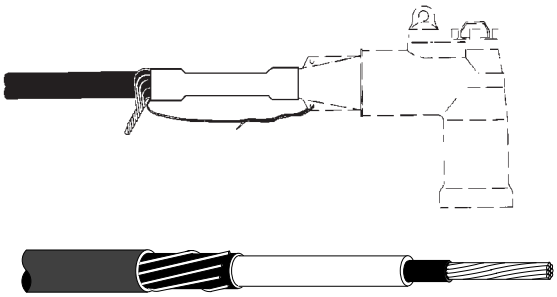
Sealing and Grounding

Cold Shrink™ cable accessory sealing kits are designed to seal the end of JCN cable. Use these kits when installing elbows or other cable accessories that do not include a jacket seal. 3M also offers 3 types of sheath sealing or breakout kits; poured resin, Cold Shrink and heat shrink, several heat shrink cable sealing end caps and a variety of grounding hardware.

Cold Shrink 8450 Series Cable Accessory Sealing Kits

The 8450 Series Cold Shrink cable accessory sealing kits are designed to seal the jacket end of power cables where elbows or other cable accessories are installed. Both the sealing tube and mastic are compatible with commonly used power cable jacketing and semiconductive materials.



Jacketed Concentric Neutral Cable (JCN)

Specifications and Ordering Information for Cold Shrink 8450 Series Cable Accessory Sealing Kits

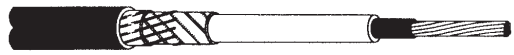
Product Number	8452	8453	8454
Cable Type	Jacketed Concentric Neutral Cable (JCN) See above for cable type illustration.		
Cable Size/Volt Class:			
Cable Size for 15 kV Class	2-4/0 AWG (35-100 mm²)	2/0 AWG - 1000 kcmil (70-500 mm²)	750-1500 kcmil (380-725 mm²)
Cable Size for 25 kV Class	2-2/0 AWG (35-50 mm²)	1/0 AWG-750 kcmil (60-380 mm²)	600-1250 kcmil (325-625 mm²)
Cable Size for 35kV Class	1/0 AWG	1/0 AWG-500 kcmil (60-250 mm²)	350-1000 kcmil (180-500 mm²)
Minimum Seal Diameter	0.95" (24 mm)	1.28" (33 mm)	1.60" (41 mm)
Maximum Installed Diameter	1.94" (49 mm)	2.67" (68 mm)	3.50" (89 mm)
Kit Components:			
Cold Shrink Sealing Tube	1	1	1
Mastic Sealing Strips 6" (152,4 mm)	3 strips	4 strips	6 strips
Instructions	1	1	1
Ordering Information	**8452**	**8453**	**8454**
UPC (054007-)	08336	09676	49938
Inner Unit Pack	1/bag	1/bag	1/bag
Case Qty.	10 kits	10 kits	10 kits

Cold Shrink™ 8460/8461 Shield Adapter Kit

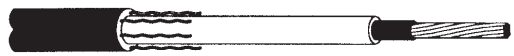
3M Shield Adapter Kits are designed for grounding and sealing tape, wire and UniShield shielded power cables when using cable accessories such as elbows, modular splices and terminations.

These Cold Shrink kits require no heat, special tools or special skills to install. The Cold Shrink kits come complete with all necessary components (except the cable accessory) and are installed in a few simple steps. We've even attached a "bleeder wire" to the ground strap eliminating the need for additional wire and connectors!

