

Wireway Selection (Reference NFPA 70, National Electrical Code)

Definition

Wireways are troughs with hinged or removable covers for housing and protecting electric wires and cable. Conductors are laid into the wireway after the wireway has been installed as a complete system.

Uses

The use of wireways are permitted as follows:

1. For exposed work in dry locations. For outdoor or wet locations, use Type 3R wireway.
2. If installed in inaccessible spaces, the use of wireway is permitted only for use with audio signal conductors (per NEC^{®†} 376.10).
3. In hazardous locations as permitted by NEC^{®†} sections 501, 502 and 504.
4. For extensions through walls, if the length passing through the wall is unbroken and access to conductors can be maintained from both sides.

The use of wireways is not permitted where a risk of severe physical damage or corrosive vapor is present.

Size of Conductors

Table I shows maximum allowable cable sizes for varying wireway sizes. (Based on UL 870 Table 7.1)

Table I

Wireway Size Inches	Maximum Cable Size AWG or kcmil
3x3	1
4x4	4/0
4x6	4/0
6x6	500
12x6	500
8x8	900
10x10	1250
12x12	2000

Conductors entering the wireway only at the ends of runs are limited in size only by the 20 percent fill requirement of the NEC[®]. However, it is recommended that wire sizes not exceed those in Table I above.

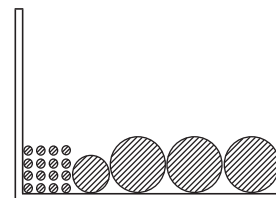
Number of Conductors

Wireways which contain no more than 30 current-carrying conductors at any cross section, and for which the sum of the cross-sectional areas of all contained conductors at any cross section does not exceed 20% of the interior cross-sectional area of the wireway, require no derating of cables. (Refer to Table II below)

Table II

Wireway Size Inches	Allowable Cable Area sq. in.
2.5x2.5	1.2
3x3	1.8
4x4	3.2
4x6	4.8
6x6	7.2
8x8	12.8
12x6	14.4
10x10	20.0
12x12	28.8

Cross sectional area of conductors
≤ 20% of cross sectional
area of wireway.



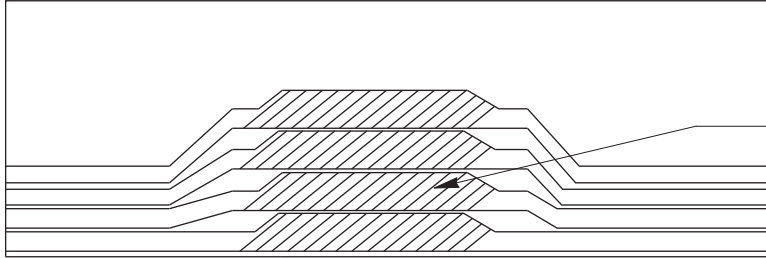
For exceptions allowing more conductors, see NEC[®] 362-5.

† Marks are the property of their respective owners.

Wireway Selection

Splices and Taps

Splices and taps are permitted within a wireway, provided they are accessible. The conductors, including splices and taps, shall not fill the wireway to more than 75 percent of its area at the point of a splice or tap.



Cross sectional area of splices and taps is less than 75% of wireway's cross sectional area

