

# catalog | Copper Cables

AIFOUR		Aluminum Shield
AsFOUR		Aluminum Steel Shield
CasFOUR		Copper Clad Shield
CoFOUR		Copper Shield



# catalog | **Copper Cables**

**AIFOUR** | **Aluminum Shield**



## Description

**Conductors:** Solid annealed copper in 19, 22, 24 and 26 AWG.

**Insulation:** Conductors are insulated with solid polyolefin, color coded in accordance with industry standards.

**Twisted Pairs:** Individual conductors are twisted into pairs with varying lay lengths to minimize crosstalk and specific color combinations to provide pair identification.

**Core Assembly:** Cables of 25 pairs or less are assembled into a cylindrical core. Cables larger than 25 pairs are assembled into units, which are then used to assemble the core. Units are individually identifiable by color coded unit binders.

**Core Wrap:** A non-hygroscopic, dielectric tape is applied over the core assembly to provide protection for the core.

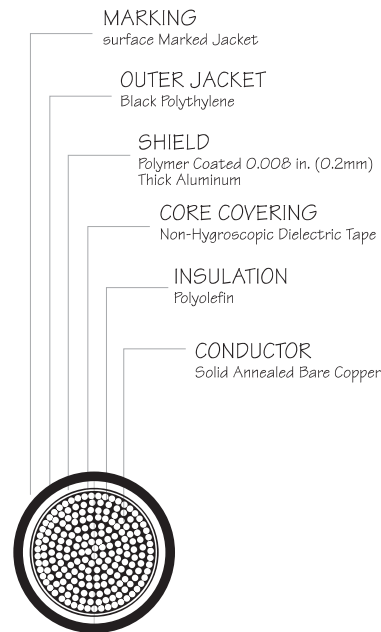
**Shielding:** A corrugated, copolymer coated, 8-mil aluminum tape is applied longitudinally with an overlap.

**Jacket:** A black, linear low-density polyethylene jacket is applied overall. The jacket provides a tough protective covering designed to withstand exposure to direct sunlight, atmospheric temperature changes and stresses expected in standard installations.

**Jacket Markings:** Information such as manufacturer's identification, pair count AWG, product identification and a telephone handset is printed at 2 ft. intervals on the cable jacket. Sequential footage markings are printed at alternate 2 ft. intervals.

**Optional Designs:** ALFOUR® cables are also available with an internal screen for use with carrier T1 systems.

## Cable cut-away



## Applications

4SProducts ALFOUR® cables are designed primarily for aerial use. In addition, they are also commonly used for buried applications. In an aerial application, the cable must be attached to a support strand (messenger). ALFOUR® cables, in 19, 22, 24 and 26 AWG, are capable of meeting the electrical requirements of 100 ohms, Category 3, Backbone UTP cables as specified in TIA/EIA-568-A.

## Qualifications & Approvals

Manufactured to meet requirements of ANSI/ICEA S-85-625-2002; formerly manufactured to R&A Specification PE-22 (PE-22 was deactivated by RUS and is superseded by ANSI/ICEA specifications).



Technical  
Data Sheet

Aluminum Shield | Single Jacket | AirCore

Pair Count 6 - 2400P

Outside Plant Copper Cable - Exchange Cable

Average mutual capacitance @ 1000 Hz											
Total No. of pairs		nF/mile		nF/km							
12 or Less		83 ± 7		52 ± 4							
Over 12		83 ± 4		52 ± 2							
Conductor Size		Minimum Insulation Resistance		Average Maximum Attenuation		Maximum Conductor Resistance		Resistance Unbalance		Dielectric Strength DC Potential Volts	
		68 °F (20 °C)		68 °F (20 °C) 772 kHz		68 °F (20 °C) (ohms)		Maximum		Minimum	
AWG	mm	Gigohm/mile	Gigohm/km	dB/kft	dB/km	mile	km	Avg %	Individual pair %	Cdr to Cdr	Cdr to Ground
19	0.90	1.0	1.6	3.3	10.9	45.0	28.0	1.5	5.0	5,000	10,000
22	0.64	1.0	1.6	4.6	15.3	91.0	56.5	1.5	5.0	4,000	10,000
24	0.50	1.0	1.6	5.7	19.4	144.0	89.5	1.5	5.0	3,000	10,000
26	0.40	1.0	1.6	7.2	23.6	232.0	144.2	1.5	5.0	2,400	10,000

Capacitance unbalance Pair-to-Pair				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	80	145	-	-
more than 12	80	145	25	45

Capacitance unbalance Pair-to-Ground				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	800	2625	-	-
more than 12	800	2625	175	574

Near End Crosstalk (NEXT)		150 kHz	772 kHz
P.S. WUNEXT mean (dB)		58	47
P.S. WUNEXT worst pair (dB)		53	42

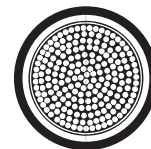
Far End Crosstalk (FEXT) @ 150 kHz				
Conductor size (AWG)	19	22	24	26
P.S. ELFEXT mean (dB)	65	63	63	61
P.S. ELFEXT worst pair (dB)	59	57	57	57

Far End Crosstalk (FEXT) @ 772 kHz				
Conductor size (AWG)	19	22	24	26
P.S. ELFEXT mean (dB)	51	49	49	47
P.S. ELFEXT worst pair (dB)	45	43	43	43



Specifications are subject to change without notice. The data given is subject to normal manufacturing tolerances. 4SProducts Copper Communication Cables are designed and tested in accordance with the requirements of ANSI/ICEA.



### Description

**Conductors:** Solid annealed copper in 19, 22, 24 and 26 AWG.

**Insulation:** Conductors are insulated with solid polyolefin, color coded in accordance with industry standards.

**Twisted Pairs:** Individual conductors are twisted into pairs with varying lay lengths to minimize crosstalk and specific color combinations to provide pair identification.

**Core Assembly:** Cables of 25 pairs or less are assembled into a cylindrical core. Cables larger than 25 pairs are assembled into units, which are then used to assemble the core. Units are individually identifiable by color coded unit binders.

**Core Wrap:** A non-hygroscopic, dielectric tape is applied over the core assembly to provide protection for the core.

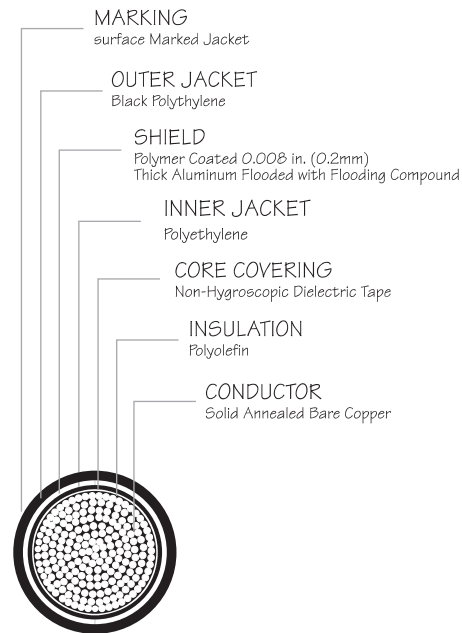
**Shielding:** A corrugated, copolymer coated, 8-mil aluminum tape is applied longitudinally with an overlap.

**Outer Jacket:** A black, linear low-density polyethylene jacket is applied overall. The jacket provides a tough protective covering designed to withstand exposure to direct sunlight, atmospheric temperature changes and stresses expected in standard installations.

**Inner Jacket:** A black polyethylene jacket.

**Jacket Markings:** Information, such as manufacturer's identification, pair count, AWG, product identification and a telephone handset is printed at 2 ft. intervals on the cable jacket. Sequential footage markings are printed at alternate 2 ft. intervals.

### Cable cut-away



### Applications

4SProducts ALFOUR®-2 cables are designed for direct burial or duct applications where protection from moisture is required. ALFOUR®-2 cables may be used aerially, but must be attached to a support strand (messenger). ALFOUR®-2 cables, in 19, 22, 24 and 26 AWG, are capable of meeting the electrical requirements of 100 ohms, Category 3, Backbone UTP Cables as specified in TIA/EIA-568-A.

### Qualifications & Approvals

Manufactured to meet requirements of ANSI/ICEA S-85-625-2002; formerly manufactured to RFA Specification PE-22 (PE-22 was deactivated by RUS and is superseded by ANSI/ICEA specifications).



## Technical Data Sheet

Aluminum Shield | Double Jacket | AirCore

Pair Count 6 - 2400P

Outside Plant Copper Cable - Exchange Cable

Average mutual capacitance @ 1000 Hz											
Total No. of pairs		nF/mile		nF/km							
12 or Less		83 ± 7		52 ± 4							
Over 12		83 ± 4		52 ± 2							
Conductor Size		Minimum Insulation Resistance		Average Maximum Attenuation		Maximum Conductor Resistance		Resistance Unbalance		Dielectric Strength DC Potential Volts	
		68 °F (20 °C)		68 °F (20 °C) 772 kHz		68 °F (20 °C) (ohms)		Maximum		Minimum	
AWG	mm	Gigohm/mile	Gigohm/km	dB/kft	dB/km	mile	km	Avg %	Individual pair %	Cdr to Cdr	Cdr to Ground
19	0.90	1.0	1.6	3.3	10.9	45.0	28.0	1.5	5.0	5,000	10,000
22	0.64	1.0	1.6	4.6	15.3	91.0	56.5	1.5	5.0	4,000	10,000
24	0.50	1.0	1.6	5.7	19.4	144.0	89.5	1.5	5.0	3,000	10,000
26	0.40	1.0	1.6	7.2	23.6	232.0	144.2	1.5	5.0	2,400	10,000

Capacitance unbalance Pair-to-Pair				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	80	145	-	-
more than 12	80	145	25	45

Capacitance unbalance Pair-to-Ground				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	800	2625	-	-
more than 12	800	2625	175	574

Near End Crosstalk (NEXT)		150 kHz	772 kHz
P.S. WUNEXT mean (dB)		58	47
P.S. WUNEXT worst pair (dB)		53	42

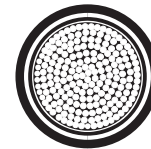
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P.S. ELFEXT mean (dB)	65	63	63	61
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Far End Crosstalk (FEXT) @ 772 kHz				
Conductor size (AWG)	19	22	24	26
P.S. ELFEXT mean (dB)	51	49	49	47
P.S. ELFEXT worst pair (dB)	45	43	43	43



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## Technical Data Sheet

Aluminum Shield | Single Jacket | Filled - Gel

Pair Count 6 - 1800P

Outside Plant Copper Cable - Exchange Cable

### Description

**Conductors:** Solid annealed copper in 19, 22, 24 and 26 AWG.

**Insulation:** Conductors are insulated with solid polyolefin, color coded in accordance with industry standards.

**Twisted Pairs:** Individual conductors are twisted into pairs with varying lay lengths to minimize crosstalk and specific color combinations to provide pair identification.

**Core Assembly:** Cables of 25 pairs or less are assembled into a cylindrical core. Cables larger than 25 pairs are assembled into units, which are then used to assemble the core. Units are individually identifiable by color coded unit binders.

**Filling Compound:** The core assembly is filled with an 80° C ETPR or PIB base jelly compound, completely filling the interstices between the pairs and under the core wrap.

**Core Wrap:** A non-hygroscopic, dielectric tape is applied over the core assembly to provide protection for the core.

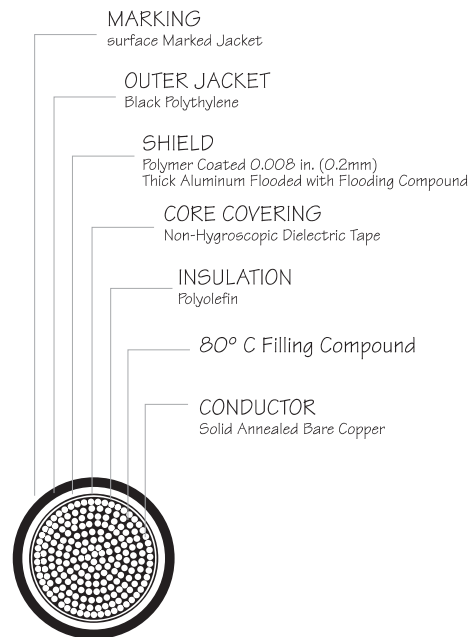
**Shielding:** A corrugated, copolymer coated, 8-mil aluminum tape is applied longitudinally with an overlap. The shield interfaces are flooded with an adhesive compound to provide a moisture barrier and inhibit corrosion.

**Jacket:** A black, linear low-density polyethylene jacket is applied overall. The jacket provides a tough protective covering designed to withstand exposure to direct sunlight, atmospheric temperature changes and stresses expected in standard installations.

**Jacket Markings:** Information, such as manufacturer's identification, pair count, AWG, product identification and a telephone handset is printed at 2 ft. intervals on the cable jacket. Sequential footage markings are printed at alternate 2 ft. intervals.

**Optional Designs:** ALFOUR®-F cables are also available with an internal screen for use with T-Carrier systems.

### Cable cut-away



### Applications

4SProducts ALFOUR®-F cables are designed for direct burial or duct applications where protection from moisture is required. ALFOUR®-F cables may be used aerially, but must be attached to a support strand (messenger). ALFOUR®-F cables, in 19, 22, 24 and 26 AWG, are capable of meeting the electrical requirements of 100 ohms, Category 3, Backbone UTP Cables as specified in TIA/EIA-568-A.

