



# Arctic Grade CAN Bus cable 1&2 pairs 0.75mm SHF2



**Store at :** -20 to +70 °C

**Install at :** -20 to +70 °C, **Bend minimum :** 20 times O.D.

**Operate at :** -65 to +80 °C, **Bend minimum :** 20 times O.D.

**Pull maximum :** 50N

## Design

**Conductor :** Stranded bare copper 24×0.20 (0.75mm<sup>2</sup>)

**Insulation :** Cellular polyolefin Ø2.95mm

**Pair :** No 2 insulated conductors stranded together into a pair

**Colour code :** 1.White/blue

**Screen on pair** : Aluminium/polyester tape (100%)

**Grounding wire** : Tinned copper 24×0.20 (0.75mm<sup>2</sup>) polyolefin insulated (nominal Ø2.40mm). Colour yellow/green.

**Assembling** : One screened pair with one grounding wire with fillers, wrapped with fire barrier tape

**Overall screen** : tinned copper braid (coverage ≥80%)

**Outer jacket** : black Fire Retardant and UV Resistant SHF2 material, LSZH (Ø 12.0mm)

**Marking** : APS Finland - ww/yy - ARCTIC GRADE CAN BUS Marine 1x2x0.75 +0.75mm SHF2 - IEC60332-3-22 Cat A - TK/lot + meter

## **Environmental properties and Fire Performances**

**Degree of acidity of gases** : IEC 60754-1, IEC 60754-2 (pH value ≥ 4,3 and Conductivity ≤10µS/mm)

**Halogen acid gas** : IEC 60754-1, IEC 60754-2 (Halogen acid gas emission ≤ 0.5%)

**Smoke Emission** : IEC 61034-2, EN 50268-2 (Transmittance) ≥ 60%)

**Toxicity of evolved gas** : EN 50305 9.2

**Flame retardant** : IEC 60332-1-2

**Fire retardant** : IEC 60332-3-22 Cat.A

**Ozone resistant** : IEC 60811-2-1

**LSZH SHF2** : IEC 60092-360

**Oil resistant** : IEC 60811, IRM 903

**MUD resistant** : upon request

**Water absorption** : IEC60811-1-3

**UV resistant** : IEC60811-2-1, ASTM-D-2565-92A

**Cold Bend** : CSA C22.2 (-65°C)

**Cold Impact** : CSA C22.2 (-55°C)

## Electrical characteristics (IEC60092-350, IEC61784, IEC61158)

**Operation voltage** : 100V

**Test voltage** : 1kV d.c. for 1 minute

**Resistance of the conductor @ 20°C** : ≤ 26.0 Ω/km for bare copper / ≤ 26.7 Ω/km for bare copper

**Insulation resistance @ 20°C** : ≥ 1GΩxkm (BUS conductor) / ≥ 10MΩxkm (earth conductor)

**Nominal Capacitance @ 800Hz** : 40 pF/m

**Average characteristic impedance** : 120 ± 10% @ 1MHz

**Nominal attenuation** : 13.2 dB/km @ 1MHz

## Ordering and delivery information

Pair count	P/N	O.D [mm]	Weight [kg/km]	Packaging
1 pair	OCBA1P075F2	12.0	225	drum 500m (+/-5%)
2 pairs	OCBA2P075F2	12.0	255	drum 500m (+/-5%)

## Other standards of reference

IEC 60092-370	Electrical installations in ships: Guidance on the selection of cables for telecommunication and data.
IEC 60092-360	Electrical installations in ships: Insulating and sheathing materials for shipboard and offshore units.
DNV TAP 827.50/2	Type Approval Program
ABS SVR	Rules for building and classing. Steel Vessels.
ABS SMR	Rules for building and classing. Steel vessels under 90 meters.
IEC 60811	Insulating and sheathing materials of electric cables - Test method

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# Arctic Grade Cat.5e LAN cable S/FTP 4 pairs SHF2



**Store at :** -20 to +70 °C

**Install at :** -20 to +70 °C, **Bend minimum :** 20 times O.D.

**Operate at :** -65 to +80 °C, **Bend minimum :** 20 times O.D.

**Pull maximum :** 50N

## Design

**Conductor :** stranded bare copper 7×0.20 AWG24 (0,22mm<sup>2</sup>)

**Insulation :** polyethylene

**Pair :** 2 insulated conductors stranded together into a pair

**Colour code :** 1.White/blue 2.White/orange 3. White/green 4.White/brown

**Screen 1 :** aluminium/polyester or Aluminium/polyester/aluminium tape over each single pair

**Screen 2 :** tinned copper braid coverage min. 60%

**Outer jacket :** grey Fire Retardant and UV Resistant SHF2 material, LSZH (nominal thickness 1.5mm, Ø 9.5mm)

**Marking :** APS Finland - ww/yy - ARCTIC GRADE SFTP Flex 4x2x24AWG Cat.5e SHF2 - IEC60332-3-22 Cat A - lot + meter

## **Environmental properties and Fire Performances**

**Degree of acidity of gases** : IEC 60754-1, IEC 60754-2 (pH value  $\geq 4,3$  and Conductivity  $\leq 10\mu\text{S}/\text{mm}$ )

