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**Wiking Kabel GmbH –  
alles außer gewöhnlich!**



**Wiking Kabel GmbH präsentiert  
neue innovative Hybrid- und Multidatakabel  
für den Schiffs- und Offshore-Einsatz**



**Die vom Lloyd's Register**

**uneingeschränkt zugelassene Spezialhybridkabel**

**welche als Netzwerk-, Kontroll- und Instrumenten-Kabel  
für die feste Installation auf Schiffen und auf Offshore-  
Plattformen eingesetzt werden,  
sind ab sofort bei uns erhältlich.**

**Haben wir Ihr Interesse geweckt –  
dann freuen wir uns über Ihre Anfragen.**



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## Type Approval Certificate

This is to certify that the undernoted product(s) has/have been tested with satisfactory results in accordance with the relevant requirements of the Lloyd's Register Type Approval System.

<b>Manufacturer</b>	<b>Wiking Kabel GmbH</b>
<b>Address</b>	Dorothea-Bernstein-Weg 42, Hamburg, 22081, Germany
<b>Place of Production</b>	Kerpen Datacom GmbH Zweifaller Straße 275-287, Stolberg, 52224, Germany
<b>Type</b>	Cables Control, Telecommunication And Instrumentation
<b>Description</b>	Hybrid Shipboard Cable(1) LKD700000120000 halogen-free, flame retardant Hybrid Shipboard Cable(2) LKD700000130000 halogen-free, flame retardant
<b>Trade Name</b>	Spezialhybrid V-II-C-1 Wiking Kabel(1) / (SK-(KS-02YSCH)/KL-U-DQ(ZN)BH/2X(St+C)/H, Spezialhybrid V-IX-B Wiking Kabel(2) / (SK-(KS-02YSCH)/2X(St+C)/H)
<b>Application</b>	Network, control and instrumentation cable for fixed installations in ships and on offshore platforms.
<b>Specified Standard</b>	IEC 60332-1-2: 2022, IEC 60332-3-22 (Category A): 2019 IEC 60793-2-10: 2019, IEC 60793-1-40: 2019 IEC 60794-2-20: 2015, IEC 60794-1-2: 2021 EN 50288-2-1: 2014, EN 50288-4-1: 2014 IEC 60092-360: 2021 (PE and XLPE) Manufacturer's specification: LKD700000120000 <sup>(1)</sup> and LKD700000130000 <sup>(2)</sup>

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**Jochen Koerner**

Electrical & Control - Senior Specialist to  
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## Type Approval Certificate

### Ratings

#### Spezialhybrid V-II-C-1 Wiking Kabel<sup>(1)</sup>:

1. Copper data pairs (6 x (4 x 2 x AWG 23/1) PiMF) 100 (Cat. 7)
2. Power Supply 3 x 1.5 mm<sup>2</sup>
3. Fibre Optic Cable (loose tube) 8 G 50/125 + 4 E 9/125  
8 fibre Multi-Mode (G 50/125 OM4-bendable)  
Colour code: red/green/blue/yellow/white/grey/brown/  
violet  
4 fibre Single-Mode (E 9/125 OS2)  
Colour code: turquoise/black/orange/pink
4. Cable core elements twisted to cable core (with filling elements if necessary)  
Overall diameter approx.: 24.0 mm

#### Spezialhybrid V-IX-B Wiking Kabel<sup>(2)</sup>:

1. Copper data pairs (2 x (4 x 2 x AWG 23/1) PiMF) 100 (Cat. 7)
2. Power Supply 3 x 2.5 mm<sup>2</sup>
3. Cable core elements twisted to cable core (with filling elements if necessary)  
Overall diameter approx.: 18.9 mm

- Min. bending radius(1) (2): 10 x cable diameter  
Temperature range  
during operation(1) (2): -10°C up to +60°C  
during installation(1) (2): -5°C up to +50°C

### Other Conditions

Suitably personal protection measures against electrical shock of the power cable for voltage above 48 V AC is required to be taken. This can be done by the installation of i.e. RCCB devices.

Installation and application is to be in accordance with the applicable Lloyd's Register Rules and Regulations.



