Cables for marine applications

The Quality Connection

LEONI
## Overview

### Applications as multifaceted as the ocean

**Overview Ethernet cables CAT 07-A**

*Industrial Ethernet Cat 5e ES (L45467-J16-B26)*

*SeaLine® CAT 7 (SHF1) (L45467-J416-C16)*

*SeaLine® CAT 7 (MUD RES) (L45467-J416-C36)*

*SeaLine® CAT 7 (SHF1) (L45467-J416-C86)*

*SeaLine® CAT 7 (MUD RES) (L45467-J416-C106)*

*SeaLine® CAT 7 (SHF1) (L45467-J417-C6)*

*SeaLine® CAT 7 (SHF1) (L45467-J416-C86)*

*SeaLine® CAT 7 (MUD RES) (L45467-J416-C106)*

*SeaLine® CAT 6 (SHF1) (L45467-J417-C16)*

*SeaLine® CAT 6 (SHF1) (L45467-J417-C106)*

*SeaLine® CAT 6 (SHF2) (L45467-J417-C116)*

*SeaLine® CAT 6 (MUD RES) (L45467-J417-C156)*

**Cables with functional integrity during fire type PH 120+**

*PROFIBUS (L45467-G17-C46)*

*PROFIBUS (L45467-G17-C56)*

*SeaLine® CAN-BUS (L45467-F19-C16)*

*SeaLine® CAN-BUS (L45467-F19-C26)*

*AS-Interface (L45587-M21-B48)*

*Foundation Fieldbus (L45467-J20-B6)*

*Foundation Fieldbus (L45467-J220-B6)*

**Overview RG types**

*SeaLine® (L45466-D15-B256)*

*SeaLine® (L45466-D18-B166)*

*SeaLine® (L45466-B13-B266)*

*SeaLine® (L45466-D14-B136)*

*SeaLine® (L45466-B18-B86)*

*PROFIBUS Hybrid (L45467-G117-W6)*

*SeaLine® EthernetLink-Cable (L45467-J217-W16)*

*SeaLine® (L45467-J316-W6)*

*SeaLine® (L45469-D49-A219)*

*SeaLine® (L45493-D49-A229)*

*Camera cable (L45466-D114-W36)*

**Overview Hybrid cables according to NEK 606**

*Hybrid cable MUD RES*
Applications as multifaceted as the ocean

The Business Unit Industrial Solutions offers a wide range of cables and cable systems tailored to the respective purpose in marine applications. With our extensive knowledge, we can offer our customers products that will match these extraordinary requirements at any time.

With its FieldLink product range, LEONI is able to design and manufacture cables as single and hybrid solutions:

- Cat 5e, Cat 6, Cat 7
- PROFIBUS cables
- CANbus cables
- AS-Interface cables
- Fieldbus cables
- Fiber optic cables
- Power and control cables
- Coaxial cables
- Cables with air and fluid tubes

Of course we could combine the different elements e.g. tubes, fiber optics, supply and control elements for special hybrid solutions according to customer requirements. The outer jacket can be provided with SHF1, SHF2 and mud resistant material as well as materials for special applications. This material guarantees excellent oil resistance and other environmental resistance characteristics.

For the armoring we have different options to prevent the cable in regards to mechanical and chemical influences:

- stainless steel
- galvanised steel
- served wires
<table>
<thead>
<tr>
<th>AWG</th>
<th>Type</th>
<th>Order Number</th>
</tr>
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<tbody>
<tr>
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</table>
Design

Wire:
Stranded tinned wire 7 X 0.25 (AWG 22)  \( \varnothing \ 0.75 \ \text{mm} \)
Insulation of Polypropylene (PP)  \( \varnothing \ 1.5 \ \text{mm} \)

Core:
Filler as central element
1.layer:  4 wire twisted
Sequence of colors: WH-YE-BU-OG
Plastic tape, overlapped
Inner jacket: Thermoplastic copolymer (FRNC)  \( \varnothing \ 3.9 \ \text{mm} \)
Alulaminate foil overlapped
Shield braiding of tinned copper wires 0.13 mm dia
Coverage about 85%  \( \varnothing \ 4.7 \ \text{mm} \)

Jacket:
Thermoplastic copolymer (FRNC) GN
Wall thickness about 0.9 mm  \( \varnothing \ (6.5 \pm 0.4) \ \text{mm} \)

Printing: "sequential length in metres" INDUSTRIAL ETHERNET ES ITP MARINE CABLE CAT 5 PLUS * 22AWG (SHIELDED) (UL) E119100 CMG 75°C Verified (UL) CAT 5E Patch Cable or PLTC FT4 Sun Res * LEONI L L-9YH(S)CH 2X2X0.34/1.5-100 GN VZN FRNC 60V

Electrical data at 20°C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Loop resistance</td>
<td>( \leq 120 \ \text{Ohm/km} )</td>
</tr>
<tr>
<td>Signal run time</td>
<td>( \leq 5.3 \ \text{ns/m} )</td>
</tr>
</tbody>
</table>
| Insulation resistance            | \( \geq 500 \ \text{MOhm*km} \)  
\( (100 \pm 15) \ \text{Ohm} \) |
| Characteristic impedance         | 1 – 100 MHz            |
| Surface transfer impedance of screen 10 MHz | \( \leq 10 \ \text{mOhm/m} \) |
| Test voltage (wire/wire/screen rms 50Hz 1min) | \( = 700 \ \text{V} \) |
Near-end crosstalk attenuation