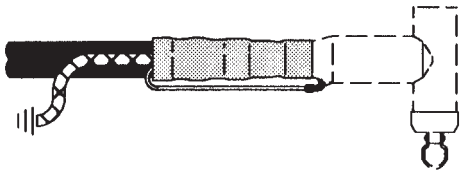
Tape Shielded



Wire Shielded



UniShield®



Specifications and Ordering Information for Cold Shrink 8460/8461 Shield Adapter Kits

Product Number	8460	8461
Cable Type	Tape Shielded, Wire Shielded, Unishield® See above for cable type illustration.	
Cable Size/Volt Class:		
Cable Size for 15 kV Class	2-350 kcmil (35-180 mm^2)	350 - 1000 kcmil (180-500 mm^2)
Cable Size for 25 kV Class	2-350 kcmil (30-180 mm^2)	1/0 AWG-750 kcmil (180-380 mm^2)
Cable Size for 35kV Class	2-250 kcmil (30-125 mm^2)	1/0 AWG-500 kcmil (180-325 mm^2)
Kit Components:		
Cold Shrink Sealing Tube	1	1
Mastic Sealing Strips 6" (152,4 mm)	3 strips	3 strips
Constant Force Spring	1	1
Preformed Ground Braid/Bleeder Wire	1	1
Scotch 13 Semi-Conductive Tape	1 strip	1 strip
Instructions	1	1
Ordering Information	**8460**	**8461**
UPC (054007-)	41458	41459
Inner Unit Pack	1/bag	1/bag
Case Qty.	10 kits	10 kits

3M™ Sheath Seal Kits for Multi-conductor Cable

3M offers 3 types of sheath sealing or breakout kits: poured resin, Cold Shrink™, and heat shrink. 3M offers 2 types of heat shrink cable sealing and caps and a variety of grounding hardware.

3M 5831 and 5832 Sheath Seal Kits

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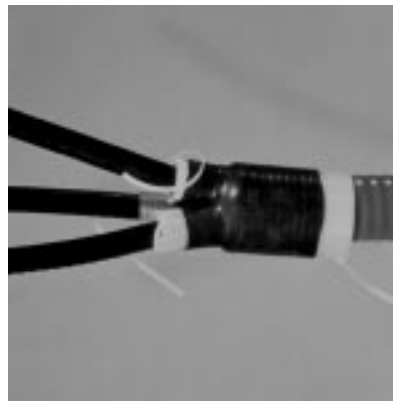
3M Sheath Seal kits 5831 and 5832 are designed to seal the sheath area for multiconductor cables with or without ground wires. They will handle copper or aluminum cables from #2 AWG through 500 kcmil (35-250 mm^2). For kit contents, see chart below. Each kit makes one seal.

Cold Shrink™ 5841 and 5842 Sheath Seal Kits



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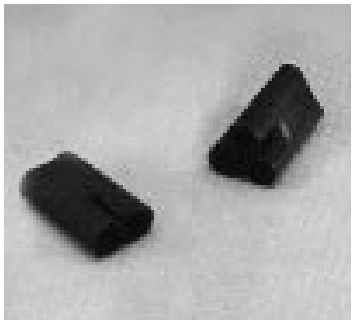
3M Cold Shrink sheath seal kits 5841 and 5842 are designed to seal the sheath area for three conductor cables without ground wires. They will handle copper or aluminum cable from #2 AWG through 500 kcmil (35-250 mm^2). No heat is required when using these kits. For kit contents, see chart below. Each kit makes one seal.

Specifications and Ordering Information for Sheath Seal Kits

Product Number	**5831**	**5832**	**5841**	**5842**
	Each kit makes 1 seal			
Conductor Size	2-3/0 AWG (35-80 mm^2)	4/0 AWG-500 kcmil (120-250 mm^2)	2-4/0 AWG (35-100 mm^2)	4/0 AWG-500 kcmil (120-250 mm^2)
Maximum Jacket or Armor O.D. Range	2.6" (66mm)	3.75" (95,2 mm)	—	—
Conductor Insulation O.D. Range	N/A	N/A	0.30-1.18" (8-30 mm)	0.77-1.88" (20-48 mm)
Cable Jacket Range	—	—	1.20-1.90" (30-48 mm)	1.80-3.10" (46-79 mm)
Kit Components:				
Molded sheath seal body	—	—	1	1
Wrap Around Mold Body	1	1	—	—
3M™ Scotchcast 2130	1	1	—	—
Abrasive Cloth	1	1	—	—
Scotch™ Super 33+ Vinyl Electrical Tape	1	1	—	—
Scotch™ 130C Linerless Rubber Splice Tape	1	1	—	—
3M™ Scotchfil Electrical Insulation Putty	1	1	—	—
Instructions	1	1	1	1
Ordering Information	**5831**	**5832**	**5841**	**5842**
UPC (054007-)	12280	12281	12291	12292
Case Qty.	1 kit	1 kit	1 kit	1 kit