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## Type Approval Certificate

This certificate is not valid for equipment, the design, ratings or operating parameters of which have been varied from the specimen tested. The manufacturer should notify Lloyd's Register EMEA of any modification or changes to the equipment in order to obtain a valid Certificate.

The Design Appraisal Document HTS/ETS 1762068-23/JK and its supplementary Type Approval Terms and Conditions form part of this Certificate.

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## Wiking Spezialhybrid V-II-C-1 with LR Approval

# Hybrid Shipboard Cable

halogen-free, flame retardant



**SK-(KS-02YSCH)/KL-U-DQ(ZN)BH/2X(St+C)/H**

**6 x Cat. 7 (4 x 2 x AWG 23/1 PiMF) + 1 x 3 x 1.5 mm<sup>2</sup> + 8 x G50/125 OM4 - bendable/ 4 x E 9/125 OS2**

### Application

For data transmission and controlling on ships.  
Recommended for fixed installation indoor and outdoor, in dry and wet locations.

### Construction

#### 1. Copper data pairs (6 x (4 x 2 x AWG 23/1) PiMF) 100Ω (Cat. 7)

**Conductor**.....solid plain copper, size: AWG 23/1  
**Insulation** .....foamed polyethylene PE with skin layer of PE  
 (Ø 1.45 mm approx.)  
**Colour code** .....white/blue, white/orange, white/green, white/brown  
**Pair Screen** .....plastic coated aluminium tape, metallic surface outside in  
 contact with tinned copper wire braid (overall screen)  
**Overall Screen**.....tinned copper wire braid  
**Outer sheath**.....halogen-free flame retardant polymer, yellow  
**Cable Marking** .....continuously numbered

#### 2. Power Supply 1 x 3 x 1.5 mm<sup>2</sup>

**Conductor**.....multistranded plain copper, size: 1.5 mm<sup>2</sup>  
 (class 5 in acc. to IEC 60228)  
**Insulation** .....cross linked polyethylene XLPE  
**Colour code** .....yellow-green, blue, brown  
**Laying up** .....cores twisted to cable core (with filling elements if necessary)  
**Overall screen** .....at least 1 layer plastic tape, overlapped;  
 1 layer of aluminium coated plastic tape, overlapped,  
 metallic surface in contact with tinned copper wire braid;  
 opt. coverage min. 84 % (in acc. to IEC 60092-350),  
 geometrical cross section approx. 2.7 mm<sup>2</sup>

#### 3. Fibre Optic Cable\* (loose tube) 8 G 50/125 + 4 E 9/125

##### 8 fibre Multi-Mode (G 50/125 OM4-bendable)

**Colour code** .....red/green/blue/yellow/white/grey/brown/violet

##### 4 fibre Single- Mode (E 9/125 OS2)

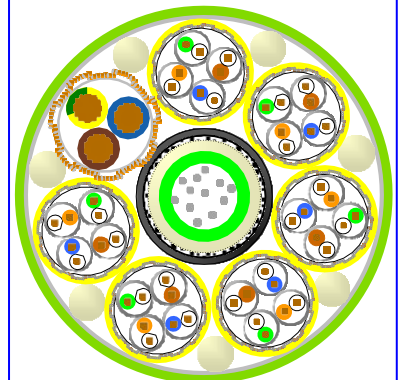
**Colour code**.....turquoise/black/orange/pink

**Core**.....jelly filled loose tube (Ø 2.9 mm) with 12 fibres  
**Strain relief/ Armour** .multifunctional E-glass yarns as strain relief and non-metallic  
 rodent protection above the central loose tube  
**Outer sheath**.....halogen-free, flame retardant polymer, black

#### 4. Cable core

**Laying up** .....elements twisted to cable core  
 (with filling elements if necessary)  
**Wrapping** .....at least 1 layer of plastic tape, overlapped  
**Outer sheath**.....halogen-free, flame retardant polymer, green  
**Cable Marking** .....SPEZIALHYBRID V-II-C-1 WIKING KABEL  
 (inkjet) Production Lot Code Length Marking