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>1</th>
<th>4</th>
<th>10</th>
<th>16</th>
<th>20</th>
<th>31.25</th>
<th>62.5</th>
<th>100</th>
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<tbody>
<tr>
<td>typ. value (dB - 100m)</td>
<td>80</td>
<td>76</td>
<td>70</td>
<td>65</td>
<td>63</td>
<td>60</td>
<td>55</td>
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Attenuation

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<th>Frequency (MHz)</th>
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<th>20</th>
<th>31.25</th>
<th>62.5</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>typ. value (dB/100m) (dB/100ft)</td>
<td>1,8 (0,5)</td>
<td>3,6 (1,1)</td>
<td>6,0 (1,8)</td>
<td>7,6 (2,3)</td>
<td>8,7 (2,7)</td>
<td>11 (3,4)</td>
<td>16 (4,9)</td>
<td>21 (6,4)</td>
</tr>
</tbody>
</table>

The electrical requirements acc. to EN 50288-2-1

Mechanical and thermal characteristics

- Conductor/Screen material acc. to DIN EN 13602 Cu-ETP-A...-B
- Insulating material acc. to specification ITP K02-E
- Jacket material acc. to specification ITP K02-E
- Flame test acc. to IEC 332-3 category A/F

UL-File E119100 Vol.1 Sec. 11 Page 1
UL-File E352715 Vol.1 Sec. 1 Page 1 Verified CAT 5E
UL-File E116441 Vol.1 Sec. 6 Page 4

Other characteristics:

- Approved for Marine and Offshore Applications
- Germanischer Lloyd
- Lloyds Register of Shipping
- ABS Europe LTD
- Bureau Veritas
- Det Norske Veritas
- Limited oil resistance
- UV-resistant
- Tensile loading: \( \leq 150 \text{ N} \)

Permissible temperature range:
- During laying: \(-40^\circ\text{C} \text{ up to } +75^\circ\text{C}\)
- Transport temperature range: \(-40^\circ\text{C} \text{ up to } +50^\circ\text{C}\)
- Min. bending radius allowed: repeated 7,5X ø, single 3X ø
- Weight about: 64 Kg/km

Application

Cable for marine application

Designation of order:

- L45467-J16-B26
- 202280
- L-9YH(ST)CH 2X2X0.34/1.5-100 GN VZN FRNC
- 1000 m on non-returnable reel
LEONI Special Cables GmbH

LEONI SeaLine®
CAT 7 (SHF1)
Cable type: 02YS CH 4X2X0.6/1.4-100 LI PIMF

Design

Wire
Stranded bare copper wire 7 X 0.2 (24 AWG) (0.22 mm²)  0.6 mm (0.024 in dia)
Insulation of foamed Polyethylene (PE) with skin  1.43 mm (0.056 in dia)

Screened pair
2 wires twisted to a pair
Aluminate foil overlapped, applied longitudinally

Core:
Central element: Strain relief (300 N)
4 screened pairs
Sequence of colors: WH/BU-WH/OG-WH/GN-WH/BN
Shield braiding of tinned copper wires 0.1 mm dia (38 AWG)
Coverage about 60%  6.6 mm (0.260 in dia)

Jacket:
Thermoplastic copolymer (FRNC) BK
Wall thickness about 1.0 mm (IEC 60092-376)  (8.7 ±0.2) mm (0.343 ±0.008 in dia)

Printing: "sequential length in metres" LEONI L SeaLine® * L45467-J416-C16 * 02YS CH 4X2X0.6/1.4-100 LI PIMF CAT7 IEC 60332-3-22 SHF1 * "internal lot number"

Electrical data at 20°C

Loop resistance  ≤  180 Ohm/km
Insulation resistance  ≥  500 MOhm/km
Signal run time  ≤  5.3 ns/m
Capacitance (1 kHz)  ≈  42 nF/km
Operating voltage (peak)  ≤  100 V
Characteristic impedance  100 MHz  (100 ±5) Ohm
LEONI Special Cables GmbH

Surface transfer impedance 10 MHz
10 mOhm/m
Test voltage (wire/wire/screen rms 50Hz 1min) 700 V

<table>
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<td>44.5</td>
<td>38.4</td>
<td></td>
</tr>
<tr>
<td>PSELFext (dB)</td>
<td>77</td>
<td>77</td>
<td>71</td>
<td>66.9</td>
<td>65</td>
<td>61.1</td>
<td>55.1</td>
<td>51</td>
<td>47.2</td>
<td>45.0</td>
<td>41.5</td>
<td>35.4</td>
</tr>
<tr>
<td>Attenuation dB/100m</td>
<td>2.9</td>
<td>5.5</td>
<td>8.5</td>
<td>10.8</td>
<td>12.1</td>
<td>15.2</td>
<td>21.7</td>
<td>27.8</td>
<td>35.0</td>
<td>40.1</td>
<td>50.0</td>
<td>73.3</td>
</tr>
</tbody>
</table>

