

Woven Steel Wire Fence Type-47

Under the state specification 710.02 for fencing, ASTM A 116 is called out.

Go to the steel and fencing certification manual for more information about the basic properties of steel.

Dimension Requirements

Dimensions should be verified to assure the delivered product meets what you ordered.

The state mandates that the woven wire fence fabric shall be design number 1047-6-9.



The sizes and constructions for fence fabric under A 116 is required to meet the following requirements.

Design Numbers for Woven Wire Fence Fabric						
Design Numbers	Number of Horizontal Wires	Fence Height		Spacing of Stay Wires, in. (cm)	Size, Steel Wire Gage	
		Nominal (Design), in	Specified (Actual), in. (cm)		Intermediate Line and Stay Wires	Top and Bottom Wires
No. 9 Grade 60						
1047-6-9	10	47	46.5 (118)	6 (15)	9	9

An example of a sample woven wire would be design number 1047-6-9. Which has a wire gage size of 9 with 10 horizontal wires and a fence height of 46.5 inches.



The woven wires shall be uniformly wrapped joints and all stay wires shall be spaced properly. The permissible variation of the wire should be within ± 0.005 inches. The line and stay wire spacing should not vary more than $3/8$ inch from the nominal dimensions. Due to the mechanics of manufacture, a certain amount of out-of-roundness is expected on the stay wires of the finished fence fabrics.

The length of fence fabric in a roll is required to be 330 ft. The length of the fence fabric in a roll should be the specified length within a tolerance of 3 %.

Mechanical Requirements

Along with Dimensional requirements another key issue is the mechanical properties of the material. Listed below is the information that can be found in the applicable specifications for steel wire.

The breaking strength of line wires should meet these requirements.

Breaking Strength of Line Wires

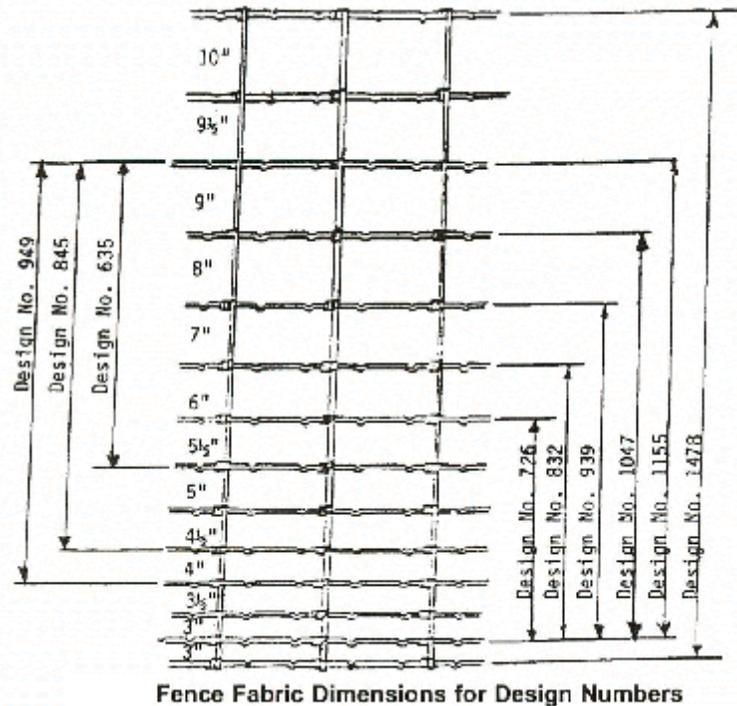
Note 1 - There is no breaking strength requirement for stay wires.

Size, Steel Wire Gage	Tensile Strength Grade, ksi	Nominal Diameter in. (mm)	Minimum Breaking Strength Line Wires Only lbf (N)
9	60 (60)	0.148 (3.77)	1030 (4590)
10	60 (60)	0.135 (3.43)	860 (3820)
10 ½	125 (125)	0.128 (3.25)	1610 (7160)
11	60 (60)	0.120 (3.05)	685 (3050)
12 ½	60 (60)	0.099 (2.51)	460 (2050)
12 ½	125 (125)	0.099 (2.51)	960 (4280)
12 ½	175 (175)	0.099 (2.51)	1345 (5990)
14	125 (125)	0.080 (2.03)	630 (2800)
14 ½	60 (60)	0.076 (1.93)	270 (1210)
14 ½	125 (125)	0.076 (1.93)	565 (2520)

An example of a breaking strength in line wires would be size # 9. This wire has a nominal diameter of 0.148 inches, a tensile strength of 60 ksi and a minimum breaking strength of 1030 lbf.

