

Wire-to-Wire Splicing

SolderSleeve wire splices



Applications

In-line wire splices.

Features and benefits

- Transparent polyvinylidene fluoride or polyolefin sleeve provides encapsulation, inspectability, strain relief, and insulation.
- Prefluxed solder preform provides a controlled soldering process.
- One-piece design makes installation easy and lowers the installed cost.
- With one or two wires per end, the NAS 1744 splices meet 75,000-ft (22,000-m) altitude immersion requirement.
- Thermochromic temperature indicator in the NAS splices facilitates termination and inspection.
- UL and CUL recognized



Available in:

Americas

Europe

Asia Pacific



<i>Fax-on-demand</i>	<i>Fax ID</i>	<i>Description</i>
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Product options

Product series	Minimum wire temperature rating	Maximum operating temperature	Intended application environment
CWT	85°C	125°C	Splashproof
D-110	125°C	150°C	Splashproof
D-1744 (NAS 1744)	125°C	150°C	Immersion sealed

Product selection process

From the Product Options table above, select the product series appropriate for your application based on the temperature rating and sealing performance required.

If the application has only one size of wire per side and no more than two wires on either side:

- Determine wire gauge sizes for both sides of splice.
- Determine number of wires (one or two wires) for each side of splice.
- Select part numbers from the appropriate table:
 - For CWT series (low temperature):
Use Table A on page 8-6.
 - For D-110 series (splashproof):
Use Table B on page 8-7.
 - For D-1744 series (immersion sealed):
Use Table C on page 8-9.

If the application has more than one size of wire per side or more than two wires on either side (or if you prefer to work with CMA or mm² sizes):

- Turn to "CMA/mm² Calculation" on page 8-10 and use the workspace there to calculate the total cross section to be spliced.
- Use Table E on page 8-11 to select the sleeve recommended for that cross section.

Notes

- While all combinations listed will provide satisfactory solder joints, the degree of strain relief obtained depends on the outer diameter of the wires being joined. Refer to Table E for the recommended size ranges for the sleeves.
- Wires 16 AWG (1.21 mm²) and larger, and wires having more than 19 strands, should be pretinned prior to splicing, to obtain the optimum solder joint quality.
- Part selection for wires 26 AWG (0.15 mm²) and smaller is covered at the end of Table B on page 8-8.

Users should independently evaluate the suitability of the product for their application. Before ordering check with factory for most current data.

8-5 Electrical Interconnect Products

Wire-to-Wire Splicing

Solder Sleeve wire splices (cont'd.)

Table A. CWT Series selection

Side A:	Side B: Size and number of conductors									
Size and number of conductors	26 AWG		24 AWG		22 AWG		20 AWG			
	1	2	1	2	1	2	1	2		
26 AWG	1	CWT-9001	CWT-9001	CWT-9001	CWT-9001	CWT-9001	CWT-9002	CWT-9002	CWT-9002	
	2	CWT-9001	CWT-9001	CWT-9001	CWT-9002	CWT-9001	CWT-9002	CWT-9002	CWT-9002	
24 AWG	1	CWT-9001	CWT-9001	CWT-9001	CWT-9001	CWT-9001	CWT-9002	CWT-9002	CWT-9002	
	2	CWT-9001	CWT-9002	CWT-9001	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	
22 AWG	1	CWT-9001	CWT-9001	CWT-9001	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	
	2	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	
20 AWG	1	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	
	2	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9003	CWT-9003	CWT-9003	
18 AWG	1	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	
	2	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	
16 AWG	1	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9002	CWT-9003	CWT-9003	CWT-9003	
	2	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	
14 AWG	1	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	
	2	CWT-9004	CWT-9004	CWT-9004	CWT-9004	CWT-9004	CWT-9004	CWT-9004	CWT-9004	
12 AWG	1	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	
	2	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	
10 AWG	1	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	
		18 AWG		16 AWG		14 AWG		12 AWG		10 AWG
		1	2	1	2	1	2	1	2	1
26 AWG	1	CWT-9002	CWT-9003	CWT-9002	CWT-9003	CWT-9003	CWT-9004	CWT-9003	CWT-9005	CWT-9005
	2	CWT-9002	CWT-9003	CWT-9002	CWT-9003	CWT-9003	CWT-9004	CWT-9003	CWT-9005	CWT-9005
24 AWG	1	CWT-9002	CWT-9003	CWT-9002	CWT-9003	CWT-9003	CWT-9004	CWT-9003	CWT-9005	CWT-9005
	2	CWT-9002	CWT-9003	CWT-9002	CWT-9003	CWT-9003	CWT-9004	CWT-9003	CWT-9005	CWT-9005
22 AWG	1	CWT-9002	CWT-9003	CWT-9002	CWT-9003	CWT-9003	CWT-9004	CWT-9003	CWT-9005	CWT-9005
	2	CWT-9002	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9004	CWT-9003	CWT-9005	CWT-9005
20 AWG	1	CWT-9002	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9004	CWT-9003	CWT-9005	CWT-9005
	2	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9004	CWT-9004	CWT-9005	CWT-9005
18 AWG	1	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9004	CWT-9004	CWT-9005	CWT-9005
	2	CWT-9003	CWT-9003	CWT-9003	CWT-9004	CWT-9003	CWT-9004	CWT-9004	CWT-9005	CWT-9005
16 AWG	1	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9003	CWT-9004	CWT-9004	CWT-9005	CWT-9005
	2	CWT-9003	CWT-9004	CWT-9003	CWT-9004	CWT-9004	CWT-9005	CWT-9004	CWT-9005	CWT-9005
14 AWG	1	CWT-9003	CWT-9003	CWT-9003	CWT-9004	CWT-9003	CWT-9004	CWT-9004	CWT-9005	CWT-9005
	2	CWT-9004	CWT-9004	CWT-9004	CWT-9005	CWT-9004	CWT-9005	CWT-9005	CWT-9005	CWT-9005
12 AWG	1	CWT-9004	CWT-9004	CWT-9004	CWT-9004	CWT-9004	CWT-9005	CWT-9004	CWT-9005	CWT-9005
	2	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005
10 AWG	1	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005	CWT-9005