### Qualifications & Approvals

Manufactured to meet requirements of ANSI/ICEA S-84-608-2002, RUS 7 CFR 1755.390 (P&39).



## Technical Data Sheet

Aluminum Shield | Single Jacket | Filled - Gel

Pair Count 6 - 1800P

Outside Plant Copper Cable - Exchange Cable

Average mutual capacitance @ 1000 Hz											
Total No. of pairs		nF/mile		nF/km							
12 or Less		83 ± 7		52 ± 4							
Over 12		83 ± 4		52 ± 2							
Conductor Size		Minimum Insulation Resistance		Average Maximum Attenuation		Maximum Conductor Resistance		Resistance Unbalance		Dielectric Strength DC Potential Volts	
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26	0.40	1.0	1.6	6.4	21.0	232.0	144.0	1.5	5.0	2,800	15,000

Capacitance unbalance Pair-to-Pair				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	80	145	-	-
more than 12	80	145	25	45

Capacitance unbalance Pair-to-Ground				
Pairs	Maximum individual		Maximum RMS	
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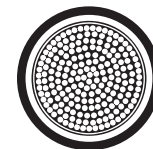
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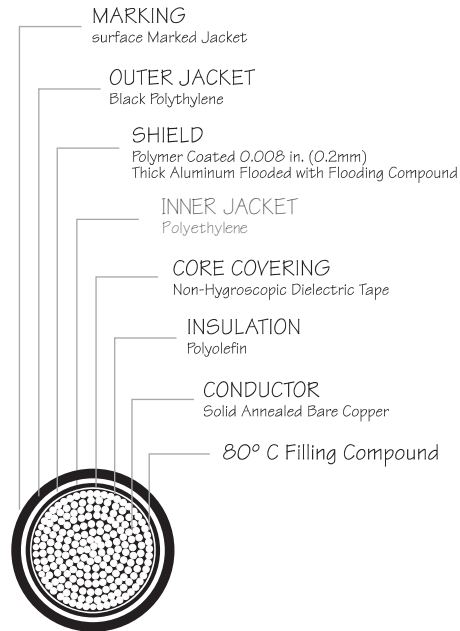
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**Outer Jacket:** A black, linear low-density polyethylene jacket is applied overall. The jacket provides a tough protective covering designed to withstand exposure to direct sunlight, atmospheric temperature changes and stresses expected in standard installations.

**Inner Jacket:** A black polyethylene jacket.

**Jacket Markings:** Information, such as manufacturer's identification, pair count, AWG, product identification and a telephone handset is printed at 2 ft. intervals on the cable jacket. Sequential footage markings are printed at alternate 2 ft. intervals.

## Cable cut-away



## Applications

4SProducts ALFOUR®-2f cables are designed for direct burial or duct applications where protection from moisture is required. ALFOUR®-2f cables may be used aerially, but must be attached to a support strand (messenger). ALFOUR®-2f cables, in 19, 22, 24 and 26 AWG, are capable of meeting the electrical requirements of 100 ohms, Category 3, Backbone UTP Cables as specified in TIA/EIA-568-A.

## Qualifications & Approvals

Manufactured to meet requirements of ANSI/ICEA S-84-608-2002, IEC 60332-1, IEC 60332-3, IEC 60332-5, IEC 60332-6, IEC 60332-7, IEC 60332-8, IEC 60332-9, IEC 60332-10, IEC 60332-11, IEC 60332-12, IEC 60332-13, IEC 60332-14, IEC 60332-15, IEC 60332-16, IEC 60332-17, IEC 60332-18, IEC 60332-19, IEC 60332-20, IEC 60332-21, IEC 60332-22, IEC 60332-23, IEC 60332-24, IEC 60332-25, IEC 60332-26, IEC 60332-27, IEC 60332-28, IEC 60332-29, IEC 60332-30, IEC 60332-31, IEC 60332-32, IEC 60332-33, IEC 60332-34, IEC 60332-35, IEC 60332-36, IEC 60332-37, IEC 60332-38, IEC 60332-39, IEC 60332-40, IEC 60332-41, IEC 60332-42, IEC 60332-43, IEC 60332-44, IEC 60332-45, IEC 60332-46, IEC 60332-47, IEC 60332-48, IEC 60332-49, IEC 60332-50, IEC 60332-51, IEC 60332-52, IEC 60332-53, IEC 60332-54, IEC 60332-55, IEC 60332-56, IEC 60332-57, IEC 60332-58, IEC 60332-59, IEC 60332-60, IEC 60332-61, IEC 60332-62, IEC 60332-63, IEC 60332-64, IEC 60332-65, IEC 60332-66, IEC 60332-67, IEC 60332-68, IEC 60332-69, IEC 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## Technical Data Sheet

Aluminum Shield | Double Jacket | Filled - Gel

Pair Count 6 - 1800P

Outside Plant Copper Cable - Exchange Cable

Average mutual capacitance @ 1000 Hz											
Total No. of pairs		nF/mile		nF/km							
12 or Less		83 ± 7		52 ± 4							
Over 12		83 ± 4		52 ± 2							
Conductor Size		Minimum Insulation Resistance		Average Maximum Attenuation		Maximum Conductor Resistance		Resistance Unbalance		Dielectric Strength DC Potential Volts	
		68 °F (20 °C)		68 °F (20 °C) 772 kHz		68 °F (20 °C) (ohms)		Maximum		Minimum	
AWG	mm	Gigohm/mile	Gigohm/km	dB/kft	dB/km	mile	km	Avg %	Individual pair %	Cdr to Cdr	Cdr to Ground
19	0.90	1.0	1.6	2.8	9.2	45.0	28.0	1.5	5.0	7,000	15,000
22	0.64	1.0	1.6	4.0	13.1	91.0	56.5	1.5	5.0	5,000	15,000
24	0.50	1.0	1.6	5.0	16.4	144.0	89.5	1.5	5.0	4,000	15,000
26	0.40	1.0	1.6	6.4	21.0	232.0	144.0	1.5	5.0	2,800	15,000

Capacitance unbalance Pair-to-Pair				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	80	145	-	-
more than 12	80	145	25	45

Capacitance unbalance Pair-to-Ground				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	800	2625	-	-
more than 12	800	2625	175	574

Near End Crosstalk (NEXT)	150 kHz	772 kHz
P.S. WUNEXT mean (dB)	58	47
P.S. WUNEXT worst pair (dB)	53	42

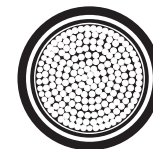
Far End Crosstalk (FEXT) @ 150 kHz				
Conductor size (AWG)	19	22	24	26
P.S. ELFEXT mean (dB)	65	63	63	61
P.S. ELFEXT worst pair (dB)	59	57	57	57

Far End Crosstalk (FEXT) @ 772 kHz				
Conductor size (AWG)	19	22	24	26
P.S. ELFEXT mean (dB)	51	49	49	47
P.S. ELFEXT worst pair (dB)	45	43	43	43



Specifications are subject to change without notice. The data given is subject to normal manufacturing tolerances. 4SProducts Copper Communication Cables are designed and tested in accordance with the requirements of ANSI/ICEA.



### Description

**Conductors:** Solid annealed copper in 19, 22, 24 and 26 AWG.

**Insulation:** Conductors are dual insulated with an inner layer of foamed, natural polyolefin covered by an outer layer of solid, colored polyolefin. The conductor insulation is color coded in accordance with industry standards.

**Twisted Pairs:** Individual conductors are twisted into pairs with varying lay lengths to minimize crosstalk and specific color combinations to provide pair identification.

**Core Assembly:** Cables of 25 pairs or less are assembled into a cylindrical core. Cables larger than 25 pairs are assembled into units, which are then used to assemble the core. Units are individually identifiable by color coded unit binders.

**Filling Compound:** The core assembly is filled with an 80° C ETPR or PIB base jelly compound, completely filling the interstices between the pairs and under the core wrap.

**Core Wrap:** A non-hygroscopic, dielectric tape is applied over the core assembly to provide protection for the core.

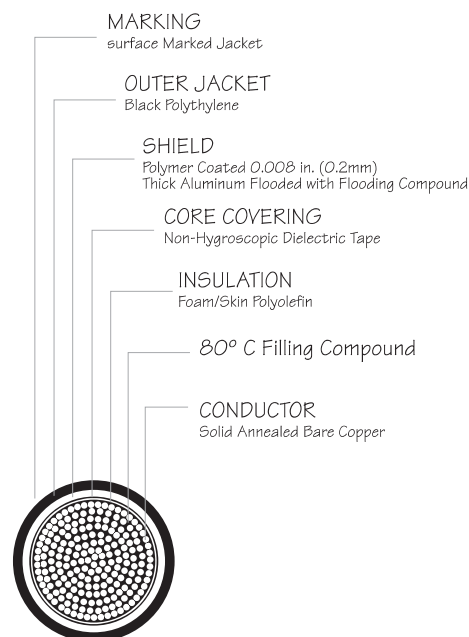
**Shielding:** A corrugated, copolymer coated, 8-mil aluminum tape is applied longitudinally with an overlap. The shield interfaces are flooded with an adhesive compound to provide a moisture barrier and inhibit corrosion.

**Jacket:** A black, linear low-density polyethylene jacket is applied overall. The jacket provides a tough protective covering designed to withstand exposure to direct sunlight, atmospheric temperature changes and stresses expected in standard installations.

**Jacket Markings:** Information such as manufacturer's identification, pair count, AWG, product identification and a telephone handset is printed at 2 ft. intervals on the cable jacket. Sequential footage markings are printed at alternate 2 ft. intervals.

**Optional Designs:** ALFOUR®-FS cables are also available with an internal screen for use with T-Carrier systems. ALFOUR®-FS cables are also available with

### Cable cut-away



### Applications

4SProducts ALFOUR®-FS cables are designed for direct burial or duct applications where protection from moisture is required. ALFOUR®-FS cables may be used aerially, but must be attached to a support strand (messenger). ALFOUR®-FS cables, in 19, 22, 24 and 26 AWG, are capable of meeting the electrical requirements of 100 ohms, Category 3, Backbone UTP Cables as specified in TIA/EIA-568-A.

### Qualifications & Approvals

Manufactured to meet requirements of ANSI/ICEA S-84-608-2002, RUS 7 CFR 1755.890 (PE-89).



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## Technical Data Sheet

Aluminum Shield | Single Jacket | Filled - Foam Skin

Pair Count 6 - 2400P

Outside Plant Copper Cable - Exchange Cable

Average mutual capacitance @ 1000 Hz											
Total No. of pairs		nF/mile		nF/km							
12 or Less		83 ± 7		52 ± 4							
Over 12		83 ± 4		52 ± 2							
Conductor Size		Minimum Insulation Resistance		Average Maximum Attenuation		Maximum Conductor Resistance		Resistance Unbalance		Dielectric Strength DC Potential Volts	
		68 °F (20 °C)		68 °F (20 °C) 772 kHz		68 °F (20 °C) (ohms)		Maximum		Minimum	
AWG	mm	Gigohm/mile	Gigohm/km	dB/kft	dB/km	mile	km	Avg %	Individual pair %	Cdr to Cdr	Cdr to Ground
19	0.90	1.0	1.6	3.2	10.5	45.0	28.0	1.5	5.0	4,500	10,000
22	0.64	1.0	1.6	4.5	14.8	91.0	56.5	1.5	5.0	3,600	10,000
24	0.50	1.0	1.6	5.6	18.4	144.0	89.5	1.5	5.0	3,000	10,000
26	0.40	1.0	1.6	7.0	23.3	232.0	144.0	1.5	5.0	2,400	10,000

Capacitance unbalance Pair-to-Pair				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	80	145	-	-
more than 12	80	145	25	45

Capacitance unbalance Pair-to-Ground				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	800	2625	-	-
more than 12	800	2625	175	574

Near End Crosstalk (NEXT)		150 kHz	772 kHz
P.S. WUNEXT mean (dB)		58	47
P.S. WUNEXT worst pair (dB)		53	42

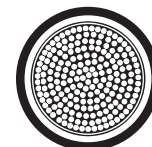
Far End Crosstalk (FEXT) @ 150 kHz				
Conductor size (AWG)	19	22	24	26
P.S. ELFEXT mean (dB)	65	63	63	61
P.S. ELFEXT worst pair (dB)	59	57	57	57

Far End Crosstalk (FEXT) @ 772 kHz				
Conductor size (AWG)	19	22	24	26
P.S. ELFEXT mean (dB)	51	49	49	47
P.S. ELFEXT worst pair (dB)	45	43	43	43



Specifications are subject to change without notice. The data given is subject to normal manufacturing tolerances. 4SProducts Copper Communication Cables are designed and tested in accordance with the requirements of ANSI/ICEA.



### Description

**Conductors:** Solid annealed copper in 19, 22, 24 and 26 AWG.

**Insulation:** Conductors are insulated with solid polyolefin, color coded in accordance with industry standards.

**Twisted Pairs:** Individual conductors are twisted into pairs with varying lay lengths to minimize crosstalk and specific color combinations to provide pair identification.