Note: The final determining factor for the 5831 and 5832 is the conductor insulation O.D. and the cable jacket O.D.
Note: The final determining factor for the 5841 and 5842 is the maximum jacket or armor diameter.

3M™ Heat Shrinkable Cable Breakout Boots



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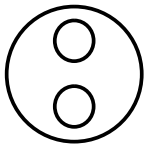
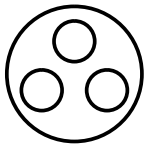
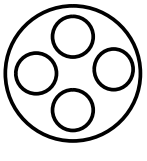
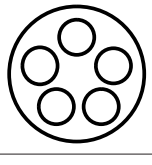
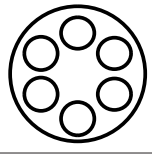
3M Heat Shrinkable HDBB cable breakout boots are designed for dependable insulating and sealing of cable breakouts in multiconductor armored or sheathed cables and conduit ends. HDBB boots are made from flame retardant, cross-linked polyolefin and meet the material requirements of MIL-I-81765-1. The boots provide excellent electrical and mechanical protection and are supplied with an internal coating of adhesive for reliable environmental sealing.

Specifications and Ordering Information for Heat Shrinkable Cable Breakout Boots

Product Number	Cross Section	UPC (054007-)	Cable Entry End (Max. to Min.)	Conductor Legs (Max. to Min.)	Case Qty.
HDBB-205-1-250		58793	0.80-0.37" (20,32-9,40 mm)	0.33-0.11" (8,38-2,79 mm)	1 each
HDBB-210-1-250		35992*	1.20-0.60" (30,38-15,24 mm)	0.50-0.17" (12,70-4,32 mm)	1 each
HDBB-220-1-250		46654**	1.90-0.90" (48,26-22,86 mm)	0.75-0.30" (19,05-7,62 mm)	1 each
HDBB-230-1-250		35993*	3.00-1.50" (76,20-38,10 mm)	1.45-0.50" (38,10-12,70 mm)	1 each
HDBB-310-1-250		35994*	0.90-0.36" (2,86-9,14 mm)	0.33-0.12" (8,38-3,05 mm)	1 each
HDBB-320-1-250		35995*	1.20-0.50" (30,38-12,70 mm)	0.50-0.16" (12,70-4,06 mm)	1 each
HDBB-321-1-250		35996*	1,50-0.69" (38,10-17,53 mm)	0.65-0.18" (16,51-4,57 mm)	1 each
HDBB-325-1-250		35997*	1.70-0.90" (43,18-22,86 mm)	0.82-0.30" (20,83-7,62 mm)	1 each
HDBB-335-1-250		03409*	2.40-1.40" (60,96-35,56 mm)	1.25-0.50" (31,75-12,70 mm)	1 each
HDBB-340-1-250		35998*	3.20-2.00" (81,28-50,80 mm)	1.45-0.75" (38,10-19,05 mm)	1 each
HDBB-345-1-250		58794	4.90-2.32" (124,46-5,93 mm)	2.00-1.00" (50,80-25,40 mm)	1 each
HDBB-405-1-250		58795	0.90-0.43" (22,86-10,92 mm)	0.28-0.11" (7,11-2,79 mm)	1 each
HDBB-410-1-250		35999*	1.25-0.80" (31,75-20,32 mm)	0.50-0.19" (1,70-4,83 mm)	1 each
HDBB-415-1-250		58855	1.75-0.98" (43,18-24,89 mm)	0.79-0.28" (20,07-7,11 mm)	1 each
HDBB-420-1-250		36000*	2.35-1.00" (59,69-2,4 mm)	1.00-0.35" 25,40-8,89 mm)	1 each
HDBB-425-1-250		58797	2.65-1.40" (67,31-35,56 mm)	1.20-0.53" (30,48-13,46 mm)	1 each
HDBB-430-1-250		58798	5.25-3.00" (133,35-76,20 mm)	1.35-0.55" (34,29-13,97 mm)	1 each
HDBB-505-1-250		46648**	2.36-0.96" (59,94-24,38 mm)	1.18-0.29" (70,73-7,36 mm)	1 each
HDBB-605-1-250		36001*	2.39-1.45" (60,71-38,10 mm)	0.80-0.35" (20,32-8,89 mm)	1 each