Electrical requirements acc. to EN 50288-4-2 & IEC 61156-6

**Mechanical and thermal characteristics**

Conductor material acc. to DIN EN 13602 Cu-ETP-A...
Screen material acc. to DIN EN 13602 Cu-ETP-A...-B
Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table 2/A (HD 624.3) (02Y)
Jacket material acc. to IEC 60092-359 / SHF1
Oil resistant acc. to IEC 60811-2-1 (4 hours / 70°C)
Flame retardant acc. to IEC 60332-1-2
Flame retardant acc. to IEC 60332-3-22 (Cat. A)

Internal Shipbuilding Specification: CAT K 07-A

**Other characteristics:**

RoHS compliant (Directive 2011/65/EC)
Low Smoke, Fire retardant, Zero Halogen
Corrosivity of fumes acc. to IEC 60754-2
Smoke-density acc. to IEC 61034
UV-resistant

Permissible temperature range
Transport, installation and operating: -40 °C (-40 °F) up to 80 °C (176 °F)

Min. bending radius allowed: repeated 10X ø, single 5X ø
Weight about: 76.6 kg/km (51.3 lb/1000ft)

**Designation of order:**

L45467-J416-C16
02YS CH 4X2X0.6/1.4-100 LI PIMF
1000 m (3281 ft) on non-returnable reel
**Design**

**Wire**
Stranded bare copper wire 7 X 0.2 (24 AWG) (0.22 mm²)  
ø 0.6 mm (0.024 in dia)
Insulation of foamed Polyethylene (PE) with skin  
ø 1.43 mm (0.056 in dia)

**Screened pair**
2 wires twisted to a pair  
Alulaminate foil overlapped, applied longitudinally

**Core:**
Central element: Strain relief (≥ 300N)  
4 screened pairs twisted  
Sequence of colors: WH/BU-WH/OG-WH/GN-WH/BN  
Shield braiding of tinned copper wires 0.1 mm dia (38 AWG)  
Coverage about 60%  
ø 6.6 mm (0.260 in dia)

**Jacket:**
Special thermoplastic copolymer BK  
Wall thickness about 1.0 mm (IEC 60092-376)  
ø (8.7 ±0.2) mm (0.343 ±0.008 in dia)

Printing: "sequential length in metres" LEONI L SeaLine® * L45467-J416-C36 * 02YSCH 4X2X0.6/1.4-100 LI PIMF CAT7 MUD RES * "internal lot number"

**Electrical data at 20°C**

- **Loop resistance**  
  ≤ 180 Ohm/km
- **Insulation resistance**  
  ≥ 500 MOhm*km
- **Signal run time**  
  ≤ 5.3 ns/m
- **Capacitance (1 kHz)**  
  = 42 nF/km
- **Operating voltage (peak)**  
  ≤ 100 V
- **Characteristic impedance**  
  100 MHz  
  (100 ±5) Ohm

---

LEONI SeaLine®
CAT 7 (MUD RES)
Cable type: 02YSCH 4X2X0.6/1.4-100 LI PIMF
Surface transfer impedance 10 MHz
Test voltage (wire/wire/screen rms 50Hz 1min)

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>1</th>
<th>4</th>
<th>10</th>
<th>16</th>
<th>20</th>
<th>31.25</th>
<th>62.5</th>
<th>100</th>
<th>155</th>
<th>200</th>
<th>300</th>
<th>600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Next (dB)</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>75.1</td>
<td>72.4</td>
<td>69.6</td>
<td>67.9</td>
<td>65.3</td>
<td>60.8</td>
<td></td>
</tr>
<tr>
<td>PSNext (dB)</td>
<td>77</td>
<td>77</td>
<td>77</td>
<td>77</td>
<td>77</td>
<td>72.5</td>
<td>69.4</td>
<td>66.6</td>
<td>64.9</td>
<td>62.3</td>
<td>57.8</td>
<td></td>
</tr>
<tr>
<td>ELFext (dB)</td>
<td>80.0</td>
<td>80.0</td>
<td>74.0</td>
<td>69.9</td>
<td>68</td>
<td>64.1</td>
<td>58.1</td>
<td>54</td>
<td>50.2</td>
<td>48.0</td>
<td>44.5</td>
<td>38.4</td>
</tr>
<tr>
<td>PSELFext (dB)</td>
<td>77</td>
<td>77</td>
<td>77</td>
<td>66.9</td>
<td>65</td>
<td>61.1</td>
<td>55.1</td>
<td>51</td>
<td>47.2</td>
<td>45.0</td>
<td>41.5</td>
<td>35.4</td>
</tr>
<tr>
<td>Attenuation dB/100m</td>
<td>2.9</td>
<td>5.5</td>
<td>8.5</td>
<td>10.8</td>
<td>12.1</td>
<td>15.2</td>
<td>21.7</td>
<td>27.8</td>
<td>35.0</td>
<td>40.1</td>
<td>50.0</td>
<td>73.3</td>
</tr>
<tr>
<td>Frequency</td>
<td>4</td>
<td>8</td>
<td>10</td>
<td>16</td>
<td>20</td>
<td>31.25</td>
<td>62.5</td>
<td>100</td>
<td>155</td>
<td>250</td>
<td>350</td>
<td>600</td>
</tr>
<tr>
<td>Return loss (dB)</td>
<td>23.1</td>
<td>24.5</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>23.6</td>
<td>21.5</td>
<td>20.1</td>
<td>18.8</td>
<td>17.3</td>
<td>17.3</td>
<td>17.3</td>
</tr>
</tbody>
</table>