Test at least four specimens, with one specimen from the top or bottom line wires, and the other three specimens from the intermediate line wires. There is no breaking test for the stay wires.

The specified height of the fence fabric is based on the sum of the line wire spacings shown in the following figure.



Inspection shall be done at the project site. Random samples shall be obtained from material delivered to the project site or at other locations designated by the Laboratory.

The purchaser shall be furnished written certification that the woven steel wire was manufactured, sampled, tested, and inspected in accordance with A 116 and has been found to meet the requirements. The purchase order is required to report test results for the material.

Coating Thickness

The steel wire is to be coated by either Type A, Z, or ZA coating material.

The steel wire is to be coated before fabrication, to the coating class specified in the order and meeting the following requirements.

Minimum Weight of Metallic Coating

Size, Steel Wire Gage	Diameter in. (mm)	Minimum Weight of Coating, oz/ft ² (g/m ²)					
		Type A Grade 60	Type Z Class 1 Grade 60	Type Z Class 3 Grades 60, 125, and 175	Type ZA Class 20 Grade 60	Type ZA Class 40 Grades 60, 125, and 175	TYPE ZA Class 80 Grades 60, 125, and 175
No. 9	0.148 (3.76)	0.40 (122)	0.35 (107)	0.90 (275)	0.20 (61)	0.40 (122)	0.80 (244)
No. 10	0.135 (3.43)	0.35 (107)	0.30 (92)	0.85 (259)	0.20 (61)	0.40 (122)	0.80 (244)
No. 10 ½	0.128 (3.25)			0.85 (259)		0.40 (122)	0.80 (244)
No. 11	0.120 (3.05)	0.35 (107)	0.30 (92)	0.85 (259)	0.20 (61)	0.40 (122)	0.80 (244)
No. 12 ½	0.099 (2.51)	0.32 (98)	0.28 (85)	0.80 (244)	0.20 (61)	0.40 (122)	0.80 (244)
No. 14	0.080 (2.03)			0.70 (214)		0.40 (122)	0.80 (244)
No. 14 ½	0.076 (1.93)	0.30 (92)	0.25 (76)	0.70 (214)	0.20 (61)	0.40 (122)	0.80 (244)

Here is an example of the minimum weight of metallic coating for a size # 9 woven wire. The diameter of the wire is 0.148 inches and the minimum weight for a Type A wire is 0.40 oz/ft². For Type Z wire there are two different classes, Class 1 and Class 3. The minimum weight for Class 1 is 0.35 oz/ft² and the minimum weight for Class 3 is 0.90 oz/ft². For Type ZA wire there are three different classes, Class 20, Class 40 and Class 80. The minimum weight for Class 20 is 0.20 oz/ft², for Class 40 the minimum weight is 0.40 oz/ft² and for Class 80 the minimum weight is 0.80 oz/ft².

Sample Certification

Gentlemen,

This letter is to Certify the 1047/6, 9/9 Gage, Class III Field Fence shipped on:

Customer Order Number: 1206

Bill of Lading Number : N/A

was melted and manufactured in the U.S.A. in accordance with ASTM A116 and Class III and has the following physical properties:

1047/6, 9/9 Gage Class III Field Fence	9 Gage Edge & Line Wire	9 Gage Stay Wire
Tensile	60 - 75 KPSI	60 - 75 KPSI
Zinc Weight	.90 oz/sq ft. Min.	.90 oz/sq ft. Min.
Diameter	.148" +/- .005"	.148" +/- .005"

This sample certification for woven wire is not correct and here are some of the reasons. The manufacturer didn't specify which diameter they used to figure out the breaking strength of the wires. For woven wire they have the diameter as $0.148" \pm .005"$, does that mean 0.143", 0.148" or 0.153". The diameter of the wire will make a difference on how much the breaking strength will be on the wire. The calculations of the breaking strength for the 0.143" diameter would be 963 lbf, for the 0.148" diameter the breaking strength would be 1,032 lbf and for the 0.153" diameter the breaking strength would be 1,103 lbf. As you can see, if they would have use the 0.143" diameter they would have failed the test because the minimum breaking strength for a size 9 woven wire is 1,030 lbf. The wires 0.148" and 0.153" would have been okay because their breaking strength had pass the minimum possible. They should have specific the tensile strength because 60,000 PSI and 75,000 PSI will make a big difference in the calculations of the breaking strength. This certification should have specified the breaking strength of the wire they tested.