Wire-to-Wire Splicing

SolderSleeve wire splices (cont'd.)

Table B. (cont'd.) For fine wire splices 26 AWG (0.15 mm²) and smaller (mm/in)

Part number	Inside diameter		Length***
	As supplied*	Fully recovered**	
D-110-0071	0.9 (0.035)	0.6 (0.025)	4.7 (0.185)
D-110-0213	0.9 (0.035)	0.6 (0.025)	4.2 (0.165)
D-110-0214	0.6 (0.025)	0.3 (0.013)	6.3 (0.250)
D-110-0217	1.0 (0.040)	0.6 (0.025)	9.1 (0.360)
D-110-40	0.6 (0.025)	0.5 (0.021)	5.1 (0.200)

Note: Micro SolderSleeve terminations are used for splicing wires smaller than 26 AWG (0.15 mm²).

*Minimum. Wire insulation must be smaller than this.

**Maximum. Wire insulation and combined conductor diameters must be greater than this.

***Nominal. Wire strip length must be approximately one-half of this.

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Description
 Data sheet
 (D-110+D-1744)
 Data sheet (CWT)

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Table C. D-1744 Series selection

Side A:	Side B: Size and number of conductors								
Size and number of conductors	26 AWG		24 AWG		22 AWG		20 AWG		
	1	2	1	2	1	2	1	2	
26 AWG	1	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-02
	2	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-02	D-1744-01	D-1744-02
24 AWG	1	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-02
	2	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-02	D-1744-02	D-1744-02
22 AWG	1	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-01	D-1744-02	D-1744-01	D-1744-02
	2	D-1744-01	D-1744-02	D-1744-01	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-02
20 AWG	1	D-1744-01	D-1744-01	D-1744-01	D-1744-02	D-1744-01	D-1744-02	D-1744-02	D-1744-02
	2	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-03
18 AWG	1	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-03
	2	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03
16 AWG	1	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-02	D-1744-03
	2	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03
14 AWG	1	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03
	2	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04
12 AWG	1	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04	D-1744-04
	2	D-1744-04	D-1744-04	D-1744-04	D-1744-04	D-1744-04	D-1744-04	D-1744-04	D-1744-04
		18 AWG		16 AWG		14 AWG		12 AWG	
		1	2	1	2	1	2	1	2
26 AWG	1	D-1744-02	D-1744-03	D-1744-02	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04
	2	D-1744-02	D-1744-03	D-1744-02	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04
24 AWG	1	D-1744-02	D-1744-03	D-1744-02	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04
	2	D-1744-02	D-1744-03	D-1744-02	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04
22 AWG	1	D-1744-02	D-1744-03	D-1744-02	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04
	2	D-1744-02	D-1744-03	D-1744-02	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04
20 AWG	1	D-1744-02	D-1744-03	D-1744-02	D-1744-03	D-1744-03	D-1744-03	D-1744-04	D-1744-04
	2	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04	D-1744-04	D-1744-04
18 AWG	1	D-1744-02	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03
	2	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04	D-1744-04	D-1744-03
16 AWG	1	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04	D-1744-03	D-1744-03
	2	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04	D-1744-04	D-1744-03
14 AWG	1	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-03	D-1744-04	D-1744-03	D-1744-03
	2	D-1744-03	D-1744-04	D-1744-04	D-1744-04	D-1744-04	D-1744-04	D-1744-04	D-1744-03
12 AWG	1	D-1744-03	D-1744-03	D-1744-03	D-1744-04	D-1744-03		D-1744-04	D-1744-04
	2								

Users should independently evaluate the suitability of the product for their application.
 Before ordering check with factory for most current data.