Electrical requirements acc. to EN 50288-4-2 & IEC 61156-6

**Mechanical and thermal characteristics**

Conductor material acc. to DIN EN 13602 Cu-ETP-A...
Screen material acc. to DIN EN 13602 Cu-ETP-A...
Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table 2/A (HD 624.3) (02Y)
Jacket material acc. to IEC 60092-359 / SHF2
Flame retardant acc. to IEC 60332-1-2
Flame retardant acc. to IEC 60332-3-24 (Cat. C)
Mud resistant acc. to NEK606

Approval for Marine and Offshore applications possible

**Other characteristics:**

RoHS compliant (Directive 2011/65/EC)
Fire retardant, Zero Halogen
Halogen free acc. to IEC 60754-1
UV-resistant

Permissible temperature range
Transport, installation and operating: -40 °C (-40 °F) up to 80 °C (176 °F)

Min. bending radius allowed: repeated 10X ø, single 5X ø
Weight about: 69 kg/km (46,2 lb/1000ft)

**Designation of order:**

L45467-J416-C36
02YSCH 4X2X0.6/1.4-100 LI PIMF
1000 m (3281 ft) on non-returnable reel
LEONI SeaLine®
CAT 7 (SHF1)
Cable type: 02YS CH 4X2X0.6/1.4-100 PIMF

Design

Wire
Bare copper wire (23 AWG) ø 0.6 mm (0.024 in dia)
Insulation of foamed Polyethylene (PE) with skin ø 1.43 mm (0.056 in dia)

Screened pair
2 wires twisted to a pair
Alulaminate foil overlapped, applied longitudinally

Core:
4 screened pairs
Sequence of colors: WH/BU-WH/OG-WH/GN-WH/BN
Shield braiding of tinned copper wires 0.1 mm dia (38 AWG)
Coverage about 55%

Jacket:
Thermoplastic copolymer (FRNC) BK
Wall thickness about 1.0 mm (IEC 60092-376) ø (7.8 ±0.2) mm (0.307 ±0.008 in dia)

Printing: "sequential length in metres" LEONI L SeaLine® * L45467-J416-C86 * 02YS CH 4X2X0.6/1.43-100 PIMF CAT7 SHF1 * "internal lot number"

Electrical data at 20°C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loop resistance</td>
<td>≤ 140 Ohm/km</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>≥ 500 MOhm/km</td>
</tr>
<tr>
<td>Signal run time</td>
<td>≤ 5.13 ns/m</td>
</tr>
<tr>
<td>Capacitance (1 kHz)</td>
<td>= 42 nF/m</td>
</tr>
<tr>
<td>Operating voltage (peak)</td>
<td>≤ 100 V</td>
</tr>
<tr>
<td>Characteristic impedance at 100 MHz</td>
<td>(100 ±5) Ohm</td>
</tr>
</tbody>
</table>
Surface transfer impedance 10 MHz
Test voltage (wire/wire/screen rms 50Hz 1min)

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>1</th>
<th>4</th>
<th>10</th>
<th>16</th>
<th>20</th>
<th>31.25</th>
<th>62.5</th>
<th>100</th>
<th>155</th>
<th>200</th>
<th>300</th>
<th>600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Next (dB)</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>75.1</td>
<td>72.4</td>
<td>69.6</td>
<td>67.9</td>
<td>65.3</td>
<td>60.8</td>
<td></td>
</tr>
<tr>
<td>PSNext (dB)</td>
<td>77</td>
<td>77</td>
<td>77</td>
<td>77</td>
<td>77</td>
<td>72.5</td>
<td>69.4</td>
<td>66.6</td>
<td>64.9</td>
<td>62.3</td>
<td>57.8</td>
<td></td>
</tr>
<tr>
<td>ELFext (dB)</td>
<td>80</td>
<td>80</td>
<td>74.0</td>
<td>69.9</td>
<td>68</td>
<td>64.1</td>
<td>58.1</td>
<td>54</td>
<td>50.2</td>
<td>48</td>
<td>44.5</td>
<td>38.4</td>
</tr>
<tr>
<td>PSELFext (dB)</td>
<td>77</td>
<td>77</td>
<td>71</td>
<td>66.9</td>
<td>65</td>
<td>61.1</td>
<td>55.1</td>
<td>51</td>
<td>47.2</td>
<td>45.0</td>
<td>41.5</td>
<td>35.4</td>
</tr>
<tr>
<td>Attenuation dB/100m</td>
<td>2.0</td>
<td>3.6</td>
<td>5.7</td>
<td>7.2</td>
<td>8.1</td>
<td>10.1</td>
<td>14.5</td>
<td>18.5</td>
<td>23.4</td>
<td>26.8</td>
<td>33.3</td>
<td>48.9</td>
</tr>
</tbody>
</table>

