GALVONALL**

GBR-40[™] Heavy Industrial Fence Pipe and GBR-20[™] Commercial Fence Pipe



The Choice of Professional Chain Link Fence Installers



TALLAHASSEE (850) 942-1003

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Proudly Made in the USA



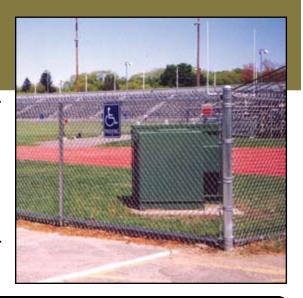
GALVONALLTM GBR-40TM

The high-tensile steel and advanced roll-forming process used to produce GalvOnAll™ GBR-40™ fence framework results in a strength superior to Schedule 40 pipe. Ameristar's GalvOnAll™ manufacturing process utilizes a full layer (0.90 oz. per sq. ft. nominal) of hot-dip zinc galvanization on both the outside and inside surfaces. This total protection process ensures much greater corrosion and exposure resistance than for conventional galvanized framework employing a painted interior.

	GALVONALL™ GBR-40™ INDUSTRIAL STRENGTH PIPE PHYSICAL DIMENSIONS & STRENGTH CHARACTERISTICS													
-	FENCE	NOMINAL	ACTUAL	WALL	WT./FT.	MIN. YIELD	v	(1) SECTION		MAX. BENDING	10' FREE	CALCULATED LOAD (LBS.)		
IN	DUSTRY O.D.	PIPE SIZE DESIGNATOR	O.D. (IN.)	THICKNESS (IN.)	(POUNDS)	STRENGTH	Х	MODULUS	=	MOMENT	SUPPORTED	CANT	LEVER	
	0.2.	DEGIGITATOR	()	()						LBS./IN.	LBS.	4'	6'	
	1-5/8"	1-1/4	1.660	.111	1.84	50,000	X	.1961	=	9,805	327	204	135	
	2"	1-1/2	1.900	.120	2.28	50,000	х	.2810	=	14,050	468	293	195	
	2-1/2"	2	2.375	.130	3.12	50,000	Х	.4881	=	24,405	814	508	330	
	3"	2-1/2	2.875	.160	4.64	50,000	х	.8778	=	43,890	1,463	914	610	
	4"	3-1/2	4.000	.160	6.56	50,000	Х	1.7819	=	89,095	2,969	1,856	1,237	

GALVONALLTM GBR-20TM

The high-tensile steel used in the manufacture of GalvOnAll™ GBR-20™ commercial fence pipe is designed to retain 80% of the strength of heavy industrial GalvOnAll™ GBR-40™ fence pipe. GalvOnAll™ GBR-20™ is a strong, yet economical alternative for an endless variety of special applications such as tennis courts, baseball and softball fields, and sports complexes, and a host of institutional and business perimeter installations.



	GALVONALL™ GBR-20™ COMMERCIAL STRENGTH PIPE PHYSICAL DIMENSIONS & STRENGTH CHARACTERISTICS													
FENCE INDUSTRY	NOMINAL PIPE SIZE	ACTUAL O.D.	WALL THICKNESS	WT./FT.	MIN. YIELD	¥	(1) MAX. SECTION BENDING		10' FREE	CALCULATED LOAD (LBS.)				
O.D.	DESIGNATOR	(IN.)	(IN.)	(POUNDS)	STRENGTH	^	MODULUS		MOMENT LBS./IN.	SUPPORTED LBS.	CANT	ILEVER		
			` '						LDS./IN.	LBS.	4'	6'		
1-3/8"	1	1.315	.080	1.06	50,000	Х	.0900	=	4,500	150		•		
1-5/8"	1-1/4	1.660	.085	1.43	50,000	Х	.1574	=	7,870	262	164	109		
2"	1-1/2	1.900	.090	1.74	50,000	Х	.2208	=	11,040	-	230	154		
2-1/2"	2	2.375	.095	2.31	50,000	х	.3734	=	18,670	-	389	259		
3"	2-1/2	2.875	.110	3.26	50,000	х	.6365	=	31,825	-	663	442		

CONSTRUCTION SPECIFICATION FOR CHAIN LINK FENCE, INDUSTRIAL, GALVANIZED UTILIZING AMERISTAR® GalvOnAll™ GBR-40™ FENCE PIPE

(MEETS "BUY AMERICA" DOMESTIC PROCUREMENTS)

PART 1 - GENERAL

1.01 WORK INCLUDED

The contractor shall provide all labor, materials and appurtenances necessary for installation of the galvanized chain link fence system defined herein at (specify project site).