**Core Assembly:** Cables of 25 pairs or less are assembled into a cylindrical core. Cables larger than 25 pairs are assembled into units, which are then used to assemble the core. Units are individually identifiable by color coded unit binders.

**Core Wrap:** A non-hygroscopic, dielectric tape is applied over the core assembly to provide protection for the core.

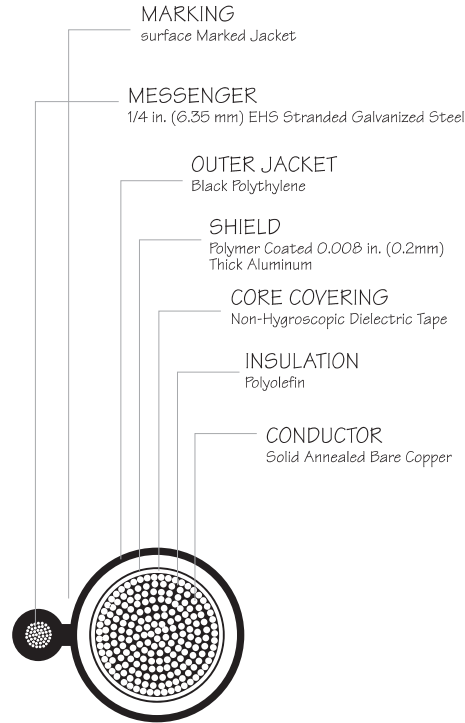
**Shielding:** A corrugated, copolymer coated, 8-mil aluminum tape is applied longitudinally with an overlap.

**Support Member:** A 1/4 inch, 7-strand Extra High Strength (EHS) galvanized steel messenger serves as the support member and is an integral part of the sheath. The messenger is flooded to inhibit corrosion.

**Jacket:** A black, linear low-density polyethylene jacket is applied overall. The jacket provides a tough protective covering designed to withstand exposure to direct sunlight, atmospheric temperature changes and stresses expected in standard installations.

**Jacket Markings:** Information such as manufacturer's identification, pair count AWG, product identification and a telephone handset is printed at 2 ft. intervals on the cable jacket. Sequential footage markings are printed at alternate 2 ft. intervals.

### Cable cut-away



### Applications

4SProducts ALFOUR®-8 cables are designed for aerial installations. The core and support member (messenger) lay parallel to each other forming a cross-sectional "Figure 8". The messenger is an integral part of the cable sheath, yet readily available for gripping, pulling and tensioning. Installation is fast and easy using standard methods and hardware. ALFOUR®-8 cables, in 19, 22, 24 and 26 AWG are capable of meeting the electrical requirements of 100 ohms, Category 3, Backbone UTP Cables as specified in TIA/EIA-568-A.

### Qualifications & Approvals

Manufactured to meet requirements of ANSI/ICEA S-85-625-1996; formerly manufactured to RFA Specification PE-38, PE-38 was deactivated by RUS (REA) in 1993 and is superseded by the ANSI/ICEA specifications.



## Technical Data Sheet

Aluminum Shield | Single Jacket | AirCore | Fig-8

Pair Count 6 - 2400P

Outside Plant Copper Cable - Exchange Cable

Average mutual capacitance @ 1000 Hz											
Total No. of pairs		nF/mile		nF/km							
12 or Less		83 ± 7		52 ± 4							
Over 12		83 ± 4		52 ± 2							
Conductor Size		Minimum Insulation Resistance		Average Maximum Attenuation		Maximum Conductor Resistance		Resistance Unbalance		Dielectric Strength DC Potential Volts	
		68 °F (20 °C)		68 °F (20 °C) 772 kHz		68 °F (20 °C) (ohms)		Maximum		Minimum	
AWG	mm	Gigohm/mile	Gigohm/km	dB/kft	dB/km	mile	km	Avg %	Individual pair %	Cdr to Cdr	Cdr to Ground
19	0.90	1.0	1.6	3.3	10.9	45.0	28.0	1.5	5.0	5,000	10,000
22	0.64	1.0	1.6	4.6	15.3	91.0	56.5	1.5	5.0	4,000	10,000
24	0.50	1.0	1.6	5.7	19.4	144.0	89.5	1.5	5.0	3,000	10,000
26	0.40	1.0	1.6	7.2	23.6	232.0	144.2	1.5	5.0	2,400	10,000

Capacitance unbalance Pair-to-Pair				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	80	145	-	-
more than 12	80	145	25	45

Capacitance unbalance Pair-to-Ground				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	800	2625	-	-
more than 12	800	2625	175	574

Near End Crosstalk (NEXT)		150 kHz	772 kHz
P.S. WUNEXT mean (dB)		58	47
P.S. WUNEXT worst pair (dB)		53	42

Far End Crosstalk (FEXT) @ 150 kHz				
Conductor size (AWG)	19	22	24	26
P.S. ELFEXT mean (dB)	65	63	63	61
P.S. ELFEXT worst pair (dB)	59	57	57	57

Far End Crosstalk (FEXT) @ 772 kHz				
Conductor size (AWG)	19	22	24	26
P.S. ELFEXT mean (dB)	51	49	49	47
P.S. ELFEXT worst pair (dB)	45	43	43	43



Specifications are subject to change without notice. The data given is subject to normal manufacturing tolerances. 4SProducts Copper Communication Cables are designed and tested in accordance with the requirements of ANSI/ICEA.



## Description

**Conductors:** Solid annealed copper in 19, 22, 24 and 26 AWG.

**Insulation:** Conductors are insulated with solid polyolefin, color coded in accordance with industry standards.

**Twisted Pairs:** Individual conductors are twisted into pairs with varying lay lengths to minimize crosstalk and specific color combinations to provide pair identification.

**Core Assembly:** Cables of 25 pairs or less are assembled into a cylindrical core. Cables larger than 25 pairs are assembled into units, which are then used to assemble the core. Units are individually identifiable by color coded unit binders.

**Core Wrap:** A non-hygroscopic, dielectric tape is applied over the core assembly to provide protection for the core.

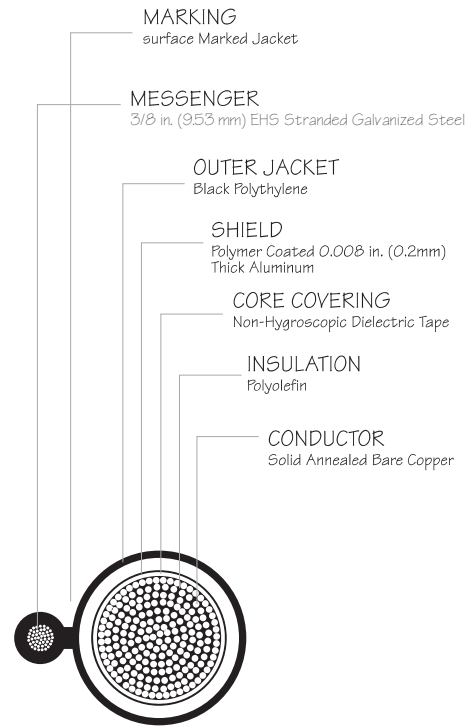
**Shielding:** A corrugated, copolymer coated, 8-mil aluminum tape is applied longitudinally with an overlap.

**Support Member:** A 3/8 inch, 7-strand Extra High Strength (EHS) galvanized steel messenger serves as the support member and is an integral part of the sheath. The messenger is flooded to inhibit corrosion.

**Jacket:** A black, linear low-density polyethylene jacket is applied overall. The jacket provides a tough protective covering designed to withstand exposure to direct sunlight, atmospheric temperature changes and stresses expected in standard installations.

**Jacket Markings:** Information such as manufacturer's identification, pair count AWG, product identification and a telephone handset is printed at 2 ft. intervals on the cable jacket. Sequential footage markings are printed at alternate 2 ft. intervals.

## Cable cut-away



## Applications

4SProducts ALFOUR®-83 cables are designed for aerial installations. The core and support member (messenger) lay parallel to each other forming a cross-sectional "Figure 8". The messenger is an integral part of the cable sheath, yet readily available for gripping, pulling and tensioning. Installation is fast and easy using standard methods and hardware. ALFOUR®-83 cables, in 19, 22, 24 and 26 AWG are capable of meeting the electrical requirements of 100 ohms, Category 3, Backbone UTP Cables as specified in TIA/EIA-568-A.

## Qualifications & Approvals

Manufactured to meet requirements of ANSI/ICEA S-85-625-1996; formerly manufactured to RFA Specification PE-38, PE-38 was deactivated by RUS (REA) in 1993 and is superseded by the ANSI/ICEA specifications.



## Technical Data Sheet

Aluminum Shield | Single Jacket | AirCore | Fig-8

Pair Count 6 - 2400P

Outside Plant Copper Cable - Exchange Cable

Average mutual capacitance @ 1000 Hz											
Total No. of pairs		nF/mile		nF/km							
12 or Less		83 ± 7		52 ± 4							
Over 12		83 ± 4		52 ± 2							
Conductor Size		Minimum Insulation Resistance		Average Maximum Attenuation		Maximum Conductor Resistance		Resistance Unbalance		Dielectric Strength DC Potential Volts	
		68 °F (20 °C)		68 °F (20 °C) 772 kHz		68 °F (20 °C) (ohms)		Maximum		Minimum	
AWG	mm	Gigohm/mile	Gigohm/km	dB/kft	dB/km	mile	km	Avg %	Individual pair %	Cdr to Cdr	Cdr to Ground
19	0.90	1.0	1.6	3.3	10.9	45.0	28.0	1.5	5.0	5,000	10,000
22	0.64	1.0	1.6	4.6	15.3	91.0	56.5	1.5	5.0	4,000	10,000
24	0.50	1.0	1.6	5.7	19.4	144.0	89.5	1.5	5.0	3,000	10,000
26	0.40	1.0	1.6	7.2	23.6	232.0	144.2	1.5	5.0	2,400	10,000

Capacitance unbalance Pair-to-Pair				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	80	145	-	-
more than 12	80	145	25	45

Capacitance unbalance Pair-to-Ground				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	800	2625	-	-
more than 12	800	2625	175	574

Near End Crosstalk (NEXT)		150 kHz	772 kHz
P.S. WUNEXT mean (dB)		58	47
P.S. WUNEXT worst pair (dB)		53	42

Far End Crosstalk (FEXT) @ 150 kHz				
Conductor size (AWG)	19	22	24	26
P.S. ELFEXT mean (dB)	65	63	63	61
P.S. ELFEXT worst pair (dB)	59	57	57	57

Far End Crosstalk (FEXT) @ 772 kHz				
Conductor size (AWG)	19	22	24	26
P.S. ELFEXT mean (dB)	51	49	49	47
P.S. ELFEXT worst pair (dB)	45	43	43	43



Specifications are subject to change without notice. The data given is subject to normal manufacturing tolerances. 4SProducts Copper Communication Cables are designed and tested in accordance with the requirements of ANSI/ICEA.





### Description

**Conductors:** Solid annealed bare copper in 22 and 24 AWG.

**Insulation:** Conductors are insulated. The conductor insulation is color-coded in accordance with industry standards.

**Twisted Pairs:** Individual conductors are twisted into pairs with varying lay lengths to minimize crosstalk and specific color combinations to provide pair identification.

**Core Assembly:** Cables of 25 pairs and less are assembled into a cylindrical core. Cables larger than 25 pairs are assembled into units, which are then used to assemble the core. Units are individually identifiable by color-coded binders.

**Filling Compound:** The core assembly is filled with an 80°C ETPR or PIB base jelly compound, completely filling the interstices between the pairs and under the core wrap.

**Core Wrap:** A non-hygroscopic, dielectric tape is applied over the core assembly to provide protection for the core.

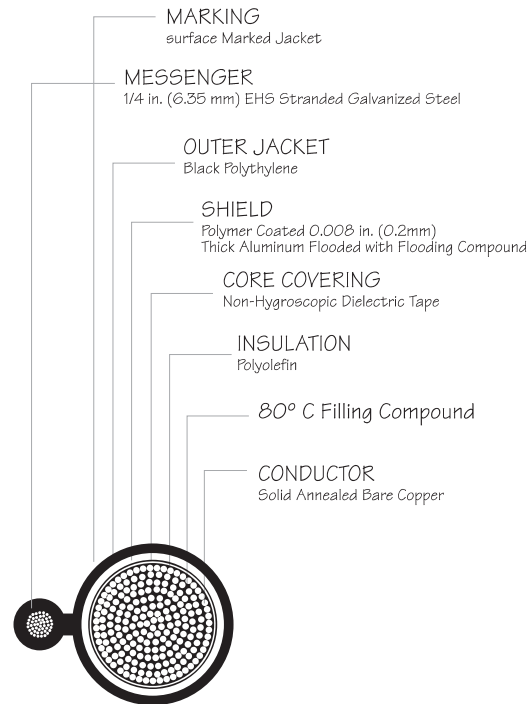
**Shielding:** A corrugated, copolymer coated, 8-mil aluminum tape is applied longitudinally with an overlap. The shield interfaces are flooded with an adhesive compound to provide a moisture barrier and inhibit corrosion.