*UPC prefix 051135-.
**UPC prefix 051138-.
Note: Breakout boots are flame retardant and supplied with a factory-applied sealant. Unlined boots are available on special order. All boots are black in color. Standard package is one and multiples of one.

ICEC Cable End Caps

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ICEC Heat Shrinkable Cable End Caps are medium-duty cross-linked, heat shrinkable polyolefin caps that provide a reliable method of sealing power cables, pipes or other cylindrical objects. The ICEC end caps are installed with a standard heat gun or torch. When applied, they provide a shrink-tight fit conforming to the object covered. On shrinking, an adhesive/lining will melt and bond to the cable jacket, providing an environmental seal.

Standard Color: Black.

Product Number	UPC (054007-)	Expanded/ Recovered I.D.	Length	Case Qty.
ICEC-201-A (Boxed)	03414*	0.80/0.36" (20/9 mm)	2.5" (64 mm)	10 each
ICEC-201-A (Bulk)	03413*	0.80/0.36" (20/9 mm)	2.5" (64 mm)	50 each
ICEC-202-A (Boxed)	03418*	1.75/0.70" (44/18 mm)	3.0" (76 mm)	10 each
ICEC-202-A (Bulk)	03417*	1.75/0.70" (44/18 mm)	3.0" (76 mm)	50 each
ICEC-203-A (Boxed)	03421*	3.50/1.65" (89/42 mm)	4.2" (107 mm)	5 each
ICEC-203-A (Bulk)	03420*	3.50/1.65" (89/42 mm)	4.2" (107 mm)	20 each

*UPC prefix 051135-.

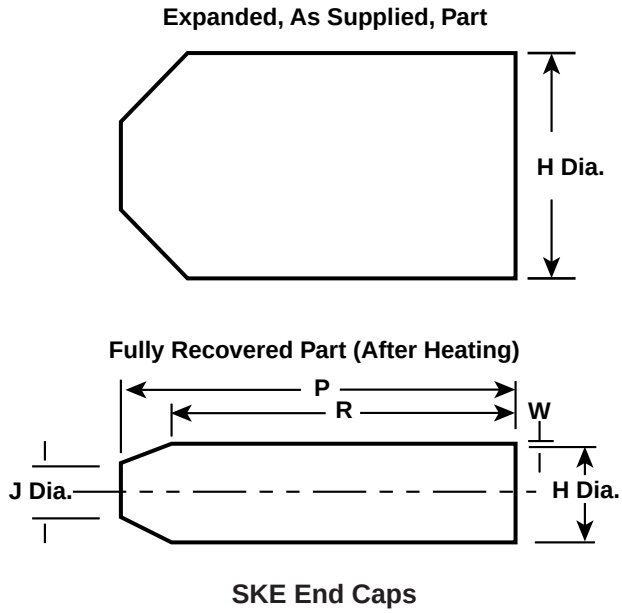
Note: End caps are supplied with a factory-applied sealant. Uncoated product is available on special order.

Heavy-Duty SKE Ends Caps

Heat Shrinkable End Caps are typically used to seal cable ends and provide moisture, mechanical and environmental protection. SKE end caps are for heavy-duty applications.