1.02 RELATED WORK

Section 02500 - Paving and Surfacing Section 03300 - Cast-In-Place Concrete Section 04200 - Unit Masonry

1.03 SYSTEM DESCRIPTION

The contractor shall supply a total galvanized chain link fence system of the design, style and strength defined herein. The system shall include all components (i.e., framework, chain link fabric, gates and fittings) required.

1.04 QUALITY ASSURANCE

The contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified.

1.05 REFERENCES

- American Society for Testing and Materials (ASTM) Standards: A90/A90M - Test Method for Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings. A392
 - Specification for Zinc-Coated Steel Chain-Link Fence Fabric. A653/A653M - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process. A924/A924M - Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process. **B6** - Specification for Zinc. **B117** - Practice for Operating Salt Spray (Fog) Apparatus. D1499 - Practice for Operating Light- and Water-Exposure Apparatus (Carbon-Arc Type) for Exposure of Plastics. *E8/E8M* - Test Methods for Tension Testing of Metallic Materials. E376 - Practice for Measuring Coating Thickness by Magnetic-Field or Eddy-Current (Electromagnetic) Test Methods. F567 - Practice for Installation of Chain-Link Fence. F626 Specification for Fence Fittings. F668 - Specification for Poly (Vinyl Chloride) (PVC)-Coated Steel Chain-Link Fence Fabric. F900 - Specification for Industrial and Commercial Swing Gates. F969 - Practice for Construction of Chain-Link Tennis Court Fence. F1043 - Specification for Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework. F1184 Specification for Industrial and Commercial Horizontal Slide Gates
- B. American Association of State Highway and Transportation Officials (AASHTO) Standards: M181 Standard Specification for Chain-Link Fence.
- C. United States Federal Supply Service General Services Administration Specifications: RR-F-191/3 Federal Specification Sheet for Fencing, Wire and Post, Metal (Chain-Link Fence Posts, Top Rails and Braces) Detail Specification.

1.06 SUBMITTAL

The manufacturer's literature shall be submitted prior to installation.

1.07 PRODUCT HANDLING AND STORAGE

Upon receipt at the job site, all materials shall be checked to

ensure that no damages occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper ventilation and drainage and to protect against damage, weather, vandalism and theft.

PART 2 - MATERIALS

2.01 MANUFACTURER

Framework for galvanized chain link fence systems shall conform to Ameristar* GalvOnAll™ GBR-40™ Fence Pipe (industrial weight), as manufactured by Ameristar* Fence Products in Tulsa, Oklahoma.