**Halogen acid gas** : IEC 60754-1, IEC 60754-2 (Halogen acid gas emission  $\leq 0.5\%$ )

**Smoke Emission** : IEC 61034-2, EN 50268-2 (Transmittance)  $\geq 60\%$ )

**Toxicity of evolved gas** : EN 50305 9.2

**Flame retardant** : IEC 60332-1-2

**Fire retardant** : IEC 60332-3-22 Cat.A

**Ozone resistant** : IEC 60811-2-1

**LSZH SHF2** : IEC 60092-360

**Oil resistant** : IEC 60811, IRM 903

**MUD resistant** : upon request

**Water absorption** : IEC60811-1-3

**UV resistant** : IEC60811-2-1, ASTM-D-2565-92A

**Cold Bend** : CSA C22.2 (-65°C)

**Cold Impact** : CSA C22.2 (-55°C)

## **Electrical characteristics**

**Test voltage** : 700 Vrms (cond/cond and cond/screen) for 1 minute

**Resistance of the conductor @ 20°C** :  $\leq 88 \Omega/\text{km}$

**Insulation resistance** :  $\geq 500 \text{ M}\Omega \times \text{km}$

**Nominal Capacitance** : 52 pF/m (cond/cond)

**Average characteristic impedance** :  $100 \pm 5 \Omega @ 100\text{MHz}$

<b>Frequency (MHz) :</b>	<b>1</b>	<b>4</b>	<b>10</b>	<b>16</b>	<b>20</b>	<b>31.5</b>	<b>62.5</b>	<b>100</b>
Attenuation (dB/100m)	3.2	6.0	9.5	12.1	13.6	17.1	24.8	32.0
NEXT (dB)	65.3	56.3	50.3	47.2	45.8	42.9	38.4	35.3
ELFEXT (dB)	63.8	51.8	43.8	39.7	37.8	33.9	27.9	23.8
Return Loss	23.0	24.1	25.0	25.0	25.0	23.6	21.5	20.1

## Ordering and delivery information

<b>Pair count</b>	<b>P/N</b>	<b>O.D [mm]</b>	<b>Weight [kg/km]</b>	<b>Packaging</b>
4 pairs	O5EASF4P24F2	9,5	100	500m or 1000m (±5%)

## Recommended connectivity

**Keystone jack :** KJ6ASTPNH

**RJ45 plug :** P456SAPS

**Panel :** PPE24SU, OPPE24SU

**Patchcords :** PCMJ6S\_

## Other standards of reference

IEC 60092-370	Electrical installations in ships: Guidance on the selection of cables for telecommunication and data.
IEC 60092-360	Electrical installations in ships: Insulating and sheathing materials for shipboard and offshore units.
DNV TAP 827.50/2	Type Approval Program
ABS SVR	Rules for building and classing. Steel Vessels.
ABS SMR	Rules for building and classing. Steel vessels under 90 meters.
CEI EN 50288-1	Multi-element metallic used in analogue and digital communication and control : Generic Specification
CEI EN 50288-2-1	Setional specification for screened cables characterised up to 100MHz
CEI EN 50288-5-1	Setional specification for screened cables characterised up to 250MHz
CEI EN 50288-4-2	Setional speci cation for screened cables characterised up to 600MHz
CEI EN 50289 series	Communication cables - Specifications for test methods
IEC 60811	Insulating and sheathing materials of electric cables - Test method
Standards	EIA/TIA 568-C.2, ISO/IEC 11801, UL444, UL1581, UL1666
Applications	100Base-TX, 100Base-T, 100VG-AnyLAN, 1000Base-TX, ATM



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## **Arctic Grade Cat.6A LAN cable S/FTP 4 pairs SHF2**