**Support Member:** A 1/4 inch, 7-strand Extra High Strength (EHS) galvanized steel messenger serves as the support member and is an integral part of the sheath. The messenger is flooded to inhibit corrosion.

**Jacket:** A black, linear low-density polyethylene jacket is applied overall. The jacket provides a tough protective covering designed to withstand exposure to direct sunlight, atmospheric temperature changes and stresses expected in standard installations.

**Jacket Markings:** Information including the manufacturer's identification, pair count, AWG and product identification appears at 2-foot intervals. Sequential length markings appear at alternate 2-foot intervals.

### Cable cut-away



### Applications

4SProducts ALFOUR®-8f cables are designed for aerial applications where a filled cable design is preferred. The core and support member (messenger) lay parallel to each other forming a cross-sectional "Figure 8". The messenger is an integral part of the cable sheath, yet readily available for gripping, pulling and tensioning. Installation is fast and easy using standard methods and hardware.

### Qualifications & Approvals

ALFOUR-8f cables meet the physical and electrical requirements of RUS specification 7 CFR 1755.390 (PE-39) latest issue, except that the figure-8 sheath shall meet the requirements of ANSI/ICEA S-85-625-2002, Option A.



## Technical Data Sheet

Aluminum Shield | Single Jacket | Filled - Gel | Fig-8

Pair Count 6 - 200P

Outside Plant Copper Cable - Exchange Cable

Average mutual capacitance @ 1000 Hz											
Total No. of pairs		nF/mile		nF/km							
12 or Less		83 ± 7		52 ± 4							
Over 12		83 ± 4		52 ± 2							
Conductor Size		Minimum Insulation Resistance		Average Maximum Attenuation		Maximum Conductor Resistance		Resistance Unbalance		Dielectric Strength DC Potential Volts	
		68 °F (20 °C)		68 °F (20 °C) 772 kHz		68 °F (20 °C) (ohms)		Maximum		Minimum	
AWG	mm	Gigohm/mile	Gigohm/km	dB/kft	dB/km	mile	km	Avg %	Individual pair %	Cdr to Cdr	Cdr to Ground
22	0.64	1.0	1.6	4.0	13.1	91.0	56.5	1.5	5.0	5,000	15,000
24	0.50	1.0	1.6	5.0	16.4	144.0	89.5	1.5	5.0	4,000	15,000

Capacitance unbalance Pair-to-Pair				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	80	145	-	-
more than 12	80	145	25	45

Capacitance unbalance Pair-to-Ground				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	800	2625	-	-
more than 12	800	2625	175	574

Near End Crosstalk (NEXT)	150 kHz	772 kHz
P.S. WUNEXT mean (dB)	58	47
P.S. WUNEXT worst pair (dB)	53	42

Far End Crosstalk (FEXT) @ 150 kHz				
Conductor size (AWG)	22	24	-	-
P.S. ELFEXT mean (dB)	63	63	-	-
P.S. ELFEXT worst pair (dB)	57	57	-	-

Far End Crosstalk (FEXT) @ 772 kHz				
Conductor size (AWG)	22	24	-	-
P.S. ELFEXT mean (dB)	49	49	-	-
P.S. ELFEXT worst pair (dB)	43	43	-	-



Specifications are subject to change without notice. The data given is subject to normal manufacturing tolerances. 4SProducts Copper Communication Cables are designed and tested in accordance with the requirements of ANSI/ICEA.



### Description

**Conductors:** Solid annealed bare copper in 22 and 24 AWG.

**Insulation:** Conductors are dual insulated with an inner layer of foamed, natural polyolefin covered by an outer layer of solid, colored polyolefin. The conductor insulation is color-coded in accordance with industry standards.

**Twisted Pairs:** Individual conductors are twisted into pairs with varying lay lengths to minimize crosstalk and specific color combinations to provide pair identification.

**Core Assembly:** Cables of 25 pairs and less are assembled into a cylindrical core. Cables larger than 25 pairs are assembled into units, which are then used to assemble the core. Units are individually identifiable by color-coded binders.

**Filling Compound:** The core assembly is filled with an 80°C ETPR or PIB base jelly compound, completely filling the interstices between the pairs and under the core wrap.

**Core Wrap:** A non-hygroscopic, dielectric tape is applied over the core assembly to provide protection for the core.

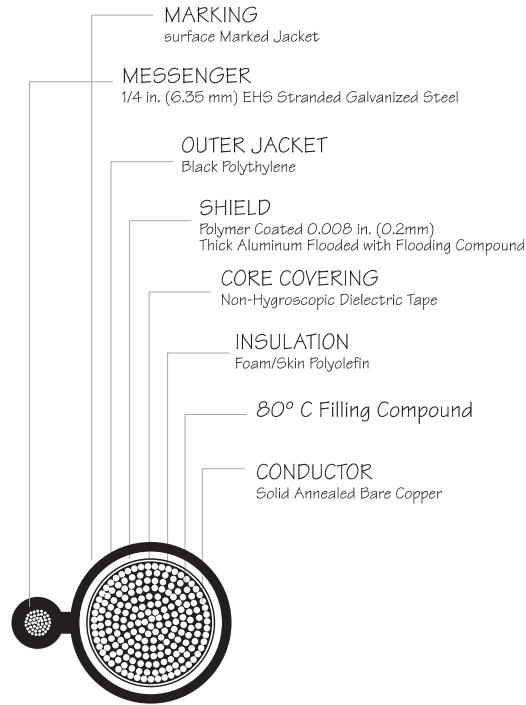
**Shielding:** A corrugated, copolymer coated, 8-mil aluminum tape is applied longitudinally with an overlap. The shield interfaces are flooded with an adhesive compound to provide a moisture barrier and inhibit corrosion.

**Support Member:** A 1/4 inch, 7-strand Extra High Strength (EHS) galvanized steel messenger serves as the support member and is an integral part of the sheath. The messenger is flooded to inhibit corrosion.

**Jacket:** A black, linear low-density polyethylene jacket is applied overall. The jacket provides a tough protective covering designed to withstand exposure to direct sunlight, atmospheric temperature changes and stresses expected in standard installations.

**Jacket Markings:** Information including the manufacturer's identification, pair count, AWG and product identification appears at 2-foot intervals. Sequential length markings appear at alternate 2-foot

### Cable cut-away



### Applications

4SProducts ALFOUR®-8fS cables are designed for aerial applications where a filled cable design is preferred and/or protection from moisture is required. The core and support member (messenger) lay parallel to each other forming a cross-sectional "Figure 8". The messenger is an integral part of the cable sheath, yet readily available for gripping, pulling and tensioning. Installation is fast and easy using standard methods and hardware.

### Qualifications & Approvals

ALFOUR-8fS cables meet the physical and electrical requirements of RUS specification 7 CFR 1755.890 (PE-89) latest issue, except that the figure-8 sheath shall meet the requirements of ANSI/ICEA S-85-625-2002, Option A.



## Technical Data Sheet

Aluminum Shield | Single Jacket | Filled - Foam Skin | Fig-8

Pair Count 6 - 200P

Outside Plant Copper Cable - Exchange Cable

Average mutual capacitance @ 1000 Hz											
Total No. of pairs		nF/mile		nF/km							
12 or Less		83 ± 7		52 ± 4							
Over 12		83 ± 4		52 ± 2							
Conductor Size		Minimum Insulation Resistance		Average Maximum Attenuation		Maximum Conductor Resistance		Resistance Unbalance		Dielectric Strength DC Potential Volts	
		68 °F (20 °C)		68 °F (20 °C) 772 kHz		68 °F (20 °C) (ohms)		Maximum		Minimum	
AWG	mm	Gigohm/mile	Gigohm/km	dB/kft	dB/km	mile	km	Avg %	Individual pair %	Cdr to Cdr	Cdr to Ground
22	0.64	1.0	1.6	4.5	14.8	91.0	56.5	1.5	5.0	3,600	10,000
24	0.50	1.0	1.6	5.6	18.4	144.0	89.5	1.5	5.0	3,000	10,000

Capacitance unbalance Pair-to-Pair				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	80	145	-	-
more than 12	80	145	25	45

Capacitance unbalance Pair-to-Ground				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	800	2625	-	-
more than 12	800	2625	175	574

Near End Crosstalk (NEXT)		150 kHz	772 kHz
P.S. WUNEXT mean (dB)		58	47
P.S. WUNEXT worst pair (dB)		53	42

Far End Crosstalk (FEXT) @ 150 kHz				
Conductor size (AWG)	22	24	-	-
P.S. ELFEXT mean (dB)	63	63	-	-
P.S. ELFEXT worst pair (dB)	57	57	-	-

Far End Crosstalk (FEXT) @ 772 kHz				
Conductor size (AWG)	22	24	-	-
P.S. ELFEXT mean (dB)	49	49	-	-
P.S. ELFEXT worst pair (dB)	43	43	-	-



Specifications are subject to change without notice. The data given is subject to normal manufacturing tolerances. 4SProducts Copper Communication Cables are designed and tested in accordance with the requirements of ANSI/ICEA.



# catalog | **Copper Cables**

**AsFOUR** | **Aluminum Steel Shield**



### Description

**Conductors:** Solid annealed copper in 19, 22, 24 and 26 AWG.

**Insulation:** Conductors are insulated with solid polyolefin. The conductor insulation is color coded in accordance with industry standard.

**Twisted Pair:** Individual conductors are twisted into pairs with varying lay lengths to minimize crosstalk and specific color combinations to provide pair identification.

**Core Assembly:** Cables of 25 pairs or less are assembled into a cylindrical core. Cables larger than 25 pairs are assembled into units, which are then used to assemble the core. Units are individually identifiable by color coded unit binders.

**Core Wrap:** A non-hygroscopic, dielectric tape is applied over the core assembly to provide protection for the core.

**Shielding:** The dual shielding system consists of two metal tapes. Inner: A corrugated, copolymer coated, 8-mil aluminum tape is applied directly over the core wrap. The aluminum tape does not butt or overlap at any point along the length of the cable. Outer: A corrugated, copolymer coated, 6-mil steel tape is applied directly over the aluminum and overlaps. The shield interfaces are flooded with an adhesive compound to provide a moisture barrier and inhibit corrosion.

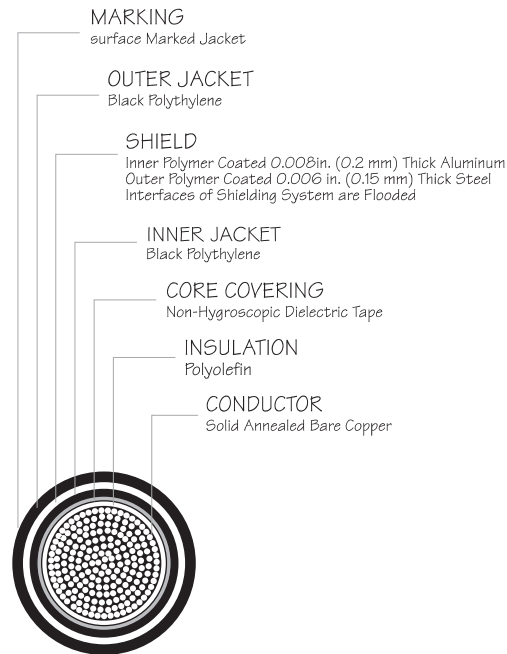
**Outer Jacket:** A black, linear low-density polyethylene jacket is applied overall. The jacket provides a tough protective covering designed to withstand exposure to direct sunlight, atmospheric temperature changes and stresses expected in standard installations.

**Inner Jacket:** A black polyethylene jacket.

**Jacket Markings:** Information, such as manufacturer's identification, pair count, AWG, product identification and a telephone handset is printed at 2 ft. intervals on the cable jacket. Sequential footage markings are printed at alternate 2 ft. intervals.

**Optional Designs:** AsFOUR®-2 is available with an internal screen for use with T-Carrier systems.

### Cable cut-away



### Applications

4SProducts AsFOUR®-2 cables are designed for direct burial or duct applications where protection from moisture is required. AsFOUR®-2 cables are recommended for use in high-risk areas where additional mechanical or rodent protection is required. AsFOUR®-2 may be used aerially, but must be attached to a support strand.