### Example Sketch



### Technical Data

<b>Flame retardant:</b>	IEC 60332-1	<b>Temperature range:</b>	-10°C up to +60°C (during operation)
<b>Flame propagation:</b>	IEC 60332-3-22 (cat. A)		- 5°C up to +50°C (during installation)
<b>Overall diameter:</b>	approx.: 24.0 mm max.: 25.0 mm	<b>Min. bending radius:</b>	10 x cable diameter
<b>Weight:</b>	approx.: 639 kg/km		
<b>Part. No.:</b>	<b>LKD700000120000</b>		

### Abbreviations

SK-	Hybrid cable
02YS	foam skin PE
(St+C)	combined screen
H	halogen-free compound
PiMF	pair in metal foil

\* Colour code in acc. to IEC 60304; please be aware to avoid mistaken identity by application



## Wiking Spezialhybrid V-II-C-1 with LR Approval

# Hybrid Shipboard Cable

halogen-free, flame retardant



**SK-(KS-02YSCH)/KL-U-DQ(ZN)BH/2X(St+C)/H**

**6 x Cat. 7 (4 x 2 x AWG 23/1 PiMF) + 1 x 3 x 1.5 mm<sup>2</sup> + 8 x G50/125 OM4 - bendable/ 4 x E 9/125 OS2**

### Electrical data at 20°C (copper data pairs - Cat. 7)

	Character	Unit	Values
Conductor resistance (loop)	max.	Ω/km	75
Impedance (f = 100 MHz)		Ω	100 Ω ± 5 Ω
Isolation resistance	min.	GΩ x km	5
Mutual capacitance	approx.	nF/km	42
Transfer capacitance (e)	approx.	pF/km	1500
Signal velocity (c)	approx.		0.8
Propagation delay	approx.	ns/100 m	420
Test voltage U <sub>eff</sub>		V	1000
Operating voltage	max.	V	125

### Electromagnetic behaviour (copper data pairs - Cat. 7)

	Character	Unit	Values
Transfer impedance at 10 MHz	nom.	mΩ/m	5
Screen attenuation up to 1000 MHz	nom.	dB	70
Coupling attenuation up to 1000 MHz	nom.	dB	85
Segregation class	in acc. to EN 50174-2		d

### Electrical characteristics (copper data pairs - Cat. 7)

Frequency MHz	Attenuation dB/100m		NEXT dB		PS-NEXT dB		ACR dB@100 m		PS-ACR dB@100 m		ACR-F dB@100 m		PSACR-F dB@100 m		RL dB	
	typ.	Cat.7 max.*	typ.	Cat.7 min.*	typ.	Cat.7 min.*	typ.	Cat.7 min.*	typ.	Cat.7 min.*	typ.	Cat.7 min.*	typ.	Cat.7 min.*	typ.	Cat.7 min.*
1	1.9	2	105	80	102	77	104	78	101	75	98	80	95	77	26.6	23
10	4.8	5.7	105	80	102	77	101	74	98	71	103	74	100	71	35.3	25
100	16.3	18.5	105	72	102	69	89	54	86	51	89	54	86	51	39.6	20.1
200	24.3	26.8	105	68	102	65	81	41	78	38	82	48	79	45	36	18
250	27.5	30.2	105	66	102	63	78	36	75	33	79	46	76	43	34	17.3
500	37.9	44.1	100	62	97	59	62	18	59	15	67	40	64	37	29	17.3
600	42.4	48.9	95	61	92	58	53	12	50	9	60	38	57	35	25.4	17.3
700	47.2	---	95	---	92	---	48	---	45	---	57	---	54	---	24.6	---
800	50.3	---	93	---	90	---	43	---	40	---	53	---	50	---	23.5	---
900	54.6	---	90	---	87	---	35	---	32	---	49	---	46	---	22.6	---
1000	58	---	88	---	85	---	30	---	27	---	44	---	41	---	21.5	---
1150	61.9	---	86	---	83	---	25	---	22	---	39	---	36	---	20.6	---

\*EN 50288-4-1 (2004) / IEC 61156-5 (2002) The effect of overall twisting of single elements can lead to an additional attenuation of 3% or frequency selective reflection at multicables.