3M SKE end caps are manufactured from semi-rigid flame retardant, cross-linked polyolefin. They are supplied with a factory applied adhesive lining for reliable environmental sealing. Six different sizes accommodate a broad range of cable diameters.

Standard Color: Black.



SKE End Caps

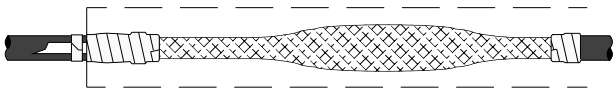
Specifications and Ordering Information for Heavy-Duty SKE End Caps

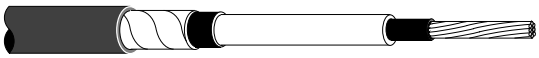
Part Number	UPC (051138-)	H Dia. Min. X	H Dia. Max. R	J Dia. Max. R	P ±10% R	R ±10% R	W ±20% R	For Cable Diameters	Case Qty.
SKE 4/10	48153	0.39 (10,0)	0.16 (4,0)	0.12 (3,0)	1.32 (33,5)	1.18 (30,0)	0.08 (2,0)	0.16-0.31 (4-8)	50 each
SKE 8/20	48154	0.79 (20,0)	0.30 (7,5)	0.26 (6,5)	2.18 (55,3)	1.97 (50,0)	0.09 (2,3)	0.31-0.43 (8-16)	50 each
SKE 15/40	48155	1.57 (40,0)	0.59 (15,0)	0.41 (10,5)	3.54 (90,0)	3.15 (80,0)	0.12 (3,0)	0.59-1.26 (15-32)	10 each
SKE 25/63	48156	2.48 (63,0)	0.98 (25,0)	0.63 (16,0)	5.63 (143,3)	5.12 (130,0)	0.13 (3,3)	1.00-1.97 (25-50)	10 each
SKE 30/76	48157	2.99 (76,0)	1.18 (30,0)	0.67 (17,0)	6.22 (158,0)	5.91 (150,0)	0,16 (4.0)	1.18-2.36 (30-60)	10 each
SKE 45/100	48158	3.94 (100,0)	1.77 (45,0)	1.02 (26,0)	6.40 (162,5)	5.50 (140,0)	0.16 (4,0)	1.77-3.15 (45-80)	10 each

NOTES:

1. All dimensions in both inches and metric - all angles in degrees.
2. Dimensions in table: X= Expanded (Minimum) R= Recovered (Maximum)
3. Color: Black

3M™ SG-2 Hi-Amp Splice Grounding Accessory Kit for 15 kV, 25 kV and 35 kV





Tape Shielded Cable

LC Shielded Cable

The 3M SG-2 hi-amp splice grounding accessory kit is designed to accommodate the shielding and grounding of inline splices made on LC, heavy-duty tape and conventional tape shielded power cables. The SG-2 design provides a fault current capacity of 15,000 amps for 15 cycles on 15, 25 and 35 kV class cables.

The SG-2 kit was designed to accommodate all 3M Quick Splice bodies as well as most other rubber-molded inline splices currently used in the electrical power distribution industry.

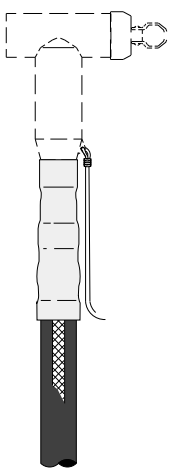
The SG-2 copper screen sleeves are applied over molded rubber splices on cables with shield diameters ranging from 1.25" (32,0 mm) to 2.25" (57,2 mm). In most cases this will include conductor sizes between 350 kcmil and 1000 kcmil and voltage classes of 15 kV through 35 kV. The SG-2 copper screen sleeve and the preformed ground connection braid have an capacity greater than that of #4 AWG copper wire and are fault current rated at 15,000 amps for 15 cycles.

Following SG-2 component installation, 3M Cold Shrink SJ-1A, SJ-2A, SJ-3A, heat shrink HSJ series or Scotch rubber mastic and vinyl tape systems are the recommended choices for sealing and rejacketing the installed, shielded splice.