2.02 MATERIAL - STEEL FRAMEWORK

- A. The steel material used to manufacture Ameristar[®] GalvOnAll[™] GBR-40[™] Fence Pipe shall be zinc-coated steel strip, galvanized by the hot-dip process conforming to the criteria of ASTM A653/A653M and the general requirements of ASTM A924/A924M.
- B. The zinc used in the galvanizing process shall conform to ASTM B6. Weight of zinc shall be determined using the test method described in ASTM A90 and shall conform to the weight range (external and internal) of ASTM F1043. Type B.
- C. The framework shall be manufactured in accordance with commercial standards to meet the strength (50,000 psi minimum yield strength) and coating requirements of the following standards: L) ASTM F1043, Group IC, Electrical Resistance Welded Round Steel Pipe, heavy industrial weight. 2.) M181, Type I, Grade 2, Electrical Resistance Welded Steel Pipe. 3.) RR-F-191/3, Class 1, Grade B, Electrical Resistance Welded Steel Pipe.
- D. The exterior surface of the electrical resistance weld shall be recoated with the same type of material and thickness as the basic zinc coating.
- E. A chromate conversion coating shall be applied to the external surface. The chromate shall be 30-micrograms/in² ± 15 micrograms/in² and shall be verified by a strip and weigh method utilizing an atomic absorption spectrophotometer or x-ray fluorescence spectrograph.
- F. A clear coat shall be applied over the chromate conversion coating. The thickness of the clear coating shall be a nominal 0.5 mils ± 0.2 mils and shall be determined in accordance with ASTM E376 using a suitable magnetic or eddy current coating thickness tester. (Note: Thickness shall be determined by taking the difference between the thickness of zinc and the total thickness of clear coat and zinc.) The exterior clear-coated surface must demonstrate the ability to withstand exposure of 500 hours without failure at a black panel temperature of 145° F when tested in accordance with ASTM D1499. The clear coat shall also withstand 500 hours of exposure to 100% relative humidity per ASTM D2247 without blistering or peeling and 950 hours of exposure to salt spray per ASTM B117 with a maximum of 5% red rust.
- G. The strength of Ameristar® GalvOnAll™ GBR-40™ Fence Pipe shall conform to the requirements of ASTM F1043; the minimum weight shall not be less than 90% of the nominal weight (see Table 1). The strength of line, end, corner and pull posts shall be determined by the use of 4° or 6° cantilevered beam test. The top rail shall be determined by a 10° free-supported beam test (see Table

1). An alternative method of determining pipe strength is by the calculation of bending moment (see Table 1). Conformance with this specification can be demonstrated by measuring the yield strength of a randomly selected piece of pipe from each lot and calculating the section modulus. The yield strength shall be determined according to the methods described in ASTM E8. For materials under this specification, the 0.2 offset method shall be used in determining yield strength. Terminal posts, line posts and top/bottom rails shall be precut to specified lengths.

2.03 MATERIAL - FENCE FABRIC

- The fabric shall be hot dipped galvanized with a minimum zinc coating weight per ASTM A392 and specified as one of the following: (Class I The weight of the zinc coating shall not be less than 1.2 oz/ft² [366 g/m²], of uncoated wire surface) or (Class II The weight of the zinc coating shall not be less than 2.0 oz/ft² [610 g/m²] of uncoated wire surface, on wire of fabric coated before weaving; on fabric coated after weaving, the weight of zinc coating shall not be less than 2.0 oz/ft² [610 g/m²] of uncoated wire surface as determined from the average of two or more specimens, and not less than 1.8 oz/ft² [500g/m²] of uncoated wire surface for any individual specimen.).
- B. Wire Size: The finished wire size shall be (specify gauge) gauge (See Table 2).
- C. Height and Mesh Size: The fabric height shall be (specify height) feet high with a mesh size of (specify mesh size) inches (See Table 2).
- D. Selvage: Top edge (<u>specify knuckled or twisted</u>) and bottom edge (<u>specify knuckled or twisted</u>).

2.04 MATERIAL - FENCE FITTINGS

The material for fence fittings shall be manufactured to meet the requirements of ASTM F626.

2.05 MATERIAL - GATES

Swing gates shall be manufactured and coated to meet the requirements of ASTM F900. Slide gates shall be manufactured to meet the requirements of ASTM F1184.

PART 3 - EXECUTION

3.01 PREPARATION

All new installation shall be laid out by the contractor in accordance with the construction plan.

3.02 INSTALLATION

Install chain link fence in accordance with ASTM F567. For chain link tennis court fences, install in accordance with ASTM F969. Fence posts shall be set at spacings of a maximum of 10' o.c. Gate posts shall be spaced according to the gate openings specified in the construction plans. The "Paving and Surfacing." ("Cast-In-Place Concrete" and "Unit Masonry" sections of this specification shall govern post base placement and material requirements. Install fabric on security side and attach with wire ties or clip to line posts at 15 inches o.c. and to rails, braces and tension wire at 24 inches o.c.