## Wiking Spezialhybrid V-II-C-1 with LR Approval

# Hybrid Shipboard Cable

halogen-free, flame retardant



**SK-(KS-02YSCH)/KL-U-DQ(ZN)BH/2X(St+C)/H**

**6 x Cat. 7 (4 x 2 x AWG 23/1 PiMF) + 1 x 3 x 1.5 mm<sup>2</sup> + 8 x G50/125 OM4 - bendable/ 4 x E 9/125 OS2**

### Electrical data at 20°C (Power Supply 230 V)

	Character	Unit	Values
Conductor Size	nom.	Mm <sup>2</sup>	1.5
Conductor resistance	max.	Ω/km	13.3
Test voltage $U_{eff}$ core:core core:screen		V	3500
		V	3500
Operating voltage	max.	V	0.6/1 kV

### Geometrical data (Power Supply 230 V)

No. of cores	RT of insulation	RT of core	Overall diameter
	nom.	nom.	approx.
	(mm)	(mm)	(mm)
1.5 mm <sup>2</sup>			
3	0.7	3.0	7.5

### Optical Properties Multimode G 50/125 (OM4 – Fibre - bendable)

Cladding diameter		μm	125 ± 1
Coating diameter		μm	245 ± 0.5
Coating non-circularity	max.	%	1
Optical attenuation at 850 nm	max.	dB/km	2.5
Optical attenuation at 1300 nm	max.	dB/km	0.7
Bandwidth at 850 nm	min.	MHz x km	3500
Bandwidth at 1300 nm	min.	MHz x km	500
laser bandwidth at 850 nm	min.	MHz x km	4700

### Optical Properties Singlemode E 9/125 (OS2 – Fibre)

Cladding diameter		μm	125 ± 1
Coating diameter		μm	245 ± 0.5
Coating non-circularity	max.	%	1
Optical attenuation at 1310 nm	max.	dB/km	0.36
Optical attenuation at 1550 nm	max.	dB/km	0.22

### Geometrical data overall

RT of outer sheath	Ø over outer sheath	Weight
nom.	nom. / max.	approx.
(mm)	(mm)	kg/km
1.4	24.0 / 25.0	639



# Hybrid Shipboard Cable

## halogen-free, flame retardant

**SK-(KS-02YSCH)/2X(St+C)/H**  
**2 x Cat. 7 (4 x 2 x AWG 23/1 PiMF) + 1 x 3 x 2.5 mm<sup>2</sup>**

### Application

For data transmission and controlling on ships.  
 Recommended for fixed installation indoor and outdoor, in dry and wet locations.

### Construction

#### 1. Copper data pairs (2 x (4 x 2 x AWG 23/1) PiMF) 100Ω (Cat. 7)

- Conductor** ..... solid plain copper, size: AWG 23/1
- Insulation** ..... foamed polyethylene PE with skin layer of PE (Ø 1.45 mm approx.)
- Colour code** ..... white/blue, white/orange, white/green, white/brown
- Pair Screen** ..... plastic coated aluminium tape, metallic surface outside in contact with tinned copper wire braid (overall screen)
- Overall Screen** ..... tinned copper wire braid
- Outer sheath** ..... halogen-free flame retardant polymer, yellow

#### 2. Power Supply 1 x 3 x 2.5 mm<sup>2</sup>

- Conductor** ..... multistranded plain copper, size: 2.5 mm<sup>2</sup> (class 5 in acc. to IEC 60228)
- Insulation** ..... cross linked polyethylene XLPE
- Colour code** ..... yellow-green, blue, brown
- Laying up** ..... cores twisted to cable core (with filling elements if necessary)
- Overall screen** ..... at least 1 layer plastic tape, overlapped; 1 layer of aluminium coated plastic tape, overlapped, metallic surface in contact with tinned copper wire braid; opt. coverage min. 84 % (in acc. to IEC 60092-350), geometrical cross section approx. 4.3 mm<sup>2</sup>

#### 3. Cable core

- Laying up** ..... elements twisted to cable core (with filling elements if necessary)
- Wrapping** ..... at least 1 layer of plastic tape, overlapped
- Outer sheath** ..... halogen-free, flame retardant polymer, green