**Mechanical and thermal characteristics**

Conductor material acc. to DIN EN 13602 Cu-ETP-A...
Screen material acc. to DIN EN 13602 Cu-ETP-A...-B
Insulating material acc. to DIN 50290-2-23 (VDE 0819), table 2/A (HD 624.3) (02Y)
Jacket material acc. to IEC 60092-359 / SHF1
Oil resistant acc. to IEC 60811-2-1 (4 hours / 70°C)
Flame retardent acc. to IEC 60332-1-2
Flame retardent acc. to IEC 60332-3-22 (Cat. A)

Internal Shipbuilding Specification: CAT K07-A

**Other characteristics:**
RoHS compliant (Directive 2011/65/EC)
Low Smoke, Fire retardent, Zero Halogen
Corrosivity of fumes acc. to IEC 60754-2
Smoke-density acc. to IEC 61034
UV-resistant

Permissible temperature range
Transport, installation and operating: -40 °C (-40 °F) up to 80 °C (176 °F)

Min. bending radius allowed: repeated 10X ø, single 5X ø
Weight about : 80 kg/km (53,6 lb/1000ft)

**Designation of order:**
L45467-J416-C86
02YS CH 4X2X0.6/1.4-100 PIMF
1000 m (3281 ft)on non-returnable reel
SeaLine®
CAT 7 (MUD RES)
Cable type: 02YS CH 4X2X0.6/1.43-100 PIMF

Design

Wire
Bare copper wire (23 AWG) ø 0.6 mm (0.024 in dia)
Insulation of foamed Polyethylene (PE) with skin ø 1.43 mm (0.056 in dia)

Screened pair
2 wires twisted to a pair
Alulaminate foil overlapped, applied longitudinally

Core:
Strain relief
4 screened pairs
Sequence of colors: WH/BU-WH/OG-WH/GN-WH/BN
Shield braiding of tinned copper wires 0.1 mm dia (38 AWG)
Coverage about 55% ø 6.6 mm (0.260 in dia)

Jacket:
Special thermoplastic copolymer BK
Wall thickness about 1.0 mm (IEC 60092-376) ø (8.7 ±0.2) mm (0.343 ±0.008 in dia)

Printing: “sequential length in metres” LEONI L SeaLine® * L45467-J416-C106 * 02YS CH 4X2X0.6/1.43-100
PIMF CAT7 IEC 60332-3-22 MUD RES * "internal lot number"

Electrical data at 20°C

Loop resistance ≤ 140 Ohm/km
Insulation resistance ≥ 500 MOhm*km
Signal run time ≤ 5.3 ns/m
Capacitance (1 kHz) = 42 nF/km
Operating voltage (peak) ≤ 100 V
Characteristic impedance 100 MHz (100 ±5) Ohm
Surface transfer impedance 10 MHz 10 mOhm/m
Test voltage (wire/wire/screen rms 50Hz 1min) 700 V
**Frequency** (MHz) | 1 | 4 | 10 | 16 | 20 | 31.25 | 62.5 | 100 | 155 | 200 | 300 | 600
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
Next (dB) | 80 | 80 | 80 | 80 | 80 | 75.1 | 72.4 | 69.6 | 67.9 | 65.3 | 60.8 |
PSNext (dB) | 77 | 77 | 77 | 77 | 77 | 72.5 | 69.4 | 66.6 | 64.9 | 62.3 | 57.8 |
ELFext (dB) | 80 | 80 | 74.0 | 69.9 | 68 | 64.1 | 58.1 | 54 | 50.2 | 48 | 44.5 | 38.4 |
PSELfext (dB) | 77 | 77 | 71 | 66.9 | 65 | 61.1 | 55.1 | 51 | 47.2 | 45.0 | 41.5 | 35.4 |
Attenuation dB/100m | 2.0 | 3.6 | 5.7 | 7.2 | 8.1 | 10.1 | 14.5 | 18.5 | 23.4 | 26.8 | 33.3 | 48.9 |

**Mechanical and thermal characteristics**

- **Conductor material** acc. to DIN EN 13602 Cu-ETP-A...
- **Screen material** acc. to DIN EN 13602 Cu-ETP-A...B
- **Insulating material** acc. to DIN EN 50290-2-23 (VDE 0819), table 2/A (HD 624.3) (02Y)
- **Jacket material** acc. to IEC 60092-359 / SHF2
- **Flame retardant** acc. to IEC 60332-1-2
- **Flame retardant** acc. to IEC 60332-3-24 (Cat. C)
- **Mud resistant** acc. to NEK606

**Approved for Marine and Offshore Applications**

- Germanischer Lloyd: Certificate No. 60 323-13 HH
- Det Norske Veritas: Certificate No. E-12548

**Other characteristics:**

- RoHS compliant (Directive 2011/65/EC)
- Fire retardant, Zero Halogen
- Halogen free acc. to IEC 60754-1
- UV-resistant