3.03 CLEANING

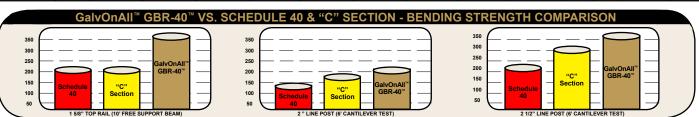
The contractor shall clean the jobsite of excess materials. Post hole excavations shall be scattered uniformly away from posts.

TABLE 1

	17,522 1														
Fence	Decimal O.D. Equivalent			Wall	Weight				Min. Yield		May Panding	Calculated Load (lbs.)			
Industry			Thick	ness			Section Modulus	х	Min. Yield Strength	=	Max. Bending Moment	10' Free	Can	6' 136	
O.D.	Inches	(mm)	Inches	(mm)	lb./ft.	(kg/m)	Inches		psi			Supported	4'	6'	
1-5/8"	1.660	42.16	.111	2.82	1.84	2.74	.1961	х	50,000	=	9,805	327	204		
2"	1.900	48.26	.120	3.05	2.28	3.39	.2810	х	50,000	=	14,050	468	293	195	
2-1/2"	2.375	60.33	.130	3.30	3.12	4.64	.4881	х	50,000	=	24,405	814	508	339	
3"	2.875	73.03	.160	4.06	4.64	6.90	.8778	Х	50,000	=	43,890	1,463	914	610	
4"	4.000	101.60	.160	4.06	6.56	9.76	1.7819	х	50,000	=	89,095	2,970	1,856	1,237	

TABLE 2

Recommended Usage					Mesh Size	Wire Gauge	Wire	Minimum Breaking Strength						
Industrial	Height	36" (910 mm)	42" (1070 mm)	48" (1220 mm)	60" (1520 mm)	72" (1830 mm)	84" (2130 mm)	96" (2440 mm)	120" (3050 mm)	144" (3660 mm)	2"		0.192" (4.88 mm)	2170#
industriai	Count	101/2	121/2	131/2	171/2	201/2	241/2	271/2	341/2	41½	(50.8 mm)	9	0.148" (3.76 mm)	1290#
Industrial/Security	Height	36" (910 mm)	42" (1070 mm)	48" (1220 mm)	60" (1520 mm)	72" (1830 mm)	84" (2130 mm)	96" (2440 mm)	120" (3050 mm)	144" (3660 mm)	1"	9	0.148" (3.76 mm)	1290#
industrial/Security	Count	20	23	27	33	39	45	53	67	79	(25.4 mm)			1230#
Tennis Court	Height								120" (3050 mm)	144" (3660 mm)	13/4"	9	0.148" (3.76 mm)	1290#
iciniis Court	Count								391/2	471/2	(44.5 mm)	11 0.120" (3.05	0.120" (3.05 mm)	850#



CONSTRUCTION SPECIFICATION FOR CHAIN LINK FENCE, COMMERCIAL, GALVANIZED UTILIZING AMERISTAR* GalvOnAll $^{\rm IM}$ GBR-20 $^{\rm IM}$ FENCE PIPE

(MEETS "BUY AMERICA" DOMESTIC PROCUREMENTS)

PART 1 - GENERAL

1.01 WORK INCLUDED

The contractor shall provide all labor, materials and appurtenances necessary for installation of the galvanized chain link fence system defined herein at (specify project site).

1.02 RELATED WORK

Section 02500 - Paving and Surfacing Section 03300 - Cast-In-Place Concrete Section 04200 - Unit Masonry

1.03 SYSTEM DESCRIPTION

The contractor shall supply a total galvanized chain link fence system of the design, style and strength defined herein. The system shall include all components (i.e., framework, chain link fabric, gates and fittings) required.

1.04 QUALITY ASSURANCE

The contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified.