## Technical Data Sheet

Aluminum Steel Shield | Dual Jacket | AirCore

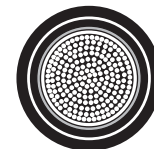
Pair Count 6 - 3000P

Outside Plant Copper Cable - Exchange Cable

ELECTRICAL CHARACTERISTICS	Conductor Size							
	AWG				mm			
	19	22	24	26	0.9	0.64	0.5	0.4
All values at or corrected to 20°C.								
<b>Mutual Capacitance</b> nF/mile (nF/km)								
Average								
≤ 12 pair	83 ± 7				(52 ± 4)			
> 12 pair	83 ± 4				(52 ± 2)			
Maximum Individual								
≤ 12 pair	94				(58)			
> 12 pair	92				(57)			
<b>Capacitance Unbalance</b> pF/kft (pF/km)								
Pair to Pair								
Maximum Individual	80				(145)			
Maximum RMS (> 12 pair)	25				(45)			
Pair to Ground								
Maximum Individual	800				(2,625)			
Maximum Average (> 12 pair)	175				(574)			
<b>Far-End Crosstalk</b> dB/kft (dB/km)								
Power Sum Mean								
0.150 MHz:	65	63	63	61	(60)	(58)	(58)	(56)
0.772 MHz:	51	49	49	47	(46)	(44)	(44)	(42)
1.600 MHz:	44	43	42	41	(39)	(38)	(37)	(36)
3.150 MHz:	39	37	37	35	(34)	(32)	(32)	(30)
6.300 MHz:	33	31	31	29	(28)	(26)	(26)	(24)
Power Sum Worst Pair:								
0.150 MHz:	59	57	57	57	(54)	(52)	(52)	(52)
0.772 MHz:	45	43	43	43	(40)	(38)	(38)	(38)
1.600 MHz:	39	37	37	37	(34)	(32)	(32)	(32)
3.150 MHz:	33	31	31	31	(28)	(26)	(26)	(26)
6.300 MHz:	27	25	25	25	(22)	(20)	(20)	(20)
<b>Near-End Crosstalk</b> dB/kft (dB/km)								
Power Sum Mean								
0.150 MHz:	58				(58)			
0.772 MHz:	47				(47)			
1.600 MHz:	43				(43)			
3.150 MHz:	38				(38)			
6.300 MHz:	34				(34)			
Power Sum Worst Pair:								
0.150 MHz:	53				(53)			
0.772 MHz:	42				(42)			
1.600 MHz:	38				(38)			
3.150 MHz:	33				(33)			
6.300 MHz:	29				(29)			
<b>Attenuation</b> dB/kft (dB/km)								
Maximum Average								
(≤ 12 pair) 150 kHz:	1.5	2.2	3.0	4.0	(5.1)	(7.3)	(9.8)	(13.0)
(> 12 pair) 150 kHz:	1.4	2.0	2.7	3.6	(4.6)	(6.6)	(8.9)	(11.8)
(≤ 12 pair) 772 kHz:	3.6	5.2	6.5	8.1	(11.9)	(16.9)	(21.3)	(26.7)
(> 12 pair) 772 kHz:	3.3	4.7	5.9	7.4	(10.8)	(15.4)	(19.4)	(24.3)
<b>Insulation Resistance</b> megohm-mile (megohm-km)	1000				(1600)			
<b>High Voltage Test</b> dc Voltage for 3 seconds								
Conductor-to-Conductor	5,000	4,000	3,000	2,400	5,000	4,000	3,000	2,400
Conductor-to-Shield	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
<b>Conductor Resistance</b> Ohm /mile (Ohm /km)								
Maximum Individual	45.0	91.0	144.0	232.0	(28.0)	(56.6)	(89.5)	(144.2)
<b>Resistance Unbalance</b> Percent								
Maximum Average	1.5				1.5			
Maximum Individual	5.0				5.0			



Specifications are subject to change without notice. The data given is subject to normal manufacturing tolerances. 4SProducts Copper Communication Cables are designed and tested in accordance with the requirements of ANSI/ICEA.



### Description

**Conductors:** Solid annealed copper in 19, 22, 24 and 26 AWG.

**Insulation:** Conductors are insulated with solid polyolefin. The conductor insulation is color coded in accordance with industry standard.

**Twisted Pair:** Individual conductors are twisted into pairs with varying lay lengths to minimize crosstalk and specific color combinations to provide pair identification.

**Core Assembly:** Cables of 25 pairs or less are assembled into a cylindrical core. Cables larger than 25 pairs are assembled into units, which are then used to assemble the core. Units are individually identifiable by color coded unit binders.

**Core Wrap:** A non-hygroscopic, dielectric tape is applied over the core assembly to provide protection for the core.

**Shielding:** The dual shielding system consists of two metal tapes. Inner: A corrugated, copolymer coated, 8-mil aluminum tape is applied directly over the core wrap. The aluminum tape does not butt or overlap at any point along the length of the cable. Outer: A corrugated, copolymer coated, 6-mil steel tape is applied directly over the aluminum and overlaps. The shield interfaces are flooded with an adhesive compound to provide a moisture barrier and inhibit corrosion.

**Support Member:** A 1/4 inch, 7-strand Extra High Strength (EHS) galvanized steel messenger serves as the support member and is an integral part of the sheath. The messenger is flooded to inhibit corrosion.

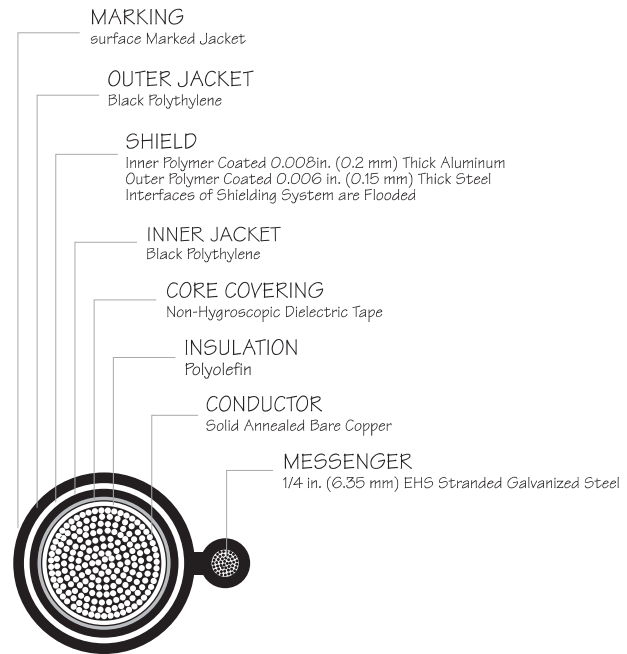
**Outer Jacket:** A black, linear low-density polyethylene jacket is applied overall. The jacket provides a tough protective covering designed to withstand exposure to direct sunlight, atmospheric temperature changes and stresses expected in standard installations.

**Inner Jacket:** A black polyethylene jacket.

**Jacket Markings:** Information, such as manufacturer's identification, pair count, AWG, product identification and a telephone handset is printed at 2 ft. intervals on the cable jacket. Sequential footage markings are printed at alternate 2 ft. intervals.

**Optional Designs:** AsFOUR®-2-8 is available with an internal screen for use with T-Carrier systems.

### Cable cut-away



### Applications

4SProducts AsFOUR®-2-8 cables are designed for aerial installations. The core and support member (messenger) lay parallel to each other forming a cross-sectional "Figure 8". The messenger is an integral part of the cable sheath, yet readily available for gripping, pulling and tensioning. Installation is fast and easy using standard methods and hardware.





ELECTRICAL CHARACTERISTICS	Conductor Size							
	AWG				mm			
	19	22	24	26	0.9	0.64	0.5	0.4
All values at or corrected to 20°C.								
<b>Mutual Capacitance</b> nF/mile (nF/km) Average ≤ 12 pair > 12 pair Maximum Individual ≤ 12 pair > 12 pair	83 ± 7 83 ± 4 94 92				(52 ± 4) (52 ± 2) (58) (57)			
<b>Capacitance Unbalance</b> pF/kft (pF/km) Pair to Pair Maximum Individual Maximum RMS (> 12 pair) Pair to Ground Maximum Individual Maximum Average (> 12 pair)	80 25 800 175				(145) (45) (2,625) (574)			
<b>Far-End Crosstalk</b> dB/kft (dB/km) Power Sum Mean 0.150 MHz: 0.772 MHz: 1.600 MHz: 3.150 MHz: 6.300 MHz: Power Sum Worst Pair: 0.150 MHz: 0.772 MHz: 1.600 MHz: 3.150 MHz: 6.300 MHz:	65 51 44 39 33	63 49 43 37 31	63 49 42 37 31	61 47 41 35 29	(60) (46) (39) (34) (28)	(58) (44) (38) (32) (26)	(58) (44) (37) (32) (26)	(56) (42) (36) (30) (24)
<b>Near-End Crosstalk</b> dB/kft (dB/km) Power Sum Mean 0.150 MHz: 0.772 MHz: 1.600 MHz: 3.150 MHz: 6.300 MHz: Power Sum Worst Pair: 0.150 MHz: 0.772 MHz: 1.600 MHz: 3.150 MHz: 6.300 MHz:	58 47 43 38 34 53 42 38 33 29				(58) (47) (43) (38) (34) (53) (42) (38) (33) (29)			
<b>Attenuation</b> dB/kft (dB/km) Maximum Average (≤ 12 pair) 150 kHz: (> 12 pair) 150 kHz: (≤ 12 pair) 772 kHz: (> 12 pair) 772 kHz:	1.5 1.4 3.6 3.3	2.2 2.0 5.2 4.7	3.0 2.7 6.5 5.9	4.0 3.6 8.1 7.4	(5.1) (4.6) (11.9) (10.8)	(7.3) (6.6) (16.9) (15.4)	(9.8) (8.9) (21.3) (19.4)	(13.0) (11.8) (26.7) (24.3)
<b>Insulation Resistance</b> megohm-mile (megohm-km)	1000				(1600)			
<b>High Voltage Test</b> dc Voltage for 3 seconds Conductor-to-Conductor Conductor-to-Shield	5,000 20,000	4,000 20,000	3,000 20,000	2,400 20,000	5,000 20,000	4,000 20,000	3,000 20,000	2,400 20,000
<b>Conductor Resistance</b> Ohm /mile (Ohm /km) Maximum Individual	45.0	91.0	144.0	232.0	(28.0)	(56.6)	(89.5)	(144.2)
<b>Resistance Unbalance</b> Percent Maximum Average Maximum Individual	1.5 5.0				1.5 5.0			



Specifications are subject to change without notice. The data given is subject to normal manufacturing tolerances. 4SProducts Copper Communication Cables are designed and tested in accordance with the requirements of ANSI/CEA.



## Technical Data Sheet

Aluminum Steel Shield | Single Jacket | Filled - Gel

Pair Count 6 - 1200P

Outside Plant Copper Cable - Exchange Cable

### Description

**Conductors:** Solid annealed copper in 19, 22 and 24 AWG.

**Insulation:** Conductors are insulated with solid polyolefin, color coded in accordance with industry standards.

**Twisted Pairs:** Individual conductors are twisted into pairs with varying lay lengths to minimize crosstalk and specific color combinations to provide pair identification.

**Core Assembly:** Cables of 25 pairs or less are assembled into a cylindrical core. Cables larger than 25 pairs are assembled into units, which are then used to assemble the core. Units are individually identifiable by color coded unit binders.

**Filling Compound:** The core assembly is filled with an 80° C ETPR or PIB base jelly compound, completely filling the interstices between the pairs and under the core wrap.

**CORE WRAP:** A non-hygroscopic, dielectric tape is applied over the core assembly to provide protection for the core.

**SHIELDING:** The dual shielding system consists of two metal tapes.

**Inner:** A corrugated, copolymer coated, 8-mil aluminum tape is applied directly over the core wrap. The aluminum tape does not butt or overlap at any point along the length of the cable.

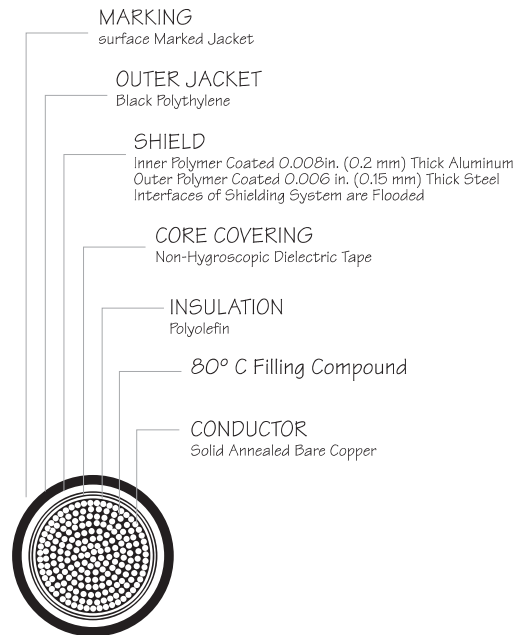
**Outer:** A corrugated, copolymer coated, 6-mil steel tape is applied directly over the aluminum and overlaps. The shield interfaces are flooded with an adhesive compound to provide a moisture barrier and inhibit corrosion.

**Jacket:** A black, linear low-density polyethylene jacket is applied overall. The jacket provides a tough protective covering designed to withstand exposure to direct sunlight, atmospheric temperature changes, and stresses expected in standard installations.

**Jacket Markings:** Information, such as manufacturer's identification, pair count, AWG, product identification and a telephone handset is printed at 2 ft. intervals on the cable jacket. Sequential footage markings are printed at alternate 2 ft. intervals.

**Optional Designs:** AsFOUR®-f is available with an internal screen for use with T-Carrier systems. AsFOUR®-f+M is also available with mechanical protection.

### Cable cut-away



### Applications

4SProducts AsFOUR®-f cables are designed for use in duct or direct burial applications where protection from moisture is required. AsFOUR®-f cables may be used aerially, but must be attached to a support strand (messenger). AsFOUR®-f cables are recommended for use in high-risk areas where additional mechanical or rodent protection is required.