**Store at :** -20 to +70 °C

**Install at :** -20 to +70 °C, **Bend minimum :** 20 times O.D.

**Operate at :** -65 to +80 °C, **Bend minimum :** 20 times O.D.

**Pull maximum :** 50N

## Design

**Conductor :** Stranded bare copper 7×0.22 AWG23 (0,28mm<sup>2</sup>)

**Insulation :** Cellular polyolefin

**Pair :** 2 insulated conductors stranded together into a pair

**Colour code :** 1.White/blue 2.White/orange 3. White/green 4.White/brown (IEC 708-1)

**Screen 1 :** Aluminium/polyester or Aluminium/polyester/aluminium tape over each single pair

**Screen 2 :** tinned copper wire braid ce

**Outer jacket :** Grey Fire Retardant and UV Resistant SHF2 material, LSZH (nominal Ø 10.0mm)

**Marking :** APS Finland - ww/yy - ARCTIC GRADE SFTP Flex 4x2x23AWG Cat.6A SHF2 - IEC60332-3-22 Cat A - lot + m

## Environmental properties and Fire Performances

**Degree of acidity of gases :** IEC 60754-1, IEC 60754-2 (pH value ≥ 4,3 and

Conductivity  $\leq 10\mu\text{S}/\text{mm}$ )

**Halogen acid gas** : IEC 60754-1, IEC 60754-2 (Halogen acid gas emission  $\leq 0.5\%$ )

**Smoke Emission** : IEC 61034-2, EN 50268-2 (Transmittance)  $\geq 60\%$ )

**Toxicity of evolved gas** : EN 50305 9.2

**Flame retardant** : IEC 60332-1-2

**Fire retardant** : IEC 60332-3-22 Cat.A

**Ozone resistant** : IEC 60811-2-1

**LSZH SHF2** : IEC 60092-360

**Oil resistant** : IEC 60811, IRM 903

**MUD resistant** : upon request

**Water absorption** : IEC60811-1-3

**UV resistant** : IEC60811-2-1, ASTM-D-2565-92A

**Cold Bend** : CSA C22.2 (-65°C)

**Cold Impact** : CSA C22.2 (-55°C)

## **Electrical characteristics (IEC 60811, EN 50288-4-2)**

**Test voltage** : 0.7kV a.c. for 1 minute

**Resistance of the conductor @ 20°C** :  $\leq 69,5 /\text{km}$

**Insulation resistance** :  $\geq 500 \text{ M}\Omega \times \text{km}$

**Nominal Capacitance @ 800÷1000MHz** : 45 pF/m

**Average characteristic impedance** :  $100 \pm 5 \Omega$  @ 100MHz

**Transfer impedance** :  $\leq 3\text{m}\Omega/\text{m}$  @ 10MHz

Frequency (MHz) :	1	4	10	20	31,25	62,5	100	155	200	300	400	500
Attenuation dB/100m (nominal)	1,8	3,3	5,4	7,4	9,6	13,9	17,5	22,4	24,8	30,7	35,9	40,2
NEXT dB (nominal)	95	95	92	88	87	86	84	83	82	81	80	79
ACR dB/100m (nominal)	93	92	87	81	77	72	66	61	57	50	44	39
ELFEXT dB (nominal)	90	88	87	85	81	77	72	68	65	62	59	57
Return Loss dB (nominal)	25	28	30	30	30	28	27	26	25	23	22	21

## Ordering and delivery information

Pair count	P/N	O.D [mm]	Weight [kg/km]	Packaging
4 pairs	O6AASF4P23F2	10,0	110	500m (+/-5%)

## Recommended connectivity

**Keystone jack** : KJ6ASTPNH

**RJ45 plug** : P456SAPS

**Panel** : PPE24SU, OPPE24SU

**Patchcords** : PCMJ6S\_

## Other standards of reference

IEC 60092-370	Electrical installations in ships: Guidance on the selection of cables for telecommunication and data.
IEC 60092-360	Electrical installations in ships: Insulating and sheathing materials for shipboard and offshore units.
DNV TAP 827.50/2	Type Approval Program
ABS SVR	Rules for building and classing. Steel Vessels.
ABS SMR	Rules for building and classing. Steel vessels under 90 meters.
CEI EN 50288-1	Multi-element metallic used in analogue and digital communication and control : Generic Specification
CEI EN 50288-2-1	Setional specification for screened cables characterised up to 100MHz
CEI EN 50288-5-1	Setional specification for screened cables characterised up to 250MHz

CEI EN 50288-4-2	Setional speci cation for screened cables characterised up to 600MHz
CEI EN 50289 series	Communication cables - Specifications for test methods
IEC 60811	Insulating and sheathing materials of electric cables - Test method
Standards	EIA/TIA 568-C.2, ISO/IEC 11801, UL444, UL1581, UL1666
Applications	100Base-TX, 100Base-T, 100VG-AnyLAN, 1000Base-TX, ATM