Each kit provides shielding and grounding for one splice.

Refer to the ordering table on page (?) for cable and accommodation. Final determining factor, for cables not specified, is a shield diameter range from 1.25" (32,0 mm) minimum through 2.25" (57,2 mm) maximum.

3M 8473 Hi-Amp Accessory Grounding Kit for 15,25 and 35 kV

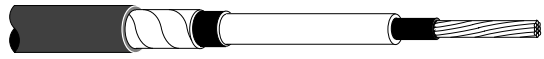


The 3M 8473 hi-amp accessory grounding kit is designed to accommodate the grounding of accessories installed on LC, heavy-duty tape and conventional tape-shielded power cables. The 8473 design provides a fault current capacity of 15,000 amps for 15 cycles on 15kV, 25 kV and 35 kV class cables.

Product application range for the 8473 kit includes cable sizes from 350 kcmil through 1000 kcmil in 15 kV through 35 kV voltage classes as indicated in the table on page ?.

The 8473 kit was designed to be used with 600-amp elbows and other accessories where cable jacket-to-accessory sealing and high-ampacity grounding is desired.

The 8473 preformed ground braid has a fault current capacity of 15,000 amps for 15 cycles with an equivalent cross-sectional area greater than #4 AWG copper wire. **Each kit provides grounding and sealing for one accessory.**

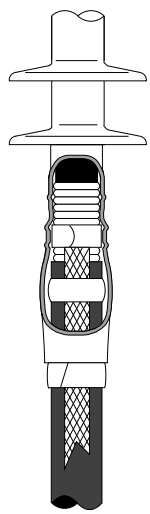


Tape Shielded Cable

LC Shielded Cable

Refer to the ordering table on page (?) for cable accommodation. Final determining factor, for cables not specified, is a shield diameter range from 1.25" (32,0 mm) minimum through 2.25" (57,2 mm) maximum.

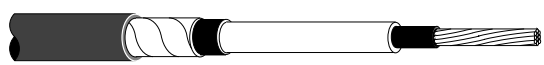
3M GSHA-8 QT-II Hi-Amp Grounding Accessory Kit for 15, 25 and 35 kV



The 3M GSHA-8 QT II termination grounding accessory kit is designed to accommodate the grounding of terminations made on LC, heavy-duty tape and conventional tape-shielded power cables. The GSHA-8 QT II design provides a fault current capacity of 15,000 amps for 15 cycles on 15 kV, 25 kV and 35 kV class cables.

The GSHA-8 kit is designed to be used in conjunction with 3M QT-II terminations in applications where high-ampacity grounding is desired.

The GSHA-8 product will accommodate cable sizes ranging from 350 kcmil through 1000 kcmil and voltage classes of 15 kV through 35 kV. The performed ground braid contained in the GSHA-8 kit has a fault current capacity of 15,000 amps for 15 cycles. **Each kit provides shielding and grounding for one termination.**



Tape Shielded Cable

LC Shielded Cable

Refer to the ordering table on page (?) for cable information. Final determining factor, for cables not specified, is a shield diameter range from 1.25" (32,0 mm) minimum through 2.25" (57,2 mm) maximum.

3M™ 2252 Cable Grounding Kit

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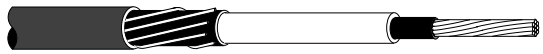
The 3M 2252 Cable Grounding Kit provides a simple yet reliable and secure method for grounding and resealing the jacket of power cables. The kits are designed for use with JCN power cables ranging from #2 AWG to 4/0, through 35 kV.



Jacketed Concentric Neutral Cable (JCN)

Note: REA acceptance listed in REA Bulletin 43-5.