Wire-to-Wire Splicing

SolderSleeve wire splices (cont'd.)

CMA/mm² Calculation

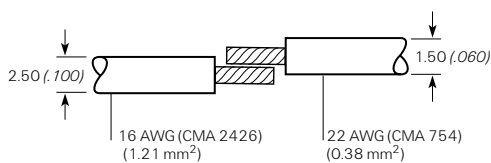
To calculate the total circular mil or mm² area of the conductors to be terminated in a single splice, follow these steps:

1. Choose either CMA or mm² as your unit of measure for selection purposes and continue to use it for all your selection criteria.
2. In the workspace below, list the CMA or mm² for each conductor that will go into the same splice. (To assist you, Table D on this page provides the CMA of typical conductors.)
3. Add together the values listed in the workspace below to obtain the total area.
4. From Table E on the next page, select the part number recommended for the total CMA or mm² you have calculated.
5. Refer to the examples on this page for further clarification.

Wire number	CMA	mm ²	
1	_____	_____	
2	_____	_____	
3	_____	_____	
4	_____	_____	
5	_____	_____	
Total	_____	_____	Part number: _____

CMA/mm² Examples (mm/in)

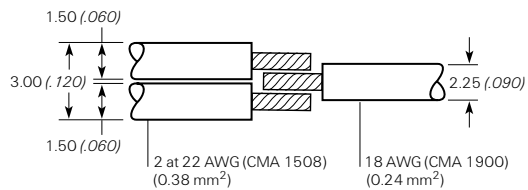
One-to-One Wire Splice



Total CMA = 3180
Total mm² = 1.59

Correct part number selection from Table E
(based on CMA/mm² and nominal jacket wire OD)
= CWT-9002 or D-110-41 or D-1744-02.

Multiwire Splice



Total CMA = 3408
Total mm² = 1.71

Correct part number selection from Table E
(based on CMA/mm² and nominal jacket wire OD)
= CWT-9003 or D-110-0181 or D-1744-03.

Table D. CMA of typical AWG conductors

AWG	28	26	24	22	20	18	16	14	12
CMA	177	304	475	754	1216	1900	2426	3831	5874
mm ²	0.09	0.15	0.24	0.38	0.61	0.95	1.21	1.92	2.94

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Description
 Data sheet
 (D-110+D-1744)
 Data sheet (CWT)

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Table E. Multiwire splice selection (mm/in)

Product series	Wire jacket OD		CMA		mm ²	
	min.	max.	min.	max.	min.	max.
CWT-9001/D-110-35/D-1744-01	.76 (0.03)	1.5 (0.06)	450	1500	0.2	.75
CWT-9002/D-110-41/D-1744-02	1.0 (0.04)	2.8 (0.11)	1250	4000	0.6	2.0
CWT-9003/D-110-0181/D-1744-03	2.0 (0.08)	4.4 (0.17)	3600	5000	1.8	2.5
CWT-9004/D-110-0101/D-1744-04	3.0 (0.12)	5.8 (0.22)	4800	9000	2.4	4.5
CWT-9005/D-110-0090/D-1744-04	4.0 (0.16)	7.0 (0.27)	8500	16200	4.2	8.1
CWT-9005/D-110-0083	4.0 (0.16)	8.6 (0.34)	16200	25000	8.1	12.5

Product characteristics

Material

Insulation (D-110, D-1744)	Radiation-crosslinked, heat-shrinkable polyvinylidene fluoride	
Insulation (CWT)	Radiation-crosslinked, heat-shrinkable polyolefin	
Solder and flux (D-110, D-1744)	Solder: Sn63 Pb37	Flux: ROL 1 per ANSI-J-004 (RMA flux)
Solder and flux (CWT)	Solder: Sn50 Pb32 Cd 18	Flux: ROM 1 per ASNS-J-004 (RA flux)
Melttable inserts (CWT, D-1744)	Melttable thermoplastic	

Typical performance

Voltage drop	2.0 mV
Tensile strength	Exceeds strength of conductor
Dielectric strength	2.0 kV
Temperature rating (CWT)	-55°C to +125°C
Temperature rating (D-110, D-1744)	-55°C to +150°C
Insulation resistance	1000 megohms

Specifications/approvals

Series	Agency	Raychem
CWT	UL E87681	D-5023
D-110	UL E87681	RT-1404
D-1744	NAS-1744	RT-1404

Installation Requirements

For proper installation of these devices the correct heating tool and reflector attachment must be used. Any one of the following Raychem heating tools is recommended:

- HL 1802E
- IR-1759 MiniRay
- AA-400 Super Heater
- CV-1981

Refer to Raychem installation procedure RPIP 850-00 for detailed instructions and recommended reflector attachments. You will find ordering information for these tools in the Application Equipment section (Section 10) of this catalog.

Users should independently evaluate the suitability of the product for their application. Before ordering check with factory for most current data.

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