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# Arctic Grade Cat.7 LAN cable S/FTP 4 pairs SHF2



**Store at :** -20 to +70 °C

**Install at :** -20 to +70 °C, **Bend minimum :** 20 times O.D.

**Operate at :** -65 to +80 °C, **Bend minimum :** 20 times O.D.

**Pull maximum :** 50N

## Design

**Conductor :** Stranded bare copper 7×0.22 AWG23 (0,28mm<sup>2</sup>)

**Insulation :** Cellular polyolefin

**Pair :** 2 insulated conductors stranded together into a pair

**Colour code :** 1.White/blue 2.White/orange 3. White/green 4.White/brown (IEC 708-1)

**Screen 1 :** Aluminium/polyester or Aluminium/polyester/aluminium tape over each single pair

**Screen 2 :** tinned copper wire braid ce

**Outer jacket :** Grey Fire Retardant and UV Resistant SHF2 material, LSZH (nominal

Ø 10.0mm)

**Marking** : APS Finland - ww/yy - ARCTIC GRADE SFTP Flex 4x2x23AWG Cat.7 SHF2  
- IEC60332-3-22 Cat A - lot + m

## **Environmental properties and Fire Performances**

**Degree of acidity of gases** : IEC 60754-1, IEC 60754-2 (pH value  $\geq 4,3$  and Conductivity  $\leq 10\mu\text{S}/\text{mm}$ )

**Halogen acid gas** : IEC 60754-1, IEC 60754-2 (Halogen acid gas emission  $\leq 0.5\%$ )

**Smoke Emission** : IEC 61034-2, EN 50268-2 (Transmittance)  $\geq 60\%$

**Toxicity of evolved gas** : EN 50305 9.2

**Flame retardant** : IEC 60332-1-2

**Fire retardant** : IEC 60332-3-22 Cat.A

**Ozone resistant** : IEC 60811-2-1

**LSZH SHF2** : IEC 60092-360

**Oil resistant** : IEC 60811, IRM 903

**MUD resistant** : upon request

**Water absorption** : IEC60811-1-3

**UV resistant** : IEC60811-2-1, ASTM-D-2565-92A

**Cold Bend** : CSA C22.2 (-65°C)

**Cold Impact** : CSA C22.2 (-55°C)

## **Electrical characteristics (IEC 60811, EN**



## 50288-4-2)

**Test voltage :** 1kV d.c. or 0.7kV a.c. for 1 minute

**Resistance of the conductor @ 20°C :** ≤ 69,5 /km

**Insulation resistance :** ≥ 500 MΩxkm (100V-500V)

**Nominal Capacitance @ 800÷1000MHz :** 55 pF/m

**Average characteristic impedance :** 100 ± 5 Ω @ 100MHz

**Transfer impedance :** ≤15mΩ/m @ 1MHz, - ≤10mΩ/m @ 10MHz - ≤30mΩ/m @ 30MHz

<b>Frequency (MHz) :</b>	<b>1</b>	<b>4</b>	<b>10</b>	<b>16</b>	<b>20</b>	<b>32.5</b>	<b>62.5</b>	<b>100</b>	<b>155</b>	<b>200</b>	<b>300</b>	<b>600</b>
Attenuation dB/100m (typical)	2.2	3.8	5.9	7.4	8.4	10.5	15.3	18.1	23.2	26.6	33.3	50.1
NEXT dB (typical)	100	100	95	90	90	90	85	82	80	77	71	67
PS NEXT dB (typical)	95	95	90	86	80	80	80	75	70	68	66	62
ELFEXT dB (typical)	96	93	90	100		100	100	100	100	100	100	100
PS ELFEXT dB (typical)	98	90	98	105	90	90	90	90	90	90	90	90
Return Loss dB (typical)	35	31	38	32	32	31	27	34	28	25	23	21

## Ordering and delivery information

Pair count	P/N	O.D [mm]	Weight [kg/km]	Packaging
4 pairs	O7ASF4P23F2	10,0	110	500m or 1000m (+/-5%)

## Recommended connectivity

**Keystone jack** : KJ6ASTPNH (Category 6A)

**RJ45 plug** : P457SAPS

**Panel** : PPE24SU, OPPE24SU

**Patchcords** : PCMJ6S\_

## Other standards of reference

IEC 60092-370	Electrical installations in ships: Guidance on the selection of cables for telecommunication and data.
IEC 60092-360	Electrical installations in ships: Insulating and sheathing materials for shipboard and offshore units.