Cross Sectional Area of Conductors

Single Conductor Cable 600V

SIZE	Cross Sectional Area of Conductors (sq. in.)							
	XXHW, XXHW-2, XHH		THHN, THWN THWN-2		THW, THW-2, THHW		RHH*, RHW* RHW-2*	
AWG- kcmil	Diameter in.	Area in. ²	Diameter in.	Area in. ²	Diameter in.	Area in. ²	Diameter in.	Area in. ²
14	0.1330	1.0139	0.1110	0.0097	0.1630	0.0209	0.1930	0.0293
12	0.1520	1.0181	0.1300	0.0133	0.1820	0.0260	0.2120	0.0353
10	0.1760	0.0243	0.1640	0.0211	0.2060	0.0333	0.2360	0.0437
8	0.2360	0.0437	0.2160	0.0366	0.2660	0.0556	0.3260	0.0835
6	0.2740	0.0590	0.2540	0.0507	0.3040	0.0726	0.3640	0.1041
4	0.3220	0.0814	0.3240	0.0824	0.3520	0.0973	0.4120	0.1333
3	0.3500	0.0962	0.3520	0.0973	0.3800	0.1134	0.4400	0.1521
2	0.3820	0.1146	0.3840	0.1158	0.4120	0.1333	0.4720	0.1750
1	0.4420	0.1534	0.4460	0.1562	0.4920	0.1901	0.5850	0.2688
1/0	0.4820	0.1825	0.4860	0.1855	0.5320	0.2223	0.6220	0.3039
2/0	0.5280	0.2190	0.5320	0.2223	0.5780	0.2624	0.6680	0.3505
3/0	0.5800	0.2642	0.5840	0.2679	0.6300	0.3117	0.7200	0.4072
4/0	0.6380	0.3197	0.6420	0.3237	0.6880	0.3718	0.7780	0.4754
250	0.7050	0.3904	0.7110	0.3970	0.7650	0.4596	0.8950	0.6291
300	0.7600	0.4536	0.7660	0.4608	0.8200	0.5281	0.9500	0.7088
350	0.8110	0.5166	0.8170	0.5242	0.8710	0.5958	1.0010	0.7870
400	0.8580	0.5782	0.8640	0.5863	0.9180	0.6619	1.0480	0.8626
500	0.9430	0.6984	0.9490	0.7073	1.0030	0.7901	1.1330	1.0082
600	1.0530	0.8790	1.0510	0.8676	1.1130	0.9729	1.2430	1.2135
700	1.1240	0.9923	1.1220	0.9887	1.1840	1.1010	1.3140	1.3561
750	1.1580	1.0532	1.1560	1.0496	1.2180	1.1652	1.3480	1.4272
800	1.1900	1.1122	1.1880	1.1085	1.2500	1.2272	1.3800	1.4957
900	1.2540	1.2351	1.2520	1.2311	1.3140	1.3561	1.4440	1.6377
1000	1.3120	1.3519	1.3100	1.3478	1.3720	1.4784	1.5020	1.7719
1250	1.4790	1.7180	-	-	1.5390	1.8602	1.7290	2.3479
1500	1.6020	2.0156	-	-	1.6620	2.1695	1.8520	2.6938
1750	1.7160	2.3127	-	-	1.7760	2.4773	1.9660	3.0357
2000	1.8220	2.6073	-	-	1.8820	2.7818	2.0720	3.3719

* RHH, RHW and RHW-2 without covering have the same dimension as THW.

Wireway Selection

Sample Calculation

A. Wireway dimensions are obtained as follows:

1. List cables by size and types.
2. List cable cross sectional areas.
3. List the number of each size of cable.
4. Multiply cable cross sectional areas by number of each cable.
5. Sum the total cross sectional areas of each cable type to obtain the total cross sectional areas for the conductors.

List Cable Sizes and Types	List Cable Cross Sectional Areas (A) sq. in.		List Number of Cables (N)		Multiply (A) x (N) = Total Cross Sectional Area for Each Size sq. in.
2 AWG-XXHW	0.1182	x	4	=	0.4728
2/0-TW	0.2290	x	2	=	0.4580
750 kcmil-RHH	1.1300	x	2	=	2.2600
Sum of the total cross sectional areas =					3.1908

6. The wireway must first meet the dimensional requirements for the largest conductor. In the example above, the largest conductor is 750 kcmil. The minimum wireway cross section based on the largest conductor size requirements is 8" x 8", as shown in Table I on page 466.
7. The wireway dimensions must meet 20% fill requirements. Based on the sum of the total conductor cross sectional areas (3.19 sq. in.), the minimum wireway cross section, based on the 20% fill requirements is 4" x 4" as shown in Table II on page 466.
8. In this example, the wireway dimensions must be the larger of the two cross sections obtained in steps 6 and 7. In this case, 8" x 8" wireway is required.