**Cable Marking** ..... SPEZIALHYBRID V-IX-B WIKING KABEL  
 (inkjet) Production Lot Code Length Marking

### Example Sketch



### Technical Data

<b>Flame retardant:</b>	IEC 60332-1	<b>Temperature range:</b>	-10°C up to +60°C (during operation)
<b>Flame propagation:</b>	IEC 60332-3-22 (cat. A)		-5°C up to +50°C (during installation)
<b>Overall diameter:</b>	approx.: 18.9 mm max.: 19.9 mm	<b>Min. bending radius:</b>	10 x cable diameter
<b>Weight:</b>	approx.: 367 kg/km		
<b>Part No.:</b>	<b>LKD700000130000</b>		

### Abbreviations

SK-	Hybrid cable
02YS	foam skin PE
2X	XLPE
(St+C)	combined screen
H	halogen-free compound
PiMF	pair in metal foil





Wiking Spezialhybrid V-IX-B with LR Approval

# Hybrid Shipboard Cable

## halogen-free, flame retardant



SK-(KS-02YSCH)/2X(St+C)/H  
2 x Cat. 7 (4 x 2 x AWG 23/1 PiMF) + 1 x 3 x 2.5 mm<sup>2</sup>

### Electrical data at 20°C (copper data pairs - Cat. 7)

	Character	Unit	Values
Conductor resistance (loop)	max.	Ω/km	75
Impedance (f = 100 MHz)		Ω	100 Ω ± 5 Ω
Isolation resistance	min.	GΩ x km	5
Mutual capacitance	approx.	nF/km	42
Transfer capacitance (e)	approx.	pF/km	1500
Signal velocity (c)	approx.		0.8
Propagation delay	approx.	ns/100 m	420
Test voltage U <sub>eff</sub>		V	1000
Operating voltage	max.	V	125

### Electromagnetic behaviour (copper data pairs - Cat. 7)

	Character	Unit	Values
Transfer impedance at 10 MHz	nom.	mΩ/m	5
Screen attenuation up to 1000 MHz	nom.	dB	70
Coupling attenuation up to 1000 MHz	nom.	dB	85
Segregation class	in acc. to EN 50174-2		d

### Electrical characteristics (copper data pairs - Cat. 7)

Frequency MHz	Attenuation dB/100m		NEXT dB		PS-NEXT dB		ACR dB@100 m		PS-ACR dB@100 m		ACR-F dB@100 m		PSACR-F dB@100 m		RL dB	
	typ.	Cat.7 max.*	typ.	Cat.7 min.*	typ.	Cat.7 min.*	typ.	Cat.7 min.*	typ.	Cat.7 min.*	typ.	Cat.7 min.*	typ.	Cat.7 min.*	typ.	Cat.7 min.*
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900	54.6	---	90	---	87	---	35	---	32	---	49	---	46	---	22.6	---
1000	58	---	88	---	85	---	30	---	27	---	44	---	41	---	21.5	---
1150	61.9	---	86	---	83	---	25	---	22	---	39	---	36	---	20.6	---

\*EN 50288-4-1 (2004) / IEC 61156-5 (2002) The effect of overall twisting of single elements can lead to an additional attenuation of 3% or frequency selective reflection at multicables.



# Hybrid Shipboard Cable

## halogen-free, flame retardant



SK-(KS-02YSCH)/2X(St+C)/H  
2 x Cat. 7 (4 x 2 x AWG 23/1 PiMF) + 1 x 3 x 2.5 mm<sup>2</sup>

<b>Electrical data at 20°C (Power Supply 230 V)</b>			
	<b>Character</b>	<b>Unit</b>	<b>Values</b>
<b>Conductor Size</b>	nom.	mm <sup>2</sup>	2.5
<b>Conductor resistance</b>	max.	Ω/km	7.98
<b>Test voltage <math>U_{eff}</math></b>	core:core	V	3500
	core:screen	V	3500
<b>Operating voltage</b>	max.	V	0.6/1 kV

<b>Geometrical data (Power Supply 230 V)</b>			
<b>No. of cores</b>	<b>RT of insulation</b>	<b>RT of core</b>	<b>Overall diameter</b>
	nom.	nom.	approx.
	(mm)	(mm)	(mm)
2.5 mm <sup>2</sup>			
3	0.7	3.4	8.3

<b>Geometrical data overall</b>		
<b>RT of outer sheath</b>	<b>Ø over outer sheath</b>	<b>Weight</b>
nom.	nom. / max.	approx.
(mm)	(mm)	kg/km
1.4	18.9 / 19.9	367