DNV TAP 827.50/2	Type Approval Program
ABS SVR	Rules for building and classing. Steel Vessels.
ABS SMR	Rules for building and classing. Steel vessels under 90 meters.
CEI EN 50288-1	Multi-element metallic used in analogue and digital communication and control : Generic Specification
CEI EN 50288-2-1	Setional specification for screened cables characterised up to 100MHz
CEI EN 50288-5-1	Setional specification for screened cables characterised up to 250MHz
CEI EN 50288-4-2	Setional speci cation for screened cables characterised up to 600MHz
CEI EN 50289 series	Communication cables - Specifications for test methods
IEC 60811	Insulating and sheathing materials of electric cables - Test method
Standards	EIA/TIA 568-C.2, ISO/IEC 11801, UL444, UL1581, UL1666
Applications	100Base-TX, 100Base-T, 100VG-AnyLAN, 1000Base-TX, ATM

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# Arctic Grade Fiber Optic cable QFCI SHF2



**Store at :** -40 to +70 °C

**Install at :** -10 to +50 °C, **Bend minimum :** 20 times O.D.

**Operate at :** -65 to +80 °C, **Bend minimum :** 15 times O.D.

**Pull maximum :** 2000N

**Crush maximum :** 3000N/100mm

**Impact maximum :** 30J

**Cable weight :** 25

## Design

**Bare fiber :** 250µm

**Buffer** : Loose tube (Ø2.2mm) filled with jelly, housing up to 12 fibers

**Colour code** : See table

**Fire protection** : A fire barrier is applied over every single tube housing fibers

**Central member** : Steel rope with LSZH sheath

**Cable core** : Loose tubes and fillers (when necessary) are stranded around the central member. The core is wrapped by a tape.

**Inner sheath** : Black SHF1 material 1.0mm thick. Nominal outer diameter 10.1mm.

**Armour** : Galvanized steel, bronze or tinned copper wire braid. Coverage  $\geq 85\%$ .

**Outer jacket** : black Fire Retardant and UV Resistant SHF2 material, LSZH (nominal O.D. 14.0mm) .

**Marking** : APS Finland ww/mm - ARCTIC GRADE Fiber Optic Cable QFCI "fiber count and type" - SHF2 IEC60332-3-22 Cat A - TK/lot + meter

## **Environmental properties and Fire Performances**

**Degree of acidity of gases** : IEC 60754-1, IEC 60754-2 (pH value  $\geq 4,3$  and Conductivity  $\leq 10\mu\text{S}/\text{mm}$ )

**Halogen acid gas** : IEC 60754-1, IEC 60754-2 (Halogen acid gas emission  $\leq 0.5\%$ )

**Smoke Emission** : IEC 61034-2, EN 50268-2 (Transmittance)  $\geq 60\%$ )

**Toxicity of evolved gas** : EN 50305 9.2

**Flame retardant** : IEC 60332-1-2

**Fire retardant** : IEC 60332-3-22 Cat.A

**Fire resistant** : IEC 60331-25

**Ozone resistant** : IEC 60811-2-1

**LSZH SHF2** : IEC 60092-360

**Oil resistant** : IEC 60811, IRM 903

**MUD resistant** : upon request

**Water absorption :** IEC60811-1-3

**UV resistant :** IEC60811-2-1, ASTM-D-2565-92A

**Cold Bend :** CSA C22.2 (-65°C)

**Cold Impact :** CSA C22.2 (-55°C)

## Colour code of fibers

01	02	03	04	05	06	07	08	09	10	11	12
White	Red	Yellow	Green	Blue	Grey	Brown	Black	Violet	Turquoise	Orange	Pink

## Colour code of tubes

Tube	Type A	Type B						
		2 fibers	4 fibers	8 fibers	12 fibers	24 fibers	48 fibers	
1	Red (12 fibers)	Red (2 fibers)	Red (2 fibers)	Red (4 fibers)	Red (4 fibers)	Red (6 fibers)	Red (12 fibers)	
2	Green (24 fibers)	Filler	Green (2 fibers)	Green (4 fibers)	Green (4 fibers)	Green (6 fibers)	Green (12 fibers)	
3	Natural (36 fibers)	Filler	Filler	Filler	Natural (4 fibers)	Natural (6 fibers)	Natural (12 fibers)	

Tube	Type A		Type B					
4	Natural (48 fibers)		Filler	Filler	Filler	Filler	Natural (6 fibers)	Natural (12 fibers)
5	- (*)		- (*)	- (*)	- (*)	- (*)	- (*)	- (*)
6	- (*)		- (*)	- (*)	- (*)	- (*)	- (*)	- (*)
	(*) filler only in case of 6 elements design							