### Qualifications & Approvals

Manufactured to meet requirements of ANSI/ICEA S-84-608-2002, RUS 7 CFR 1755.390 (P€-39).



www.4SProducts.com

## Technical Data Sheet

Aluminum Steel Shield | Single Jacket | Filled - Gel

Pair Count 6 - 1200P

Outside Plant Copper Cable - Exchange Cable

Average mutual capacitance @ 1000 Hz											
Total No. of pairs		nF/mile		nF/km							
12 or Less		83 ± 7		52 ± 4							
Over 12		83 ± 4		52 ± 2							
Conductor Size		Minimum Insulation Resistance		Average Maximum Attenuation		Maximum Conductor Resistance		Resistance Unbalance		Dielectric Strength DC Potential Volts	
		68 °F (20 °C)		68 °F (20 °C) 772 kHz		68 °F (20 °C) (ohms)		Maximum		Minimum	
AWG	mm	Gigohm/mile	Gigohm/km	dB/kft	dB/km	mile	km	Avg %	Individual pair %	Cdr to Cdr	Cdr to Ground
19	0.90	1.0	1.6	2.8	9.2	45.0	28.0	1.5	5.0	7,000	15,000
22	0.64	1.0	1.6	4.0	13.1	91.0	56.5	1.5	5.0	5,000	15,000
24	0.50	1.0	1.6	5.0	16.4	144.0	89.5	1.5	5.0	4,000	15,000

Capacitance unbalance Pair-to-Pair					
Pairs	Maximum individual		Maximum RMS		
	pF/kft	pF/km	pF/kft	pF/km	
12 or Less	80	145	-	-	
more than 12	80	145	25	45	

Capacitance unbalance Pair-to-Ground					
Pairs	Maximum individual		Maximum RMS		
	pF/kft	pF/km	pF/kft	pF/km	
12 or Less	800	2625	-	-	
more than 12	800	2625	175	574	

Near End Crosstalk (NEXT)		150 kHz		772 kHz	
P.S. WUNEXT mean (dB)		58		47	
P.S. WUNEXT worst pair (dB)		53		42	

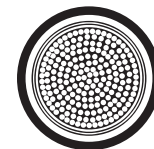
Far End Crosstalk (FEXT) @ 150 kHz				
Conductor size (AWG)	19	22	24	-
P.S. ELFEXT mean (dB)	65	63	63	-
P.S. ELFEXT worst pair (dB)	59	57	57	-

Far End Crosstalk (FEXT) @ 772 kHz				
Conductor size (AWG)	19	22	24	-
P.S. ELFEXT mean (dB)	51	49	49	-
P.S. ELFEXT worst pair (dB)	45	43	43	-



Specifications are subject to change without notice. The data given is subject to normal manufacturing tolerances. 4SProducts Copper Communication Cables are designed and tested in accordance with the requirements of ANSI/CEA.



### Description

**Conductors:** Solid annealed copper in 19, 22, 24 and 26 AWG.

**Insulation:** Conductors are dual insulated with an inner layer of foamed, natural polyolefin covered by an outer layer of solid, colored polyolefin. The conductor insulation is color coded in accordance with industry standard.

**Twisted Pair:** Individual conductors are twisted into pairs with varying lay lengths to minimize crosstalk and specific color combinations to provide pair identification.

**Core Assembly:** Cables of 25 pairs or less are assembled into a cylindrical core. Cables larger than 25 pairs are assembled into units, which are then used to assemble the core. Units are individually identifiable by color coded unit binders.

**Filling Compound:** The core assembly is filled with an 80° C ETPR or PIB base jelly compound, completely filling the interstices between the pairs and under the core wrap.

**Core Wrap:** A non-hygroscopic, dielectric tape is applied over the core assembly to provide protection for the core.

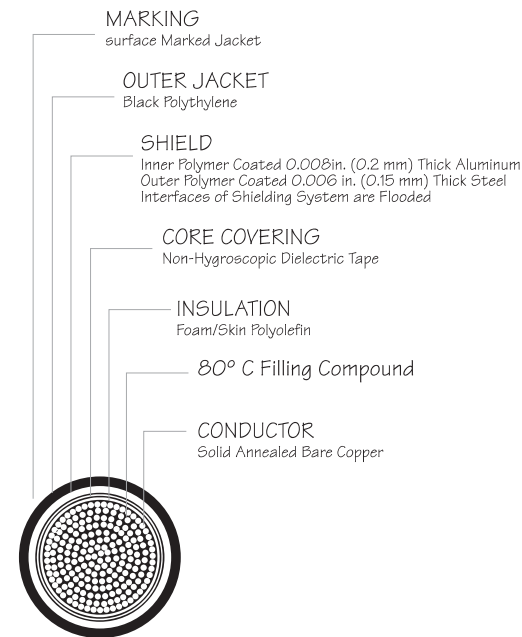
**Shielding:** The dual shielding system consists of two metal tapes. Inner: A corrugated, copolymer coated, 8-mil aluminum tape is applied directly over the core wrap. The aluminum tape does not butt or overlap at any point along the length of the cable. Outer: A corrugated, copolymer coated, 6-mil steel tape is applied directly over the aluminum and overlaps. The shield interfaces are flooded with an adhesive compound to provide a moisture barrier and inhibit corrosion.

**Jacket:** A black, linear low-density polyethylene jacket is applied overall. The jacket provides a tough protective covering designed to withstand exposure to direct sunlight, atmospheric temperature changes and stresses expected in standard installations.

**Jacket Markings:** Information, such as manufacturer's identification, pair count, AWG, product identification and a telephone handset is printed at 2 ft. intervals on the cable jacket. Sequential footage markings are printed at alternate 2 ft. intervals.

**Optional Designs:** AsFOUR®-FS is available with an internal screen for use with T-Carrier systems. AsFOUR®-FS is also available with mechanical protection.

### Cable cut-away



### Applications

4SProducts AsFOUR®-FS cables are designed for direct burial or duct applications where protection from moisture is required. AsFOUR®-FS cables are recommended for use in high-risk areas where additional mechanical or rodent protection is required. AsFOUR®-FS may be used aerially, but must be attached to a support strand.

### Qualifications & Approvals

Manufactured to meet requirements of ANSI/ICEA S-84-608-2002, RUS 7 CFR 1755.890 (PE-89).



www.4SProducts.com

## Technical Data Sheet

Aluminum Steel Shield | Single Jacket | Filled - Foam Skin

Pair Count 6 - 3000P

Outside Plant Copper Cable - Exchange Cable

Average mutual capacitance @ 1000 Hz											
Total No. of pairs		nF/mile		nF/km							
12 or Less		83 ± 7		52 ± 4							
Over 12		83 ± 4		52 ± 2							
Conductor Size		Minimum Insulation Resistance		Average Maximum Attenuation		Maximum Conductor Resistance		Resistance Unbalance		Dielectric Strength DC Potential Volts	
		68 °F (20 °C)		68 °F (20 °C) 772 kHz		68 °F (20 °C) (ohms)		Maximum		Minimum	
AWG	mm	Gigohm/mile	Gigohm/km	dB/kft	dB/km	mile	km	Avg %	Individual pair %	Cdr to Cdr	Cdr to Ground
19	0.90	1.0	1.6	3.2	10.5	45.0	28.0	1.5	5.0	4,500	10,000
22	0.64	1.0	1.6	4.5	14.8	91.0	56.5	1.5	5.0	3,600	10,000
24	0.50	1.0	1.6	5.6	18.4	144.0	89.5	1.5	5.0	3,000	10,000
26	0.40	1.0	1.6	7.0	23.3	232.0	144.0	1.5	5.0	2,400	10,000

Capacitance unbalance Pair-to-Pair				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	80	145	-	-
more than 12	80	145	25	45

Capacitance unbalance Pair-to-Ground				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	800	2625	-	-
more than 12	800	2625	175	574

Near End Crosstalk (NEXT)		150 kHz		772 kHz	
P.S. WUNEXT mean (dB)		58		47	
P.S. WUNEXT worst pair (dB)		53		42	

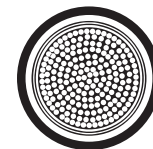
Far End Crosstalk (FEXT) @ 150 kHz				
Conductor size (AWG)	19	22	24	26
P.S. ELFEXT mean (dB)	65	63	63	61
P.S. ELFEXT worst pair (dB)	59	57	57	57

Far End Crosstalk (FEXT) @ 772 kHz				
Conductor size (AWG)	19	22	24	26
P.S. ELFEXT mean (dB)	51	49	49	47
P.S. ELFEXT worst pair (dB)	45	43	43	43



Specifications are subject to change without notice. The data given is subject to normal manufacturing tolerances. 4SProducts Copper Communication Cables are designed and tested in accordance with the requirements of ANSI/ICEA.



### Description

**Conductors:** Solid annealed copper in 19, 22, 24 and 26 AWG.

**Insulation:** Conductors are dual insulated with an inner layer of foamed, natural polyolefin covered by an outer layer of solid, colored polyolefin. The conductor insulation is color coded in accordance with industry standard.

**Twisted Pair:** Individual conductors are twisted into pairs with varying lay lengths to minimize crosstalk and specific color combinations to provide pair identification.

**Core Assembly:** Cables of 25 pairs or less are assembled into a cylindrical core. Cables larger than 25 pairs are assembled into units, which are then used to assemble the core. Units are individually identifiable by color coded unit binders.

**Filling Compound:** The core assembly is filled with an 80° C ETPR or PIB base jelly compound, completely filling the interstices between the pairs and under the core wrap.

**Core Wrap:** A non-hygroscopic, dielectric tape is applied over the core assembly to provide protection for the core.

**Shielding:** The dual shielding system consists of two metal tapes. Inner: A corrugated, copolymer coated, 8-mil aluminum tape is applied directly over the core wrap. The aluminum tape does not butt or overlap at any point along the length of the cable. Outer: A corrugated, copolymer coated, 6-mil steel tape is applied directly over the aluminum and overlaps. The shield interfaces are flooded with an adhesive compound to provide a moisture barrier and inhibit corrosion.

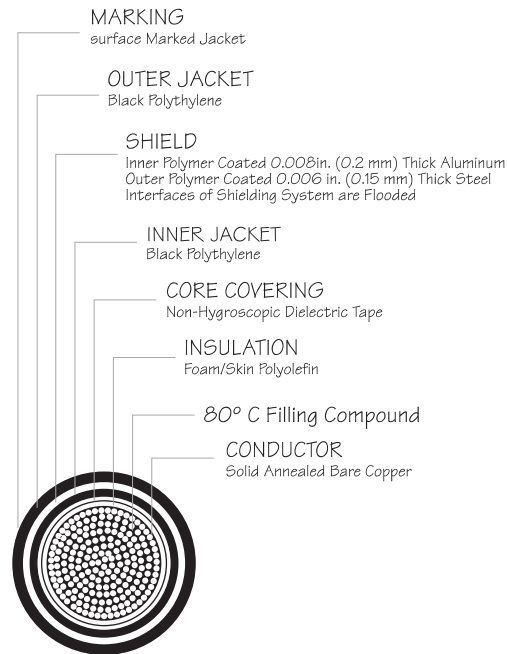
**Outer Jacket:** A black, linear low-density polyethylene jacket is applied overall. The jacket provides a tough protective covering designed to withstand exposure to direct sunlight, atmospheric temperature changes and stresses expected in standard installations.

**Inner Jacket:** A black polyethylene jacket.

**Jacket Markings:** Information, such as manufacturer's identification, pair count, AWG, product identification and a telephone handset is printed at 2 ft. intervals on the cable jacket. Sequential footage markings are printed at alternate 2 ft. intervals.

**Optional Designs:** AsFOUR®-2fS is available with an internal screen for use with T-Carrier systems.

### Cable cut-away



### Applications

4SProducts AsFOUR®-2fS cables are designed for direct burial or duct applications where protection from moisture is required. AsFOUR®-2fS cables are recommended for use in high-risk areas where additional mechanical or rodent protection is required. AsFOUR®-2fS may be used aurally, but must be attached to a support strand.

### Qualifications & Approvals

Manufactured to meet requirements of ANSI/ICEA S-84-608-2002, RUS 7 CFR 1755.890 (PE-89).



