



QUALITY PRODUCTS...UNEQUALLED SERVICE

CORRUGATED METAL PIPE HEIGHT OF COVER LIMITS

Height of cover limits for:

Round and Pipe-Arch Profiles

H20, H25, & E80 Live Loads

*2-2/3' x 1/2 * 3 x1 * 5x1 Corrugations*

Galvanized, Aluminized Type 2, & Polymer CMP

WWW.METALCULVERTS.COM

1-800-735-7312

Standard Corrugation/ H20 & H25 Live loads



Cover Height Limits for Corrugated Metal Pipe* 2-2/3" x 1/2" Corrugations

H20 and H25 Live Loads

Round Pipe

| Diameter | Minimum Cover (in) | Maximum Cover (Feet) for Steel Thickness(In) | | | | | |
|----------|--------------------|---|-------|-------|-------|-------|-------|
| | | 0.052 | 0.064 | 0.079 | 0.109 | 0.138 | 0.168 |
| 12 | 12 | 197 | 248 | 310 | | | |
| 15 | 12 | 158 | 198 | 248 | | | |
| 18 | 12 | 131 | 165 | 206 | | | |
| 21 | 12 | 113 | 141 | 177 | 248 | | |
| 24 | 12 | 98 | 124 | 155 | 217 | | |
| 30 | 12 | | 99 | 124 | 173 | | |
| 36 | 12 | | 83 | 103 | 145 | 186 | |
| 42 | 12 | | 71 | 88 | 124 | 159 | 195 |
| 48 | 12 | | 62 | 77 | 108 | 139 | 171 |
| 54 | 12 | | | 67 | 94 | 122 | 150 |
| 60 | 12 | | | | 80 | 104 | 128 |
| 66 | 12 | | | | 68 | 88 | 109 |
| 72 | 12 | | | | | 75 | 93 |
| 78 | 12 | | | | | | 79 |
| 84 | 12 | | | | | | 66 |

| Steel Thickness Reference | |
|---------------------------|------|
| Inches | Gage |
| 0.052 | 18 |
| 0.064 | 16 |
| 0.079 | 14 |
| 0.109 | 12 |
| 0.138 | 10 |
| 0.168 | 8 |

H20 and H25 Live Loads

Pipe Arch

| Round Equivalent (Inches) | Span x Rise (Inches) | Minimum Specified Steel Thickness (Inches) | Minimum Cover (Inches) | Maximum Cover (ft) over pipe arch for soil corner bearing capacity of 2 tons/sq ft |
|---------------------------|----------------------|--|------------------------|--|
| 15 | 17 x 13 | 0.064 | 12 | 16 |
| 18 | 21 x 15 | 0.064 | 12 | 15 |
| 21 | 24 x 18 | 0.064 | 12 | 15 |
| 24 | 28 x 20 | 0.064 | 12 | 15 |
| 30 | 35 x 24 | 0.064 | 12 | 15 |
| 36 | 42 x 29 | 0.064 | 12 | 15 |
| 42 | 49 x 33 | 0.079 | 12 | 15 |
| 48 | 57 x 38 | 0.109 | 12 | 15 |
| 54 | 64 x 43 | 0.109 | 12 | 15 |
| 60 | 71 x 47 | 0.138 | 12 | 15 |
| 66 | 77 x 52 | 0.168 | 12 | 15 |
| 72 | 83 x 57 | 0.168 | 12 | 15 |

*Table Notes:

- Tables recreated from NCSPA Corrugated Steel Pipe Design Manual, 2008 -Tables were calculated using the following values:
 - Unit weight of soil=120 pcs
 - Density of compacted backfill = 90% AASHTO T-99
 - AISI load reduction factor K = 0.86
- H20 & H25 minimum covers are measured from top of pipe to bottom of flexible pavement, or top of pipe to top of rigid pavement
- Refer to NCSPA Installation Manual for proper installation procedure of round and arch pipes
- State DOT cover requirements may vary

3x1 or 5x1 Corrugation/ H20 & H25 Live Loads



Cover Height Limits for Corrugated Metal Pipe*

3x1 or 5x1 Corrugations

H20 & H25 Live Loads

Round Pipe

| Diameter | Minimum Cover (in) | Maximum Cover (feet) for Steel Thickness(in) | | | | |
|----------|--------------------|--|-------|-------|-------|-------|
| | | 0.064 | 0.079 | 0.109 | 0.138 | 0.168 |
| 54 | 12 | 56 | 70 | 99 | 127 | 155 |
| 60 | 12 | 51 | 63 | 89 | 114 | 140 |
| 66 | 12 | 46 | 58 | 81 | 104 | 127 |
| 72 | 12 | 42 | 53 | 74 | 95 | 117 |
| 78 | 12 | 39 | 49 | 68 | 88 | 108 |
| 84 | 12 | 36 | 45 | 63 | 82 | 100 |
| 90 | 12 | 34 | 42 | 59 | 76 | 93 |
| 96 | 12 | 32 | 40 | 56 | 71 | 87 |
| 102 | 18 | 30 | 37 | 52 | 67 | 82 |
| 108 | 18 | 28 | 35 | 49 | 64 | 78 |
| 114 | 18 | 26 | 33 | 46 | 59 | 72 |
| 120 | 18 | 24 | 30 | 42 | 54 | 67 |
| 126 | 24 | 22 | 28 | 39 | 50 | 62 |
| 132 | 24 | | 26 | 36 | 47 | 57 |
| 138 | 24 | | 24 | 33 | 43 | 53 |
| 144 | 24 | | | 31 | 40 | 49 |