1.05 REFERENCES

- American Society for Testing and Materials (ASTM) Standards: A90/A90M Test Method for Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings. A392 Specification for Zinc-Coated Steel Chain-Link Fence Fabric. A653/A653M Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process. A924/A924M Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process. B6 Specification for Zinc. B117 Practice for Operating Salt Spray (Fog) Apparatus. D1499 Practice for Operating Light- and Water-Exposure Apparatus (Carbon-Arc Type) for Exposure of Plastics. E8/E8M Test Methods for Tension Testing of Metallic Materials. E376 Practice for Measuring Coating Thickness by Magnetic-Field or Eddy-Current (Electromagnetic) Test Methods. F567 Practice for Installation of Chain-Link Fence. F626 Specification for Fence Fittings. F668 Specification for Poly (Vinyl Chloride) (PVC)-Coated Steel Chain-Link Fence Fabric. F900 Specification for Industrial and Commercial Swing Gates. F969 Practice for Construction of Chain-Link Fence Fabric. F900 Practice for Construction of Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework. F1184 Specification for Industrial and Commercial Horizontal Slide Gates.
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- C. United States Federal Supply Service General Services Administration Specifications: RR-F-191/3 Federal Specification Sheet for Fencing, Wire and Post, Metal (Chain-Link Fence Posts, Top Rails and Braces) Detail Specification.

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The manufacturer's literature shall be submitted prior to installation.

$1.07 \quad PRODUCT\ HANDLING\ AND\ STORAGE$

Upon receipt at the job site, all materials shall be checked to ensure that no damages occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper

ventilation and drainage and to protect against damage, weather, vandalism and theft.

PART 2 - MATERIALS

2.01 MANUFACTURER

Framework for galvanized chain link fence systems shall conform to Ameristar* GalvOnAll™ GBR-20™ Fence Pipe (commercial weight), as manufactured by Ameristar* Fence Products in Tulsa, Oklahoma

2.02 MATERIAL - STEEL FRAMEWORK

- A. The steel material used to manufacture Ameristar[®] GalvOnAll[™] GBR-20[™]Fence Pipe shall be zinc-coated steel strip, galvanized by the hot-dip process conforming to the criteria of ASTM A653/ A653M and the general requirements of ASTM A924/A924M.
- B. The zinc used in the galvanizing process shall conform to ASTM B6. Weight of zinc shall be determined using the test method described in ASTM A90 and shall conform to the weight range allowance for ASTM A653, Designation G-90.
- C. The framework shall be manufactured in accordance with commercial standards to meet the strength (50,000 psi minimum yield strength) and coating requirements of ASTM F1043, Group IC, Electrical Resistance Welded Round Steel Pipe, light industrial (commercial) weight.
- D. The exterior surface of the electrical resistance weld shall be recoated with the same type of material and thickness as the basic zinc coating.
- E. A chromate conversion coating shall be applied to the external surface. The chromate shall be 30-micrograms/in² ± 15 micrograms/in² and shall be verified by a strip and weigh method utilizing an atomic absorption spectrophotometer or x-ray fluorescence spectrograph.
- F. A clear coat shall be applied over the chromate conversion coating. The thickness of the clear coating shall be a nominal 0.5 mils ± 0.2 mils and shall be determined in accordance with ASTM E376 using a suitable magnetic or eddy current coating thickness tester. (Note: Thickness shall be determined by taking the difference between the thickness of zinc and the total thickness of clear coat and zinc.) The exterior clear-coated surface must demonstrate the ability to withstand exposure of 500 hours without failure at a black panel temperature of 145° F when tested in accordance with ASTM D1499. The clear coat shall also withstand 500 hours of exposure to 100% relative humidity per ASTM D2247 without blistering or peeling and 950 hours of exposure to salt spray per ASTM B117 with a maximum of 5% red rust.
- G. The strength of Ameristar* GalvOnAll™ GBR-20™ Fence Pipe shall conform to the requirements of ASTM F1043; the minimum weight shall not be less than 90% of the nominal weight (see Table 1). The strength of line, end, corner and pull posts shall be determined by the use of 4° or 6° cantilevered beam test. The top rail shall be determined by a 10° free-supported beam test (see Table 1). An alternative method of determining pipe strength is by the calculation of bending moment (see Table 1). Conformance with this specification can be demonstrated by measuring the yield strength of a randomly selected piece of pipe from each lot

and calculating the section modulus. The yield strength shall be determined according to the methods described in ASTM E8. For materials under this specification, the 0.2 offset method shall be used in determining yield strength. Terminal posts, line posts and top/bottom rails shall be precut to specified lengths.