**Permissible temperature range**

- Transport, installation and operating: \(-40°C (-40°F)\) up to \(80°C (176°F)\)

**Min. bending radius allowed:** repeated 10X ø, single 5X ø

**Weight about:** 81 kg/km (54 lb/1000ft)

**Designation of order:**

L45467-J416-C106
227214
02YS CH  4X2X0.6/1.43-100 PIMF SW
1000 m (3281 ft) on non-returnable reel

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**LEONI Special Cables GmbH**

**Technisches Datenblatt · Technical Data Sheet · Technisches Datenblatt · Technical Data Sheet · Technisches Datenblatt**

**Date of issue:** 13.07.2010  **Technical modification reserved**  **Creator:** LSC E / LIEBEL  **Number:** L45467-J416-C106-EN

**Up-dating:** 13.08.2014  **Name:** LM  **Supersedes:** 10.12.2013  **E:** 13.07.2010  **M:** 13.07.2010
**SeaLine®**

**CAT 7 (SHF1)**

Cable type: 02YS CH 4X2X0.76/1.8-100 LI PIMF

### Design

**Wire**
- Stranded bare copper wire 7 X 0.25 (22 AWG) (0.34mm²)  
  ø 0.76 mm (0.030 in dia)
- Insulation of foamed Polyethylene (PE) with skin  
  ø 1.8 mm (0.071 in dia)

**Screened pair**
- 2 wires twisted to a pair
- Aluminate foil overlapped, applied longitudinally

**Core:**
- Central element: Strain relief (≥ 300N)
- 4 screened pairs
- Sequence of colors: WH/BU-WH/OG-WH/GN-WH/BN
- Shield braiding of tinned copper wires 0.1 mm dia (38 AWG)
- Coverage about 65%  
  ø 7.8 mm (0.307 in dia)

**Jacket:**
- Thermoplastic copolymer (FRNC) BK
- Wall thickness about 1.1 mm (IEC 60092-376)  
  ø (10.0 ±0.2) mm (0.394 ±0.008 in dia)

*Printing:* "sequential length in metres" LEONI L SeaLine® * L45467-J417-C6 * 02YSCH 4X2X0.76/1.8-100 LI PIMF  
CAT7 IEC 60332-3-22 SHF1 * "internal lot number"

### Electrical data at 20°C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loop resistance</td>
<td>≤ 110 Ohm/km</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>≥ 500 MOhm/km</td>
</tr>
<tr>
<td>Signal run time</td>
<td>≤ 5.3 ns/m</td>
</tr>
<tr>
<td>Capacitance (1 kHz)</td>
<td>= 42 nF/km</td>
</tr>
<tr>
<td>Operating voltage (peak)</td>
<td>≤ 100 V</td>
</tr>
<tr>
<td>Characteristic impedance</td>
<td>100 MHz</td>
</tr>
<tr>
<td>Surface transfer impedance</td>
<td>10 MHz</td>
</tr>
<tr>
<td>Test voltage (wire/wire/screen rms)</td>
<td>(100 ±5) Ohm</td>
</tr>
<tr>
<td></td>
<td>50Hz 1min</td>
</tr>
<tr>
<td></td>
<td>700 V</td>
</tr>
</tbody>
</table>

---

**LEONI Special Cables GmbH**

Phone +49 (0)4491-292-292  Fax +49 (0)4491-292-169  Internet www.leoni-special-cables.com

Date of issue : 09.07.2010  Technical modification reserved  Creator : LSC E / LIEBEL

LEONI Special Cables GmbH

Frequency (MHz)      1  4  10  16  20  31.25  62.5  100  155  200  300  600
Next (dB)            80  80  80  80  80  75.1  72.4  69.6  67.9  65.3  60.8
PSNext (dB)          77  77  77  77  77  77  72.5  69.4  66.6  64.9  62.3  57.8
ELFext (dB)          80  80  74.0  69.9  68  64.1  58.1  54  50.2  48  44.5  38.4
PSELfext (dB)        77  77  71  66.9  65  61.1  55.1  51  47.2  45.0  41.5  35.4
Attenuation (dB/100m)     2.0  3.6  5.7  7.2  8.1  10.1  14.5  18.5  23.4  26.8  33.3  48.9

Frequency (MHz)      4  8  10  16  20  31.25  62.5  100  155  250  350  600
Return loss (dB)     23.1  24.5  25  25  25  23.6  21.5  20.1  18.8  17.3  17.3  17.3

Electrical requirements acc. to EN 50288-4-1 & IEC 61156-5

Mechanical and thermal characteristics
Conductor material acc. to DIN EN 13602 Cu-ETP-A...
Screen material acc. to DIN EN 13602 Cu-ETP-A...B
Insulating material acc. to DIN 50290-2-23 (VDE 0819), table 2/A (HD 624.3) (02Y)
Jacket material acc. to IEC 60092-359 / SHF1
Oil resistant acc. to IEC 60811-2-1 (4 hours / 70°C)
Flame retardant acc. to IEC 60332-1-2
Flame retardant acc. to IEC 60332-3-22 (Cat. A)