*Table Notes

- Maximum covers for round pipe are for 5x1. Max covers *increased* by 12% if using 3x1
- **Figures in Blue require standard trench installation.** All others may be embankment or trench.
- Minimum covers are measured from top of pipe to bottom of flexible pavement, or top of pipe to top of rigid pavement
- Tables recreated from NCSA Corrugated Steel Pipe Design Manual, 2008 -Tables were calculated using the following values:
 - Unit weight of soil=120 pcs
 - Density of compacted backfill =90% AASHTO T-99
 - AISI load reduction factor K = 0.86
- Refer to NCSA Installation Manual for proper installation procedure of round and arch pipes
- State DOT requirements may vary

| Inches | Gage |
|--------|------|
| 0.064 | 16 |
| 0.079 | 14 |
| 0.109 | 12 |
| 0.138 | 10 |
| 0.168 | 8 |

Steel Thickness Reference:

H20 & H25 Live Loads

Pipe Arch

| Round Equilibrant (in) | Span & Rise (in) | Minimum Specified Steel Thickness (in) | | Minimum Cover (in) | Maximum Cover (ft) over pipe arch for soil corner bearing capacity of 2 tons/sq ft |
|------------------------|------------------|--|-------|--------------------|--|
| | | 3 x 1 | 5 x 1 | | |
| 48 | 53 x 41 | 0.079 | 0.109 | 12 | 25 |
| 54 | 60 x 46 | 0.079 | 0.109 | 15 | 25 |
| 60 | 66 x 51 | 0.079 | 0.109 | 15 | 25 |
| 66 | 73 x 55 | 0.079 | 0.109 | 18 | 24 |
| 72 | 81 x 59 | 0.079 | 0.109 | 18 | 21 |
| 78 | 87 x 63 | 0.079 | 0.109 | 18 | 20 |
| 84 | 95 x 67 | 0.079 | 0.109 | 18 | 20 |
| 90 | 103 x 71 | 0.079 | 0.109 | 18 | 20 |
| 96 | 112 x 75 | 0.079 | 0.109 | 21 | 20 |
| 102 | 117 x 79 | 0.109 | 0.109 | 21 | 19 |
| 108 | 128 x 83 | 0.109 | 0.109 | 24 | 19 |
| 114 | 137 x 87 | 0.109 | 0.109 | 24 | 19 |
| 120 | 142 x 91 | 0.138 | 0.138 | 24 | 19 |

Standard Corrugation/ E80 Live Loads



Cover Height Limits for Corrugated Metal Pipe* 2-2/3" x 1/2" Corrugations

E80 Live Loads

Round Pipe

| Diameter | Minimum Cover (in) | Maximum Cover (Feet) for Steel Thickness(In) | | | | | | Steel Thickness Reference | |
|----------|--------------------|--|-------|-------|-------|-------|-------|---------------------------|----|
| | | 0.052 | 0.064 | 0.079 | 0.109 | 0.138 | 0.168 | | |
| 12 | 12 | 197 | 248 | 310 | | | | | |
| 15 | 12 | 158 | 198 | 248 | | | | | |
| 18 | 12 | 131 | 165 | 206 | | | | | |
| 21 | 12 | 113 | 141 | 177 | 248 | | | | |
| 24 | 12 | 98 | 124 | 155 | 217 | | | 0.052 | 18 |
| 30 | 12 | | 99 | 124 | 173 | | | 0.064 | 16 |
| 36 | 12 | | 83 | 103 | 145 | 186 | | 0.079 | 14 |
| 42 | 12 | | 71 | 88 | 124 | 159 | 195 | 0.109 | 12 |
| 48 | 12 | | 62 | 77 | 108 | 139 | 171 | 0.138 | 10 |
| 54 | 18 | | | 67 | 94 | 122 | 150 | 0.168 | 8 |
| 60 | 18 | | | | 80 | 104 | 128 | | |
| 66 | 18 | | | | 68 | 88 | 109 | | |
| 72 | 18 | | | | | 75 | 93 | | |
| 78 | 24 | | | | | | 79 | | |
| 84 | 24 | | | | | | 66 | | |