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- The fabric shall be hot dipped galvanized with a minimum zinc coating weight per ASTM A392 and specified as one of the following: (Class I The weight of the zinc coating shall not be less than 1.2 oz./ft² [366 g/m²], of uncoated wire surface) or (Class II The weight of the zinc coating shall not be less than 2.0 oz./ft² [610 g/m²] of uncoated wire surface, on wire of fabric coated before weaving; on fabric coated after weaving, the weight of zinc coating shall not be less than 2.0 oz./ft² [610 g/m²] of uncoated wire surface as determined from the average of two or more specimens, and not less than 1.8 oz./ft² [500g/m²] of uncoated wire surface for any individual specimen.).
- B. Wire Size: The finished wire size shall be (<u>specify gauge</u>) gauge (See Table 2).
- C. Height and Mesh Size: The fabric height shall be (specify height) feet high with a mesh size of (specify mesh size) inches (See Table 2).
- D. Selvage: Top edge (<u>specify knuckled or twisted</u>) and bottom edge (<u>specify knuckled or twisted</u>).

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The material for fence fittings shall be manufactured to meet the requirements of ASTM F626.

2.05 MATERIAL - GATES

Swing gates shall be manufactured and coated to meet the requirements of ASTM F900. Slide gates shall be manufactured to meet the requirements of ASTM F1184.

PART 3 - EXECUTION

3.01 PREPARATION

All new installation shall be laid out by the contractor in accordance with the construction plan.

3.02 INSTALLATION

Install chain link fence in accordance with ASTM F567. For chain link tennis court fences, install in accordance with ASTM F969. Fence posts shall be set at spacings of a maximum of 10' o.c. Gate posts shall be spaced according to the gate openings specified in the construction plans. The "Paving and Surfacing," "Cast-In-Place Concrete" and "Unit Masonry" sections of this specification shall govern post base placement and material requirements. Install fabric on security side and attach with wire ties or clip to line posts at 15 inches o.c. and to rails, braces and tension wire at 24 inches o.c.

3.03 CLEANING

The contractor shall clean the jobsite of excess materials. Post hole excavations shall be scattered uniformly away from posts.

TABLE 1

Fence	Decimal O.D. Equivalent		Pipe Wall		Weight		Section		Min. Yield		Max. Bending	Calculated Load (lbs.)		
Industry			Thick	ness	WC	igiit	Modulus	x	Strength	= '	Moment	10' Free	Canti	lever
O.D.	Inches	(mm)	Inches	(mm)	lb./ft.	(kg/m)	Inches		psi		lb. in.	Supported	4'	6'
1-3/8"	1.315	33.40	.080	2.03	1.06	1.57	.0900	х	50,000	=	4,500	150	N/A	N/A
1-5/8"	1.660	42.16	.085	2.16	1.43	2.13	.1574	х	50,000	=	7,870	262	164	109
2"	1.900	48.26	.090	2.29	1.74	2.59	.2208	Х	50,000	=	11,040	N/A	230	154
2-1/2"	2.375	60.33	.095	2.41	2.32	3.45	.3734	Х	50,000	=	18,670	N/A	389	259
3"	2.875	73.03	.111	2.82	3.26	4.85	.6365	Х	50,000	=	31,825	N/A	663	442

TABLE 2

Recommended l	Usage				Fabric H	eight and Diamo	nd Count				Mesh Size	Wire Gauge	Wire	Minimum Breaking Strength
Commercial	Height	36" (910 mm)	42" (1070 mm)	48" (1220 mm)	60" (1520 mm)	72" (1830 mm)	84" (2130 mm)	96" (2440 mm)	120" (3050 mm)	144" (3660 mm)	-	q	0 148" (3 76 mm)	1290#
Commercial	Count	101/2	121/2	131/2	171/2	201/2	241/2	271/2	341/2	411/2	(50.8 mm)	,	0.148" (3.76 mm)	1230#
Tennis Court	Height								120" (3050 mm)	144" (3660 mm)	13/4"	9	0.148" (3.76 mm)	1290#
Tennis Court	Count								39½	471/2	(44.5 mm)	11	0.120" (3.05 mm)	850#

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