## Technical Data Sheet

Aluminum Steel Shield | Dual Jacket | Filled - Foam Skin

Pair Count 6 - 3000P

Outside Plant Copper Cable - Exchange Cable

Average mutual capacitance @ 1000 Hz											
Total No. of pairs		nF/mile		nF/km							
12 or Less		83 ± 7		52 ± 4							
Over 12		83 ± 4		52 ± 2							
Conductor Size		Minimum Insulation Resistance		Average Maximum Attenuation		Maximum Conductor Resistance		Resistance Unbalance		Dielectric Strength DC Potential Volts	
		68 °F (20 °C)		68 °F (20 °C) 772 kHz		68 °F (20 °C) (ohms)		Maximum		Minimum	
AWG	mm	Gigohm/mile	Gigohm/km	dB/kft	dB/km	mile	km	Avg %	Individual pair %	Cdr to Cdr	Cdr to Ground
19	0.90	1.0	1.6	3.2	10.5	45.0	28.0	1.5	5.0	4,500	10,000
22	0.64	1.0	1.6	4.5	14.8	91.0	56.5	1.5	5.0	3,600	10,000
24	0.50	1.0	1.6	5.6	18.4	144.0	89.5	1.5	5.0	3,000	10,000
26	0.40	1.0	1.6	7.0	23.3	232.0	144.0	1.5	5.0	2,400	10,000

Capacitance unbalance Pair-to-Pair				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	80	145	-	-
more than 12	80	145	25	45

Capacitance unbalance Pair-to-Ground				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	800	2625	-	-
more than 12	800	2625	175	574

Near End Crosstalk (NEXT)		150 kHz		772 kHz	
P.S. WUNEXT mean (dB)		58		47	
P.S. WUNEXT worst pair (dB)		53		42	

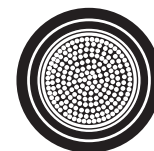
Far End Crosstalk (FEXT) @ 150 kHz				
Conductor size (AWG)	19	22	24	26
P.S. ELFEXT mean (dB)	65	63	63	61
P.S. ELFEXT worst pair (dB)	59	57	57	57

Far End Crosstalk (FEXT) @ 772 kHz				
Conductor size (AWG)	19	22	24	26
P.S. ELFEXT mean (dB)	51	49	49	47
P.S. ELFEXT worst pair (dB)	45	43	43	43



Specifications are subject to change without notice. The data given is subject to normal manufacturing tolerances. 4SProducts Copper Communication Cables are designed and tested in accordance with the requirements of ANSI/ICEA.



# catalog | **Copper Cables**

CasFOUR | **Copper Clad Shield**





## Description

**Conductors:** Solid annealed copper in 19, 22 and 24 AWG.

**Insulation:** Conductors are insulated with solid polyolefin, color coded in accordance with industry standards.

**Twisted Pairs:** Individual conductors are twisted into pairs with varying lay lengths to minimize crosstalk and specific color combinations to provide pair identification.

**Core Assembly:** Cables of 25 pairs or less are assembled into a cylindrical core. Cables larger than 25 pairs are assembled into units, which are then used to assemble the core. Units are individually identifiable by color coded unit binders.

**Filling Compound:** The core assembly is filled with an 80°C ETPR or PIB base jelly compound, completely filling the interstices between the pairs and under the core wrap.

**Core Wrap:** A non-hygroscopic, dielectric tape is applied over the core assembly to provide protection for the core.

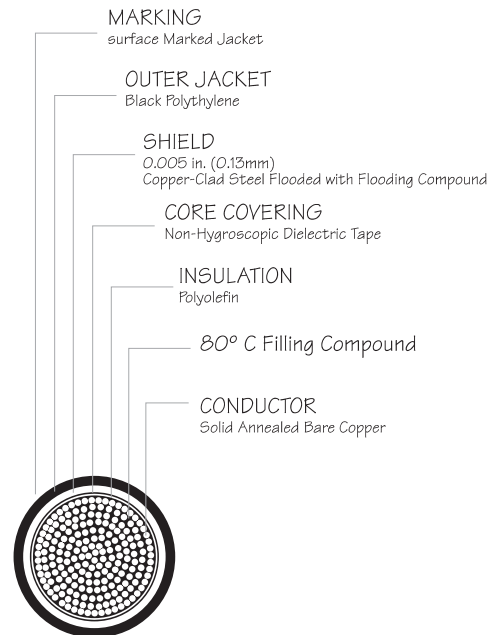
**Shielding:** A corrugated, gopher resistant, copper alloy or copper clad steel tape is applied longitudinally with an overlap. The shield interfaces are flooded with an adhesive compound to provide a moisture barrier and inhibit corrosion.

**Jacket:** A black, linear low-density polyethylene jacket is applied overall. The jacket provides a tough protective covering designed to withstand exposure to direct sunlight, atmospheric temperature changes and stresses expected in standard installations.

**Jacket Markings:** Information, such as manufacturer's identification, pair count, AWG, product identification and a telephone handset is printed at 2 ft. intervals on the cable jacket. Sequential footage markings are printed at alternate 2 ft. intervals.

**Optional Designs:** CasFOUR®-F is available with an internal screen for use with T-Carrier systems. CasFOUR®-F is also available with mechanical protection.

## Cable cut-away



## Applications

4SProducts CasFOUR®-F cables are designed for use in duct or direct burial applications where protection from moisture is required. CasFOUR®-F cables may be used aerially, but must be attached to a support strand (messenger). CasFOUR®-F cables are recommended for use in high-risk areas where additional mechanical or rodent protection is required.

## Qualifications & Approvals

Manufactured to meet requirements of ANSI/ICEA S-84-608-2002, RUS 7 CFR 1755.390 (P&39).



## Technical Data Sheet

Copper Clad Steel Shield | Single Jacket | Filled - Gel

Pair Count 6 - 1800P

Outside Plant Copper Cable - Exchange Cable

Average mutual capacitance @ 1000 Hz											
Total No. of pairs		nF/mile		nF/km							
12 or Less		83 ± 7		52 ± 4							
Over 12		83 ± 4		52 ± 2							
Conductor Size		Minimum Insulation Resistance		Average Maximum Attenuation		Maximum Conductor Resistance		Resistance Unbalance		Dielectric Strength DC Potential Volts	
		68 °F (20 °C)		68 °F (20 °C) 772 kHz		68 °F (20 °C) (ohms)		Maximum		Minimum	
AWG	mm	Gigohm/mile	Gigohm/km	dB/kft	dB/km	mile	km	Avg %	Individual pair %	Cdr to Cdr	Cdr to Ground
19	0.90	1.0	1.6	2.8	9.2	45.0	28.0	1.5	5.0	7,000	15,000
22	0.64	1.0	1.6	4.0	13.1	91.0	56.5	1.5	5.0	5,000	15,000
24	0.50	1.0	1.6	5.0	16.4	144.0	89.5	1.5	5.0	4,000	15,000

Capacitance unbalance Pair-to-Pair					
Pairs	Maximum individual		Maximum RMS		
	pF/kft	pF/km	pF/kft	pF/km	
12 or Less	80	145	-	-	
more than 12	80	145	25	45	

Capacitance unbalance Pair-to-Ground					
Pairs	Maximum individual		Maximum RMS		
	pF/kft	pF/km	pF/kft	pF/km	
12 or Less	800	2625	-	-	
more than 12	800	2625	175	574	

Near End Crosstalk (NEXT)		150 kHz		772 kHz	
P.S. WUNEXT mean (dB)		58		47	
P.S. WUNEXT worst pair (dB)		53		42	

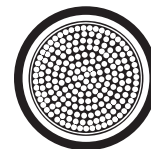
Far End Crosstalk (FEXT) @ 150 kHz				
Conductor size (AWG)	19	22	24	-
P.S. ELFEXT mean (dB)	65	63	63	-
P.S. ELFEXT worst pair (dB)	59	57	57	-

Far End Crosstalk (FEXT) @ 772 kHz				
Conductor size (AWG)	19	22	24	-
P.S. ELFEXT mean (dB)	51	49	49	-
P.S. ELFEXT worst pair (dB)	45	43	43	-



Specifications are subject to change without notice. The data given is subject to normal manufacturing tolerances. 4SProducts Copper Communication Cables are designed and tested in accordance with the requirements of ANSI/ICEA.



### Description

**Conductors:** Solid annealed copper in 19, 22, and 24 AWG.

**Insulation:** Conductors are dual insulated with an inner layer of foamed, natural polyolefin covered by an outer layer of solid, colored polyolefin. The conductor insulation is color coded in accordance with industry standards.

**Twisted Pair:** Individual conductors are twisted into pairs with varying lay lengths to minimize crosstalk and specific color combinations to provide pair identification.

**Core Assembly:** Cables of 25 pairs or less are assembled into a cylindrical core. Cables larger than 25 pairs are assembled into units, which are then used to assemble the core. Units are individually identifiable by color coded unit binders.

**Filling Compound:** The core assembly is filled with an 80°C ETPR or PIB base jelly compound, completely filling the interstices between the pairs and under the core wrap.

**Core Wrap:** A non-hygroscopic, dielectric tape is applied over the core assembly to provide protection for the core.

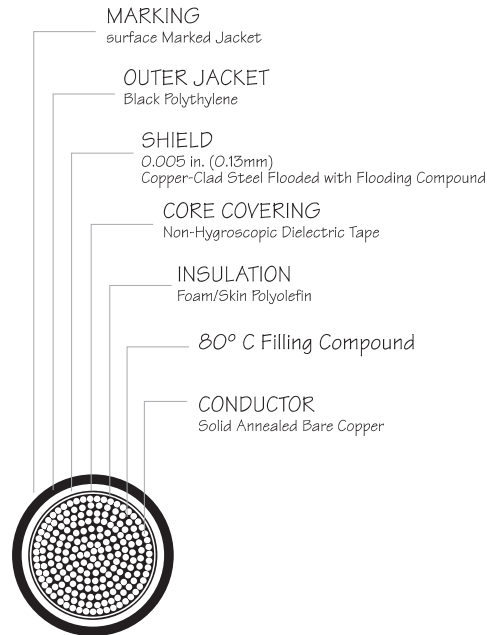
**Shielding:** A corrugated, gopher resistant, copper alloy or copper clad steel tape is applied longitudinally with an overlap. The shield interfaces are flooded with an adhesive compound to provide a moisture barrier and inhibit corrosion.

**Jacket:** A black, linear low-density polyethylene jacket is applied overall. The jacket provides a tough protective covering designed to withstand exposure to direct sunlight, atmospheric temperature changes and stresses expected in standard installations.

**Jacket Markings:** Information, such as manufacturer's identification, pair count AWG, product identification and a telephone handset is printed at 2 ft. intervals on the cable jacket. Sequential footage markings are printed at alternate 2 ft. intervals.

**Optional Designs:** CasFOUR®-FS is available with an internal screen for use with T-Carrier systems. CasFOUR®-FS is ALSO available with mechanical protection.

### Cable cut-away



### Applications

4SProducts CasFOUR®-FS cables are designed for direct burial or duct applications where protection from moisture is required. CasFOUR®-FS cables are recommended for use in high-risk areas where additional mechanical or rodent protection is required. CasFOUR®-FS cables may be used aerially, but must be attached to a support strand.

### Qualifications & Approvals

Manufactured to meet requirements of ANSI/ICEA S-84-608-2002, RUS 7 CFR 1755.890 (PE-89).



## Technical Data Sheet

Copper Clad Steel Shield | Single Jacket | Filled - Foam Skin

Pair Count 6 - 2400P

Outside Plant Copper Cable - Exchange Cable

Average mutual capacitance @ 1000 Hz											
Total No. of pairs		nF/mile		nF/km							
12 or Less		83 ± 7		52 ± 4							
Over 12		83 ± 4		52 ± 2							
Conductor Size		Minimum Insulation Resistance		Average Maximum Attenuation		Maximum Conductor Resistance		Resistance Unbalance		Dielectric Strength DC Potential Volts	
		68 °F (20 °C)		68 °F (20 °C) 772 kHz		68 °F (20 °C) (ohms)		Maximum		Minimum	
AWG	mm	Gigohm/mile	Gigohm/km	dB/kft	dB/km	mile	km	Avg %	Individual pair %	Cdr to Cdr	Cdr to Ground
19	0.90	1.0	1.6	3.2	10.5	45.0	28.0	1.5	5.0	4,500	10,000
22	0.64	1.0	1.6	4.5	14.8	91.0	56.5	1.5	5.0	3,600	10,000
24	0.50	1.0	1.6	5.6	18.4	144.0	89.5	1.5	5.0	3,000	10,000

Capacitance unbalance Pair-to-Pair					
Pairs	Maximum individual		Maximum RMS		
	pF/kft	pF/km	pF/kft	pF/km	
12 or Less	80	145	-	-	
more than 12	80	145	25	45	

Capacitance unbalance Pair-to-Ground					
Pairs	Maximum individual		Maximum RMS		
	pF/kft	pF/km	pF/kft	pF/km	
12 or Less	800	2625	-	-	
more than 12	800	2625	175	574	

Near End Crosstalk (NEXT)		150 kHz		772 kHz	
P.S. WUNEXT mean (dB)		58		47	
P.S. WUNEXT worst pair (dB)		53		42	

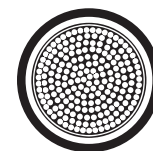
Far End Crosstalk (FEXT) @ 150 kHz					
Conductor size (AWG)		19	22	24	-
P.S. ELFEXT mean (dB)		65	63	63	-
P.S. ELFEXT worst pair (dB)		59	57	57	-

Far End Crosstalk (FEXT) @ 772 kHz					
Conductor size (AWG)		19	22	24	-
P.S. ELFEXT mean (dB)		51	49	49	-
P.S. ELFEXT worst pair (dB)		45	43	43	-



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# catalog | Copper Cables

CoFOUR | Copper Shield



### Description

**Conductors:** Solid annealed copper in 19, 22 and 24 AWG.

**Insulation:** Conductors are insulated with solid polyolefin, color coded in accordance with industry standards.

**Twisted Pairs:** Individual conductors are twisted into pairs with varying lay lengths to minimize crosstalk and specific color combinations to provide pair identification.

**Core Assembly:** Cables of 25 pairs or less are assembled into a cylindrical core. Cables larger than 25 pairs are assembled into units, which are then used to assemble the core. Units are individually identifiable by color coded unit binders.