## Ordering and delivery information

Fiber count	SM	OM1	OM2	OM3	OM4	Packaging
2	OQFCIA02S22	OQFCIA02M12	OQFCIA02M22	OQFCIA02M32	OQFCIA02M42	drum 2000m (+/-5%)
4	OQFCIA04S22	OQFCIA04M12	OQFCIA04M22	OQFCIA04M32	OQFCIA04M42	drum 2000m (+/-5%)
8	OQFCIA08S22	OQFCIA08M12	OQFCIA08M22	OQFCIA08M32	OQFCIA08M42	drum 2000m (+/-5%)

Fiber count	SM	OM1	OM2	OM3	OM4	Packaging
12	OQFCIA12S22	OQFCIA12M12	OQFCIA12M22	OQFCIA12M32	OQFCIA12M42	drum 2000m (+/-5%)
24	OQFCIA24S22	OQFCIA24M12	OQFCIA24M22	OQFCIA24M32	OQFCIA24M42	drum 2000m (+/-5%)
48	OQFCIA48S22	OQFCIA48M12	OQFCIA48M22	OQFCIA48M32	OQFCIA48M42	drum 2000m (+/-5%)

Note : for bronze braid add “B” at the end of the P/N, for bronze braid add “T” at the end of the P/N.

## Other standards of reference

IEC 60092-370	Electrical installations in ships: Guidance on the selection of cables for telecommunication and data.
DNV TAP 827.50/1	Type Approval Program - Optical Fibre Cables
ABS SVR	Rules for building and classing. Steel Vessels.
ABS SMR	Rules for building and classing. Steel vessels under 90 meters.
IEC 60793	General specifications for both multimode and single-mode optical fibres
IEC 60794	general specifications for optical fibres cables

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## Arctic Grade Profibus cable 1&2 pairs 0.35mm<sup>2</sup> SHF2



**Store at :** -20 to +70 °C

**Install at :** -20 to +70 °C, **Bend minimum :** 20 times O.D.

**Operate at :** -65 to +80 °C, **Bend minimum :** 20 times O.D.

**Pull maximum :** 50N

## Design

**Conductor** : Stranded bare copper 7×0.25 (0.35mm<sup>2</sup> )

**Insulation** : Polyolefin Ø2.75mm

**Pair** : 2 insulated conductors stranded together into a pair

**Colour code** : 1.Green/red 2.Blue/brown

**Assembling** : No 1 pair with fillers or no 2 pairs stranded together into a compact core

**Screen** : Aluminium/polyester tape (100%) with tinned copper braid (coverage ≥60%)

**Outer jacket** : Black or purple Fire Retardant and UV Resistant SHF2 material, LSZH (Ø 9,6mm)

**Marking** : APS Finland - ww/yy - ARCTIC GRADE PROFIBUS MARINE ...x2x0.35mm<sup>2</sup> SHF2 - IEC60332-3-22 Cat.A - TK/lot + meter

## Environmental properties and Fire Performances

**Degree of acidity of gases** : IEC 60754-1, IEC 60754-2 (pH value ≥ 4,3 and Conductivity ≤10µS/mm)

**Halogen acid gas** : IEC 60754-1, IEC 60754-2 (Halogen acid gas emission ≤ 0.5%)

**Smoke Emission** : IEC 61034-2, EN 50268-2 (Transmittance) ≥ 60%)

**Toxicity of evolved gas** : EN 50305 9.2

**Flame retardant** : IEC 60332-1-2

**Fire retardant** : IEC 60332-3-22 Cat.A

**Ozone resistant** : IEC 60811-2-1

**LSZH SHF2** : IEC 60092-360

**Oil resistant** : IEC 60811, IRM 903

**MUD resistant** : upon request

**Water absorption** : IEC60811-1-3

**UV resistant** : IEC60811-2-1, ASTM-D-2565-92A

**Cold Bend** : CSA C22.2 (-65°C)

**Cold Impact** : CSA C22.2 (-55°C)

## **Electrical characteristics (IEC60092-350, IEC61784, IEC61158)**

**Operation voltage** : 100V

**Test voltage** : 1500V a.c. for 1 minute

**Resistance of the conductor @ 20°C** :  $\leq 55.0 \Omega/\text{km}$

**Insulation resistance @ 20°C** :  $\geq 1\text{G}\Omega \times \text{km}$

**Nominal Capacitance @ 800Hz** : 30 pF/m

**Characteristic impedance** :  $150 \Omega \pm 15 @ 1\text{MHz}$

Nominal attenuation :	45 dB/km	@ 16MHz
	22 dB/km	@ 4MHz
	5 dB/km	@ 38,4 KHz
	3 dB/km	@ 9,6 KHz
Baudrate :	9.6 kBits/s	@ Max. 1200m
	19.2 kBits /	@ Max. 1200m
	93.75 kBits/s	@ Max. 1200m
	187.5 kBits /s	@ Max. 1000m
	500 kBits /s	@ Max. 400m