Internal Shipbuilding Specification: CAT K07-A

Approved for Marine and Offshore Applications
- Germanischer Lloyd : Certificate No. 60 323-13 HH
- Det Norske Veritas : Certificate No. E-12549

Other characteristics:
- RoHS compliant (Directive 2011/65/EC)
- Low Smoke, Fire retardant, Zero Halogen
- Corrosivity of fumes acc. to IEC 60754-2
- Smoke-density acc. to IEC 61034
- UV-resistant

Permissible temperature range
Transport, installation and operating: -40 °C (-40 °F) up to 80 °C (176 °F)
Min. bending radius allowed: repeated 10X ø, single 5X ø
Weight about: 102 kg/km (68,4 lb/1000ft)

Designation of order:
L45467-J417-C6
220834
02YS CH 4X2X0.76/1.8-100 LI PIMF
1000 m (3281 ft) on non-returnable reel
SeaLine®
CAT 6 (SHF1)
Cable type: 02YSCH 4X2X0.76/1.8-100 LI PIMF

Design

Wire
Stranded bare copper wire 7 X 0.25 (22 AWG) (0.34mm²)  ø 0.76 mm (0.030 in dia)
Insulation of foamed Polyethylene (PE) with skin  ø 1.8 mm (0.071 in dia)

Screened pair
2 wires twisted to a pair
Alulaminate foil overlapped, applied longitudinally

Core:
Central element: Strain relief (≥ 300N)
4 screened pairs
Sequence of colors: WH/BU-WH/OG-WH/GN-WH/BN
Shield braiding of tinned copper wires 0.1 mm dia (38 AWG)
Coverage about 65%  ø 7.8 mm (0.307 in dia)

Jacket:
Thermoplastic copolymer (FRNC) BK
Wall thickness about 1.1 mm (IEC 60092-376)  ø (10.0 ±0.2) mm (0.394 ±0.008 in dia)

Printing: "sequential length in metres"  LEONI L SeaLine® * L45467-J417-C106 * 02YSCH 4X2X0.76/1.8-100 LI PIMF CAT6 IEC 60332-3-22 SHF1 * "internal lot number"

Electrical data at 20°C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loop resistance</td>
<td>≤ 110 Ohm/km</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>≥ 500 MΩm*km</td>
</tr>
<tr>
<td>Signal run time</td>
<td>≤ 5.3 ns/m</td>
</tr>
<tr>
<td>Capacitance (1 kHz)</td>
<td>= 42 nF/km</td>
</tr>
<tr>
<td>Operating voltage (peak)</td>
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<td>Characteristic impedance</td>
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<td>Surface transfer impedance</td>
<td>10 MHz 10 mΩm/m</td>
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<tr>
<td>Test voltage (wire/wire/screen rms 50Hz 1min)</td>
<td>≤ 700 V</td>
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LEONI Special Cables GmbH

Technisches Datenblatt - Technical Data Sheet – Technisches Datenblatt – Technical Data Sheet – Technisches Datenblatt

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Electrical requirements acc. to EN 50288-5-1

**Mechanical and thermal characteristics**

- Conductor material acc. to DIN EN 13602 Cu-ETP-A...
- Screen material acc. to DIN EN 13602 Cu-ETP-A-B...
- Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table 2/A (HD 624.3) (02Y)
- Jacket material acc. to IEC 60092-359 / SHF1
- Oil resistant acc. to IEC 60811-2-1 (4 hours / 70°C)
- Flame retardant acc. to IEC 60332-1-2
- Flame retardant acc. to IEC 60332-3-22 (Cat. A)
- Internal Shipbuilding Specification: CAT K 07-A

Approved for Marine and Offshore Applications
- Germanischer Lloyd : Certificate No. 60 323-13 HH
- Det Norske Veritas : Certificate No. E-12549

**Other characteristics:**

- RoHS compliant (Directive 2011/65/EC)
- Low Smoke, Fire retardant, Zero Halogen
- Corrosivity of fumes acc. to IEC 60754-2
- Smoke-density acc. to IEC 61034
- UV-resistant

Permissible temperature range
- Transport, installation and operating: -40 °C (-40 °F) up to 80 °C (176 °F)

Min. bending radius allowed: repeated 10X ø, single 5X ø
- Weight about: 102 kg/km (68,4 lb/1000ft)

**Designation of order:**
- L45467-J417-C106
- 226368
- 02YSCH 4X2X0.76/1.8-100 LI PIMF SW
- 1000 m (3281 ft) on non-returnable reel
**Design**

**Wire**

Stranded bare copper wire 7 X 0.25 (22 AWG)  (0.34mm²)  φ 0.76 mm (0.030 in dia)

Insulation of foamed Polyethylene (PE) with skin  φ 1.8 mm (0.071 in dia)

**Screened pair**

2 wires twisted to a pair

Alulamate foil overlapped, applied longitudinally

**Core:**

Central element: Strain relief (≥ 300N)

4 screened pairs

Sequence of colors: WH/BU-WH/OG-WH/GN-WH/BN

Shield braiding of tinned copper wires 0.1 mm dia (38 AWG)

Coverage about 65%  φ 7.8 mm (0.307 in dia)