**Filling Compound:** The core assembly is filled with an 80° C ETPR or PIB base jelly compound, completely filling the interstices between the pairs and under the core wrap.

**Core Wrap:** A non-hygroscopic, dielectric tape is applied over the core assembly to provide protection for the core.

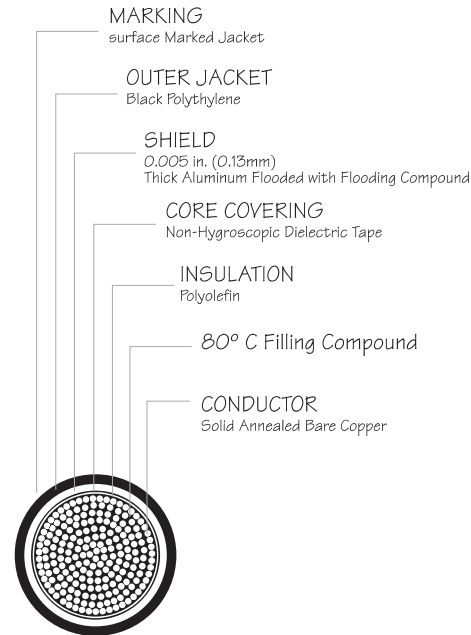
**Shielding:** A corrugated, 5-mil copper tape is applied longitudinally with an overlap. The shield interfaces are flooded with an adhesive compound to provide a moisture barrier and inhibit corrosion.

**Jacket:** A black, linear low-density polyethylene jacket is applied overall. The jacket provides a tough protective covering designed to withstand exposure to direct sunlight, atmospheric temperature changes and stresses expected in standard installations.

**Jacket Markings:** Information, such as manufacturer's identification, pair count, AWG, product identification and a telephone handset is printed at 2 ft. intervals on the cable jacket. Sequential footage markings are printed at alternate 2 ft. intervals.

**Optional Designs:** CoFOUR®-F is available with an screen for use with T-Carrier systems. CoFOUR®-F + M is available with mechanical protection.

### Cable cut-away



### Applications

4SProducts CoFOUR®-F cables are designed for use in duct or direct burial applications where protection from moisture is required. CoFOUR®-F cables may be used aerially, but must be attached to a support strand.

### Qualifications & Approvals

Manufactured to meet requirements of ANSI/ICEA S-84-608-2002, RUS 7 CFR 1755.390 (P&39).



## Technical Data Sheet

Copper Shield | Single Jacket | Filled - Gel

Pair Count 6 - 1800P

Outside Plant Copper Cable - Exchange Cable

Average mutual capacitance @ 1000 Hz											
Total No. of pairs		nF/mile		nF/km							
12 or Less		83 ± 7		52 ± 4							
Over 12		83 ± 4		52 ± 2							
Conductor Size		Minimum Insulation Resistance		Average Maximum Attenuation		Maximum Conductor Resistance		Resistance Unbalance		Dielectric Strength DC Potential Volts	
		68 °F (20 °C)		68 °F (20 °C) 772 kHz		68 °F (20 °C) (ohms)		Maximum		Minimum	
AWG	mm	Gigohm/mile	Gigohm/km	dB/kft	dB/km	mile	km	Avg %	Individual pair %	Cdr to Cdr	Cdr to Ground
19	0.90	1.0	1.6	2.8	9.2	45.0	28.0	1.5	5.0	7,000	15,000
22	0.64	1.0	1.6	4.0	13.1	91.0	56.5	1.5	5.0	5,000	15,000
24	0.50	1.0	1.6	5.0	16.4	144.0	89.5	1.5	5.0	4,000	15,000

Capacitance unbalance Pair-to-Pair					
Pairs	Maximum individual		Maximum RMS		
	pF/kft	pF/km	pF/kft	pF/km	
12 or Less	80	145	-	-	
more than 12	80	145	25	45	

Capacitance unbalance Pair-to-Ground					
Pairs	Maximum individual		Maximum RMS		
	pF/kft	pF/km	pF/kft	pF/km	
12 or Less	800	2625	-	-	
more than 12	800	2625	175	574	

Near End Crosstalk (NEXT)		150 kHz		772 kHz	
P.S. WUNEXT mean (dB)		58		47	
P.S. WUNEXT worst pair (dB)		53		42	

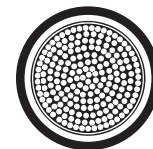
Far End Crosstalk (FEXT) @ 150 kHz				
Conductor size (AWG)	19	22	24	-
P.S. ELFEXT mean (dB)	65	63	63	-
P.S. ELFEXT worst pair (dB)	59	57	57	-

Far End Crosstalk (FEXT) @ 772 kHz				
Conductor size (AWG)	19	22	24	-
P.S. ELFEXT mean (dB)	51	49	49	-
P.S. ELFEXT worst pair (dB)	45	43	43	-



Specifications are subject to change without notice. The data given is subject to normal manufacturing tolerances. 4SProducts Copper Communication Cables are designed and tested in accordance with the requirements of ANSI/ICEA.



### Description

**Conductors:** Solid annealed copper in 19, 22, and 24 AWG.

**Insulation:** Conductors are dual insulated with an inner layer of foamed, natural polyolefin covered by an outer layer of solid, colored polyolefin. The conductor insulation is color coded in accordance with industry standards.

**Twisted Pairs:** Individual conductors are twisted into pairs with varying lay lengths to minimize crosstalk and specific color combinations to provide pair identification.

**Core Assembly:** Cables of 25 pairs or less are assembled into a cylindrical core. Cables larger than 25 pairs are assembled into units, which are then used to assemble the core. Units are individually identifiable by color coded unit binders.

**Filling Compound:** The core assembly is filled with an 80°C ETPR or PIB base jelly compound, completely filling the interstices between the pairs and under the core wrap.

**Core Wrap:** A non-hygroscopic, dielectric tape is applied over the core assembly to provide protection for the core.

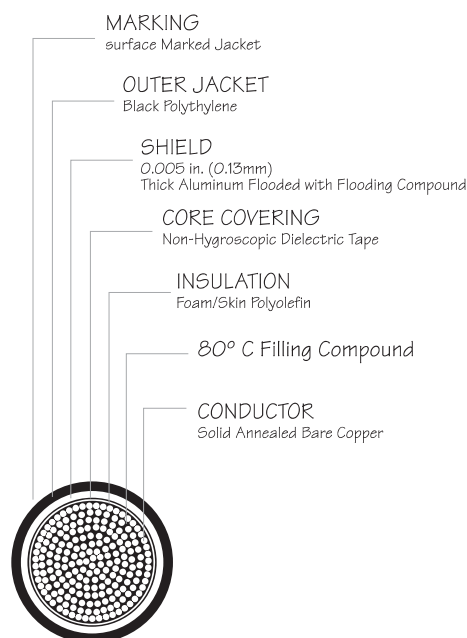
**Shielding:** A corrugated 5-mil copper tape is applied longitudinally with an overlap. The shield interfaces are flooded with an adhesive compound to provide a moisture barrier and inhibit corrosion.

**Jacket:** A black, linear low-density polyethylene jacket is applied overall. The jacket provides a tough protective covering designed to withstand exposure to direct sunlight, atmospheric temperature changes and stresses expected in standard installations.

**Jacket Markings:** Information, such as manufacturer's identification, pair count AWG, product identification and a telephone handset is printed at 2 ft. intervals on the cable jacket. Sequential footage markings are printed at alternate 2 ft. intervals.

**Optional Designs:** CoFOUR®-FS is available with an internal screen for use with T-Carrier systems. CoFOUR®-FS+M is also available with mechanical protection.

### Cable cut-away



### Applications

4SProducts CoFOUR®-FS cables are designed for direct burial or duct applications where protection from moisture is required. CoFOUR®-FS may be used aerially, but must be attached to a support strand.

### Qualifications & Approvals

Manufactured to meet requirements of ANSI/ICEA S-84-608-2002, RUS 7 CFR 1755.890 (PE-89).





## Technical Data Sheet

Copper Shield | Single Jacket | Filled - Foam Skin

Pair Count 6 - 2400P

Outside Plant Copper Cable - Exchange Cable

Average mutual capacitance @ 1000 Hz											
Total No. of pairs		nF/mile		nF/km							
12 or Less		83 ± 7		52 ± 4							
Over 12		83 ± 4		52 ± 2							
Conductor Size		Minimum Insulation Resistance		Average Maximum Attenuation		Maximum Conductor Resistance		Resistance Unbalance		Dielectric Strength DC Potential Volts	
		68 °F (20 °C)		68 °F (20 °C) 772 kHz		68 °F (20 °C) (ohms)		Maximum		Minimum	
AWG	mm	Gigohm/mile	Gigohm/km	dB/kft	dB/km	mile	km	Avg %	Individual pair %	Cdr to Cdr	Cdr to Ground
19	0.90	1.0	1.6	3.2	10.5	45.0	28.0	1.5	5.0	4,500	10,000
22	0.64	1.0	1.6	4.5	14.8	91.0	56.5	1.5	5.0	3,600	10,000
24	0.50	1.0	1.6	5.6	18.4	144.0	89.5	1.5	5.0	3,000	10,000

Capacitance unbalance Pair-to-Pair				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	80	145	-	-
more than 12	80	145	25	45

Capacitance unbalance Pair-to-Ground				
Pairs	Maximum individual		Maximum RMS	
	pF/kft	pF/km	pF/kft	pF/km
12 or Less	800	2625	-	-
more than 12	800	2625	175	574

Near End Crosstalk (NEXT)		150 kHz		772 kHz	
P.S. WUNEXT mean (dB)		58		47	
P.S. WUNEXT worst pair (dB)		53		42	

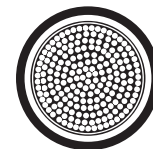
Far End Crosstalk (FEXT) @ 150 kHz				
Conductor size (AWG)	19	22	24	-
P.S. ELFEXT mean (dB)	65	63	63	-
P.S. ELFEXT worst pair (dB)	59	57	57	-

Far End Crosstalk (FEXT) @ 772 kHz				
Conductor size (AWG)	19	22	24	-
P.S. ELFEXT mean (dB)	51	49	49	-
P.S. ELFEXT worst pair (dB)	45	43	43	-



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## Technical Data Sheet

## Color Code Charts - Copper Cables

### Pair Identification Colors

For pairs numbering 1 through 25, the pair identification colors are outlined below. In cable constructions containing more than 25 pairs, the colors are repeated as necessary. color coded binders are used to identify 25 pair groups of color coded pairs.

Pair Number	Tip Color	Ring Color	Pair Number	Tip Color	Ring Color
01	White	Blue	16	Yellow	Blue
02	White	Orange	17	Yellow	Orange
03	White	Green	18	Yellow	Green
04	White	Brown	19	Yellow	Brown
05	White	Slate	20	Yellow	Slate
06	Red	Blue	21	Violet	Blue
07	Red	Orange	22	Violet	Orange
08	Red	Green	23	Violet	Green
09	Red	Brown	24	Violet	Brown
10	Red	Slate	25	Violet	Slate
11	Black	Blue			
12	Black	Orange			
13	Black	Green			
14	Black	Brown			
15	Black	Slate			

### Identification of Groups of Pairs

For cables through 600 pairs, 25 pair groups are identified by their binder colors in the same sequence as the pair identification is accomplished. Group 1 has White-Blue binders, Group 2 has White-Orange binders, etc. In this manner, each pair is uniquely identified. In cables having 25 pairs or less, binders are normally not used. However, if specified, the binders will be Group 1, White-Blue. For cables of 100-pairs or less, the use of the white binder is optional.

PairNumber	Group Number	Binder Color
01	001-025	White-Blue
02	026-050	White-Orange
03	051-070	White-Green
04	076-100	White-Brown
05	100-125	White-Slate
06	126-150	Red-Blue
07	151-175	Red-Orange
08	176-200	Red-Green
09	201-225	Red-Brown
10	226-250	Red-Slate
11	251-275	Black-Blue
12	276-300	Black-Orange
13	301-325	Black-Green
14	326-350	Black-Brown
15	351-375	Black-Slate
16	376-400	Yellow-Blue
17	401-425	Yellow-Orange
18	426-450	Yellow-Green
19	451-475	Yellow-Brown
20	476-500	Yellow-Slate
21	501-525	Violet-Blue
22	526-550	Violet-Orange
23	551-575	Violet-Green
24	576-600	Violet-Brown
		Violet-Slate

## Technical Data Sheet

## Color Code Charts - Copper Cables

### Super-units Binder Identification Colors

It is desirable for manufacturing purposes to combine four 25 pair groups into "super units" when cables have 900 pairs or more.

Pair Number	Group Number	Binder Color	
0001-0600	001-024	White	W
0601-1200	025-048	Red	R
1201-1800	049-072	Black	BK
1801-2400	073-096	Yellow	Y
2401-3000	097-120	Violet	V

### Spare Pairs

Cable of 100 pairs and above may include spare pairs to replace the defective pairs (if any) during production. The number of spare pairs shall not exceed 1% of the nominal pair size. A part of these spare pairs used for the manufacture. A part of these spare pairs used by the manufacturer, the cable shall not include any other spare pairs for the end user.