	1.5 MBits /s	@ Max. 200m
	12 MBits /s	@ Max. 100m

## Ordering and delivery information

Pair count	P/N	O.D [mm]	Weight [kg/km]	Packaging
1 pair	OPBA1P035F2	9.6	95	drum 500m (+/-5%)
2 pairs	OPBA2P035F2	9.6	120	drum 500m (+/-5%)

## Other standards of reference

IEC 60092-370	Electrical installations in ships: Guidance on the selection of cables for telecommunication and data.
IEC 60092-360	Electrical installations in ships: Insulating and sheathing materials for shipboard and offshore units.
DNV TAP 827.50/2	Type Approval Program
ABS SVR	Rules for building and classing. Steel Vessels.
ABS SMR	Rules for building and classing. Steel vessels under 90 meters.

IEC 60811	Insulating and sheathing materials of electric cables - Test method
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# Arctic Grade RS422 cables up to 4 pairs, armoured, SHF2



**Store at :** -20 to +70 °C

**Install at :** -20 to +70 °C, **Bend minimum :** 20 times O.D.

**Operate at :** -65 to +80 °C, **Bend minimum :** 20 times O.D.

**Pull maximum :** 50N

## Design

**Conductor :** stranded tinned copper 7×0.20mm AWG24 (0.60mm, 0.22mm<sup>2</sup>)

**Insulation :** polyethylene Ø1.10mm

**Pair :** no 2 insulated conductors stranded together into a pair

**Colour code :** 1.White/blue 2.White/orange 3. White/green 4.White/brown

**Assembling :** 1, 2 or 4 pairs assembled together into a compact core

**Overall screen :** aluminium/polyester tape (coverage 100%) with tinned copper drain wire 7×0.20mm.

**Inner jacket :** black Fire Retardant SHF1 material, LSZH (Ø 7.0mm)

**Armour :** galvanized steel, tinned copper or bronze wires braid (nominal coverage

85%)

**Outer jacket** : black Fire Retardant and UV Resistant SHF2 material, LSZH (nominal thickness 1.5mm)

**Marking** : APS Finland - ww/yy - ARCTIC GRADE RS422 SHF2 ARMOURED CABLE ...  
PAIRS 24AWG 100 OHM - IEC60332-3-22 Cat A - lot + m

## **Environmental properties and Fire Performances**

**Degree of acidity of gases** : IEC 60754-1, IEC 60754-2 (pH value  $\geq 4,3$  and Conductivity  $\leq 10\mu\text{S}/\text{mm}$ )

**Halogen acid gas** : IEC 60754-1, IEC 60754-2 (Halogen acid gas emission  $\leq 0.5\%$ )

**Smoke Emission** : IEC 61034-2, EN 50268-2 (Transmittance)  $\geq 60\%$ )

**Toxicity of evolved gas** : EN 50305 9.2

**Flame retardant** : IEC 60332-1-2

**Fire retardant** : IEC 60332-3-22 Cat.A

**Ozone resistant** : IEC 60811-2-1

**LSZH SHF2** : IEC 60092-360

**Oil resistant** : IEC 60811, IRM 903

**MUD resistant** : upon request

**Water absorption** : IEC60811-1-3

**UV resistant** : IEC60811-2-1, ASTM-D-2565-92A

**Cold Bend** : CSA C22.2 (-65°C)

**Cold Impact** : CSA C22.2 (-55°C)

## Electrical characteristics

**Operation voltage** : 100V

**Test voltage** : 2000V d.c. for 1 minute

**Resistance of the conductor @ 20°C** :  $\leq 90 \Omega/\text{km}$

**Insulation resistance @ 20°C** :  $\geq 1\text{G}\Omega \times \text{km}$

**Nominal Capacitance @ 800Hz** : 52 pF/m

**Characteristic impedance** :  $100 \pm 15 \Omega @ 1\text{MHz}$

**Nominal attenuation** : 28 dB/km @ 1MHz

## Ordering and delivery information

Pair count	P/N	O.D [mm]	Weight [kg/km]	Packaging
1 pair	ORS2A1P24Fx2	12.0	195	drum 500m (+/-5%)
2 pairs	ORS2A2P24Fx2	12.0	195	drum 500m (+/-5%)
4 pairs	ORS2A4P24Fx2	12.0	215	drum 500m (+/-5%)

For armour replace x with "A" for Galvanized Steel Wire Braid, "T" for Tinned Copper Wire Braid, "B" for Bronze Wire Braid.