Specifications and Ordering Information for 3M Sealing and Grounding Products 15 kV, 25 kV and 35 kV

Product Number	SG-2	8473	GSHA-8	2252
Cable Type	Tape Shielded Cable, LC Shielded Cable See page 273 for cable type illustration.			Jacketed Concentric Neutral Cable (JCN). See above for cable type illustration.
	Each kit provides grounding and sealing for 1 splice or termination			
Shield O.D. Range	1.25-2.25" (132,0-52,2 mm)	1.25-2.25" (132,0-52,2 mm)	1.25-2.25" (132,0-52,2 mm)	—
Conductor Range	350-1000 kcmil	350-1000 kcmil	350-1000 kcmil	2-4/0 AWG (35-100 mm^2)
Kit Contents:				
PST Cold Shrink Tube	—	1	—	—
Roll of Scotch™ 13 Semiconducting Tape	—	—	1	—
Roll of Scotch™2228 Rubber Mastic Tape	—	—	—	1
Roll of Scotch™ Super 33+ Vinyl Electrical Tape	—	—	—	1
Tin-plated copper "C" connector	—	—	—	1
10" (25,4 cm) Length of tin plated copper braid	—	—	—	1
Copper screen sleeve	1	—	—	—
Mastic seal strip	1	1	1	1
Constant-force spring	1	1	1	1
Preformed ground braid	1	1	1	—
Instructions	1	1	1	1
Ordering Information	**SG-2**	**8473**	**GSHA-8**	**2252**
UPC (054007-)	50041	50043	50042	08335
Case Qty.	10 each	10 each	10 each	10 each

3M™ GS Series Ground Strap Assembly

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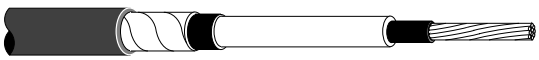
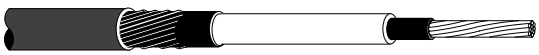
The 3M GS series ground strap assembly kit is designed for grounding tape- and wire- shielded power cables. Check that cable conductor size matches the ground strap assembly shown in the ordering table below.
Each kit contains three spring and strap connecting assemblies.



Tape Shielded Cable



Wire Shielded Cable

Specifications and Ordering Information for 3M GS Series Ground Assembly

Product Number	GS-1	GS-2	GS-3
Cable Type	Jacketed URD Cable (JCN) See above for cable type illustration.		
Strap Length x Width	4.75" x 0.31"	7.12" x 0.62"	6.87" x 0.62"
Conductor Size:			
5kV-100% 90 mils	8-3/0 (10-80)	2/0-750 (70-325)	600-2000 (325-1000)
5kV-133% 8 kV -100% 115 mils	8-1/0 (10-50)	1/0-750 (60-325)	500-2000 (300-1000)
8 kV-133% 140 mils	8-1 (10-38)	1-600 (50-300)	400-1750 (240-850)
15 kV- 100% 175 mils	—	2-500 (35-250)	350-1750 (180-850)
15 kV- 133% 220 mils	—	2-350 (35-180)	250-1500 (125-725)
25 kV 260 mils	—	2-400 (35-200)	3/0-1000 (95-500)
35 kV 345 mils	—	1/0-300 (60-150)	1/0-750 (60-325)
Ordering Information	**GS-1**	**GS-2**	**GS-3**
UPC (054007-)	33976	33977	33978
Inner Unit Pack	3/ bag	3/ bag	3/ bag
Case Qty.	9 each	9 each	9 each

Product Information for Constant Force Springs

Product Number	CFS-.47/.78	CFS-.80/1.50	CFS-1.00/2.20	CFS-1.50-3.00	CFS-1.50/3.00W	CFS-1.80/4.00
Application Range						
Min.(in./mm)	.50(12,7)	.80(20,3)	1.00(25,4)	1.50(38,1)	1.50(38.1)	1.80(45,7)
Max.(in./mm)	.75(19,0)	1.50(38,1)	2.20(56,0)	3.00(76,2)	3.00(76,2)	4.00(101.6)
Width(in./mm)	.500(12,7)	.625(15,9)	.625(15,9)	.625(15,9)	.750(19,0)	.625(15,9)
STD.Ctn	30	30	30	9	9	9
UPC (054007-)	42372	42374	42375	42376	42378	42379