E80 Live Load

Pipe Arch

| Round Equivalent (Inches) | Span x Rise (Inches) | Minimum Specified Steel Thickness | Minimum Cover (Inches) | Maximum Cover (ft) over pipe arch for soil corner bearing capacity of 3 tons/sq ft |
|---------------------------|----------------------|-----------------------------------|------------------------|--|
| 15 | 17 x 13 | 0.079 | 24 | 22 |
| 18 | 21 x 15 | 0.079 | 24 | 22 |
| 21 | 24 x 18 | 0.109 | 24 | 22 |
| 24 | 28 x 20 | 0.109 | 24 | 22 |
| 30 | 35 x 24 | 0.138 | 24 | 22 |
| 36 | 42 x 29 | 0.138 | 24 | 22 |
| 42 | 49 x 33 | 0.168 | 24 | 22 |
| 48 | 57 x 38 | 0.168 | 24 | 22 |
| 54 | 64 x 43 | 0.168 | 24 | 22 |
| 60 | 71 x 47 | 0.168 | 24 | 22 |

*Table Notes:

- Tables recreated from NCSPA Corrugated Steel Pipe Design Manual, 2008 Tables were calculated using the following values:
 - Unit weight of soil=120 pcs
 - Density of compacted backfill= AASHTO T-99 density of 90%
 - AISI load reduction factor K=.86
- E80 minimum covers are measured from top of pipe to bottom of tie
- Refer to NCSPA Installation Manual for proper installation procedure of round and arch pipes

3x1 or 5x1 Corrugation/ E80 Live Loads



Cover Height Limits for Corrugated Metal Pipe*

3x1 or 5x1 Corrugations

E80 Live Loads Round Pipe

| Diameter | Minimum Cover (in) | Maximum Cover (feet) for Steel Thickness(in) | | | | |
|----------|--------------------|--|-------|-------|-------|-------|
| | | 0.064 | 0.079 | 0.109 | 0.138 | 0.168 |
| 54 | 18 | 56 | 70 | 98 | 127 | 155 |
| 60 | 18 | 50 | 63 | 88 | 114 | 139 |
| 66 | 18 | 46 | 57 | 80 | 103 | 127 |
| 72 | 18 | 42 | 52 | 74 | 95 | 116 |
| 78 | 24 | 39 | 48 | 68 | 87 | 107 |
| 84 | 24 | 36 | 45 | 63 | 81 | 99 |
| 90 | 24 | 33 | 42 | 59 | 76 | 93 |
| 96 | 24 | 31 | 39 | 55 | 71 | 87 |
| 102 | 30 | 29 | 37 | 52 | 67 | 82 |
| 108 | 30 | | 35 | 49 | 63 | 77 |
| 114 | 30 | | 32 | 45 | 58 | 72 |
| 120 | 30 | | 30 | 42 | 54 | 66 |
| 126 | 36 | | | 39 | 50 | 61 |
| 132 | 36 | | | 36 | 46 | 58 |
| 138 | 36 | | | 33 | 43 | 53 |
| 144 | 36 | | | | 39 | 49 |

*Table Notes

- Maximum covers for round pipe are for 5x1. Max covers *increased* by 12% if using 3x1
- Figures in Blue require additional minimum cover
- Minimum covers are measured from top of pipe to bottom of tie
- Tables recreated from NCSPA Corrugated Steel Pipe Design Manual, 2008 -Tables were calculated using the following values:
 - Unit weight of soil=120 pcs
 - Density of compacted backfill = AASHTO T-99 density of 90%
 - AISI load reduction factor K=.86
- Refer to NCSPA Installation Manual for proper installation procedure of round and arch pipes

Steel Thickness Reference

| Inches | 0.064 | 0.079 | 0.109 | 0.138 | 0.168 |
|--------|-------|-------|-------|-------|-------|
| Gage | 16 | 14 | 12 | 10 | 8 |

E80 Live Loads Pipe Arch

| Round Equilant (in) | Span & Rise (in) | Minimum Specified Steel Thickness (in) | | Minimum Cover (in) | Maximum Cover (ft) over pipe arch for soil corner bearing capacity of 3 tons/sq ft |
|---------------------|------------------|--|-------|--------------------|--|
| | | 3 x 1 | 5 x 1 | | |
| 48 | 53 x 41 | 0.079 | 0.109 | 24 | 25 |
| 54 | 60 x 46 | 0.079 | 0.109 | 24 | 25 |
| 60 | 66 x 51 | 0.079 | 0.109 | 24 | 25 |
| 66 | 73 x 55 | 0.079 | 0.109 | 30 | 24 |
| 72 | 81 x 59 | 0.079 | 0.109 | 30 | 21 |
| 78 | 87 x 63 | 0.079 | 0.109 | 30 | 18 |
| 84 | 95 x 67 | 0.079 | 0.109 | 30 | 18 |
| 90 | 103 x 71 | 0.079 | 0.109 | 36 | 18 |
| 96 | 112 x 75 | 0.079 | 0.109 | 36 | 18 |
| 102 | 117 x 79 | 0.109 | 0.109 | 36 | 17 |
| 108 | 128 x 83 | 0.109 | 0.109 | 42 | 17 |
| 114 | 137 x 87 | 0.109 | 0.109 | 42 | 17 |
| 120 | 142 x 91 | 0.138 | 0.109 | 42 | 17 |