## Other standards of reference

IEC 60092-370	Electrical installations in ships: Guidance on the selection of cables for telecommunication and data.
IEC 60092-360	Electrical installations in ships: Insulating and sheathing materials for shipboard and offshore units.
DNV TAP 827.50/2	Type Approval Program
ABS SVR	Rules for building and classing. Steel Vessels.
ABS SMR	Rules for building and classing. Steel vessels under 90 meters.
IEC 60811	Insulating and sheathing materials of electric cables - Test method

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# Arctic Grade RS485 cables up to 4 pairs, armoured, SHF2



**Store at :** -20 to +70 °C

**Install at :** -20 to +70 °C, **Bend minimum :** 20 times O.D.

**Operate at :** -65 to +80 °C, **Bend minimum :** 20 times O.D.

**Pull maximum :** 50N

## Design

**Conductor :** stranded tinned copper 7×0.20mm AWG24 (0.60mm, 0.22mm<sup>2</sup>)

**Insulation :** polyethylene Ø1.30mm

**Pair :** 2 insulated conductors stranded together into a pair

**Colour code** : 1.White/blue 2.White/orange 3. White/green 4.White/brown

**Assembling** : 1, 2 or 4 pairs assembled together into a compact core

**Overall screen 1** : aluminium/polyester tape (coverage 100%) with stranded tinned copper drain wire 7×0.20mm.

**Overall screen 2** : tinned copper braid (nominal coverage 85%)

**Inner jacket** : black Fire Retardant SHF1 material, LSZH (Ø 8.0mm)

**Armour** : galvanized steel wires, tinned copper or bronze wires braid (nominal coverage 85%)

**Outer jacket** : black Fire Retardant and UV Resistant SHF2 material, LSZH (nominal thickness 1.5mm)

**Marking** : APS Finland - ww/yy - ARCTIC GRADE RS485 SHF2 ARMOURED CABLE ...  
PAIRS 24AWG 100 OHM - IEC60332-3-22 Cat A - lot + m

## **Environmental properties and Fire Performances**

**Degree of acidity of gases** : IEC 60754-1, IEC 60754-2 (pH value  $\geq 4,3$  and Conductivity  $\leq 10\mu\text{S}/\text{mm}$ )

**Halogen acid gas** : IEC 60754-1, IEC 60754-2 (Halogen acid gas emission  $\leq 0.5\%$ )

**Smoke Emission** : IEC 61034-2, EN 50268-2 (Transmittance)  $\geq 60\%$

**Toxicity of evolved gas** : EN 50305 9.2

**Flame retardant** : IEC 60332-1-2

**Fire retardant** : IEC 60332-3-22 Cat.A

**Ozone resistant** : IEC 60811-2-1

**LSZH SHF2** : IEC 60092-360

**Oil resistant** : IEC 60811, IRM 903

**MUD resistant** : upon request

**Water absorption** : IEC60811-1-3

**UV resistant** : IEC60811-2-1, ASTM-D-2565-92A

**Cold Bend** : CSA C22.2 (-65°C)

**Cold Impact** : CSA C22.2 (-55°C)

## Electrical characteristics

**Operation voltage** : 100V

**Test voltage** : 2000V d.c. for 1 minute

**Resistance of the conductor @ 20°C** :  $\leq 90 \Omega/\text{km}$

**Insulation resistance @ 20°C** :  $\geq 1\text{G}\Omega\text{xkm}$

**Nominal Capacitance @ 800Hz** : 42 pF/m

**Characteristic impedance** :  $120 \pm 15 \Omega @ 1\text{MHz}$

**Nominal attenuation** : 22 dB/km @ 1MHz

## Ordering and delivery information

Pair count	P/N	O.D [mm]	Weight [kg/km]	Packaging
1 pair	ORS5A1P24Fx2	12.2	200	drum 500m (+/-5%)
2 pairs	ORS5A2P24Fx2	12.2	200	drum 500m (+/-5%)
4 pairs	ORS5A4P24Fx2	12.2	220	drum 500m (+/-5%)

For armour replace x with “A” for Galvanized Steel Wire Braid, “T” for Tinned Copper Wire Braid, “B” for Bronze Wire Braid.

## Other standards of reference

IEC 60092-370	Electrical installations in ships: Guidance on the selection of cables for telecommunication and data.
IEC 60092-360	Electrical installations in ships: Insulating and sheathing materials for shipboard and offshore units.
DNV TAP 827.50/2	Type Approval Program
ABS SVR	Rules for building and classing. Steel Vessels.
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