |                 |
| 18               | 1.00              | 46                        | 64              |                 |                 |
| 21               | 1.00              | 40                        | 55              |                 |                 |
| 24               | 1.00              | 34                        | 48              | 77              |                 |
| 30               | 1.25              | 27                        | 38              | 62              |                 |
| 36               | 1.50              | <sup>2</sup> 22           | 31              | 51              |                 |
| 42               | 1.75              |                           | <sup>2</sup> 27 | 44              |                 |
| 48               | 2.00              |                           |                 | 38              | 54              |
| 54               | 2.00              |                           |                 | 34              | 48              |
| 60               | 2.00              |                           |                 | <sup>3</sup> 30 | 43              |
| 66               | 2.00              |                           |                 |                 | 39              |
| 72               | 2.18              |                           |                 |                 | <sup>3</sup> 36 |

<sup>1</sup>ASTM B745 makes provisions for two additional sizes, 78" and 84".  
<sup>2</sup>Trench installation only. Embankment installations may be used for the heavier gages (10 gage max).



Corrugated Aluminum Alloy Pipe (CAAP)  
 For Alclad Alloy 3004-H32 ( $F_u = 27$  ksi,  $F_v = 20$  ksi)  
 AASHTO LRFD Cover Heights  
 Corner bearing capacity 4 ksf  
 Soil density 120 pcf

CAAP Pipe-Arch  
 $2\frac{3}{8}'' \times \frac{1}{2}''$

| 'Span x Rise<br>(in) | Equiv Dia<br>(in) | Minimum<br>Gage | Minimum Cover<br>(ft) | Maximum Cover<br>(ft) |
|----------------------|-------------------|-----------------|-----------------------|-----------------------|
| 17 x 13              | 15                | 16              | 1.9                   | 12                    |
| 21 x 15              | 18                | 16              | 2.0                   | 12                    |
| 24 x 18              | 21                | 16              | 1.9                   | 12                    |
| 28 x 20              | 24                | 14              | 2.0                   | 12                    |
| 35 x 24              | 30                | 14              | 2.0                   | 12                    |
| 42 x 29              | 36                | 12              | 2.0                   | 12                    |
| 49 x 33              | 42                | 12              | 2.0                   | 12                    |
| 57 x 38              | 48                | 10              | 2.0                   | 11                    |
| 64 x 43              | 54                | 10              | 2.0                   | 11                    |
| 71 x 47              | 60                | 8               | 2.0                   | 11                    |

<sup>1</sup>ASTM B745 makes provisions for two additional larger sizes: 77"x 52" and 83"x 57".



Corrugated Aluminum Alloy Pipe (CAAP)  
 For Alclad Alloy 3004-H32 ( $F_u = 27$  ksi,  $F_v = 20$  ksi)  
 AASHTO LRFD Cover Heights  
 Corner bearing capacity 4 ksf  
 Soil density 120 pcf

CAAP Pipe-Arch  
 $3'' \times 1''$

| 'Span x Rise<br>(in) | Equiv Dia<br>(in) | Minimum<br>Gage | Minimum Cover<br>(ft) | Maximum Cover<br>(ft) |
|----------------------|-------------------|-----------------|-----------------------|-----------------------|
| 53 x 41              | 48                | 16              | 2.0                   | 11                    |
| 60 x 46              | 54                | 16              | 1.3                   | 20                    |
| 66 x 51              | 60                | 16              | 1.3                   | 20                    |
| 73 x 55              | 66                | 14              | 1.3                   | 20                    |
| 81 x 59              | 72                | 12              | 1.5                   | 16                    |
| 87 x 63              | 78                | 12              | 1.5                   | 16                    |
| 95 x 67              | 84                | 12              | 1.5                   | 16                    |
| 103 x 71             | 90                | 10              | 1.5                   | 16                    |
| 112 x 75             | 96                | 8               | 1.6                   | 15                    |
| 117 x 79             | 102               | 8               | 1.6                   | 16                    |

<sup>1</sup>ASTM B745 makes provisions for three additional larger sizes: 128"x 83", 137"x 87" and 142"x 91".



Corrugated Aluminum Alloy Pipe (CAAP)  
 For Alclad Alloy 3004-H32 ( $F_u = 27$  ksi,  $F_v = 20$  ksi)  
 AASHTO LRFD Cover Heights  
 Corner bearing capacity 4 ksf  
 Soil density 120 pcf

CAAP Pipe-Arch  
 $\frac{3}{4}'' \times \frac{3}{4}'' \times 7\frac{1}{2}''$   
 Spiral Rib Pipe

| 'Span x Rise<br>(in) | Equiv Dia<br>(in) | Minimum<br>Gage | Minimum Cover<br>(ft) | Maximum Cover<br>(ft) |
|----------------------|-------------------|-----------------|-----------------------|-----------------------|
| 20 x 16              | 18                | 16              | 1.6                   | 15                    |
| 23 x 19              | 21                | 16              | 1.7                   | 14                    |
| 27 x 21              | 24                | 16              | 1.8                   | 13                    |
| 33 x 26              | 30                | 16              | 1.8                   | 13                    |
| 40 x 31              | 36                | 14              | 1.9                   | 13                    |
| 46 x 36              | 42                | <sup>2</sup> 14 | 1.9                   | 13                    |
| 53 x 41              | 48                | 12              | 2.0                   | 13                    |
| 60 x 46              | 54                | <sup>2</sup> 12 | 2.0                   | 20                    |
| 66 x 51              | 60                | 10              | 2.0                   | 20                    |
| 73 x 55              | 66                | <sup>2</sup> 10 | 2.2                   | 20                    |

<sup>1</sup>ASTM B745 makes provisions for one additional size, 81"x 59".

<sup>2</sup>Trench installation only. Embankment installations may be used for the heavier gages (10 gage max).