**Jacket:**

Thermoplastic copolymer (FRNC) (cross-linked) BK

Wall thickness about 1.1 mm (IEC 60092-376)  φ (10.0 ±0.2) mm (0.394 ±0.008 in dia)

**Electrical data at 20°C**

- Loop resistance ≤ 110 Ohm/km
- Insulation resistance ≥ 500 MOhm*km
- Signal run time ≤ 5.3 ns/m
- Capacitance (1 kHz) = 42 nF/km
- Operating voltage (peak) ≤ 100 V
- Characteristic impedance 100 MHz (100 ±5) Ohm
- Surface transfer impedance 10 MHz
- Test voltage (wire/wire/screen rms 50Hz 1min) 700 V
**LEONI Special Cables GmbH**

**Technisches Datenblatt - Technical Data Sheet – Technisches Datenblatt – Technical Data Sheet – Technisches Datenblatt**

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**LEONI Special Cables GmbH**

**Date of issue:** 24.04.2012  
**Technical modification reserved**

**Date of issue:** 24.04.2012  
**Technical modification reserved**

**Creator:** LSC E / LIEBEL

**Number:** L45467-J417-C116-EN

**Up-dating:** 14.08.2014  
**Name:** LM

**Supersedes:** 00.0.0000  
**E:** 24.04.2012  
**M:** 14.08.2014

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### Frequency (MHz)

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<th>16</th>
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<th>31.25</th>
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<tr>
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**Frequency**

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<td>25</td>
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<td>20.1</td>
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<td>17.3</td>
</tr>
</tbody>
</table>

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**Electrical requirements acc. to EN 50288-5-1**

**Mechanical and thermal characteristics**

- Conductor material acc. to DIN EN 13602 Cu-ETP-A...
- Screen material acc. to DIN EN 13602 Cu-ETP-A...
- Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table 2/A (HD 624.3) (02Y)
- Jacket material acc. to IEC 60092-359 / SHF2
- Oil resistant acc. to IEC 60811-2-1 (24 hours / 100°C)
- Flame retardant acc. to IEC 60332-1-2
- Flame retardant acc. to IEC 60332-3-22 (Cat. A)

**Approved for Marine and Offshore Applications**

- Germanischer Lloyd : Certificate No. 60 323-13 HH
- Det Norske Veritas : Certificate No. E-12548

**Other characteristics:**

- RoHS compliant (Directive 2011/65/EC)
- Low Smoke, Fire retardant, Zero Halogen
- Corrosivity of fumes acc. to IEC 60754-2
- Smoke-density acc. to IEC 61034
- UV-resistant

**Permissible temperature range**

- Transport, installation and operating: -40 °C (-40 °F) up to 80 °C (176 °F)

**Min. bending radius allowed:** repeated 10X ø, single 5X ø

**Weight about:** 103 kg/km (69,0 lb/1000ft)

---

**Designation of order:**

L45467-J417-C116

228557

02YSCHX 4X2X0.76/1.8-100 LI PIMF SW

1000 m (3281 ft) on non-returnable reel
LEONI SeaLine®
CAT 6 (MUD RES)
Cable type: 02YSCH(Z)H 4X2X0.76/1.8-100 LI PIMF

Design

Wire
Stranded bare copper wire 7 X 0.25 (22 AWG) (0.34mm²) 0.76 mm (0.030 in dia)
Insulation of foamed Polyethylene (PE) with skin 1.8 mm (0.071 in dia)

Screened pair
2 wires twisted to a pair
Alulaminate foil overlapped, applied longitudinally

Core:
Central element: Strain relief (≥ 300N)
4 screened pairs
Sequence of colors: WH/BU-WH/OG-WH/GN-WH/BN
Shield braiding of tinned copper wires 0.1 mm dia (38 AWG)
Coverage about 65% 7.8 mm (0.307 in dia)

Inner-Jacket:
Thermoplastic copolymer (FRNC) BK
Wall thickness about 1.1 mm (IEC 60092-376)
Braiding of stainless steel wires 0.2 mm dia

Jacket:
Special thermoplastic copolymer (FRNC) BK
Wall thickness about 0.85 mm (IEC 60092-376)

Printing: “sequential length in metres” LEONI L SeaLine® L45467-J417-C156 * 02YSCH(Z)H 4X2X0.76/1.8-100 LI PIMF CAT6 IEC 60332-3-22 MUD RES * “internal lot number”

Electrical data at 20°C

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<tr>
<th>Parameter</th>
<th>Value</th>
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<tr>
<td>Loop resistance</td>
<td>≤ 110 Ohm/km</td>
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<tr>
<td>Insulation resistance</td>
<td>≥ 500 MOhm*km</td>
</tr>
<tr>
<td>Signal run time</td>
<td>≤ 5.3 ns/m</td>
</tr>
<tr>
<td>Capacitance (1 kHz)</td>
<td>= 42 nF/km</td>
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</table>
### Operating voltage (peak)
- Maximum: \( \leq 100 \text{ V} \)

### Characteristic impedance
- 100 MHz: \((100 \pm 5) \text{ Ohm}\)

### Surface transfer impedance
- 10 MHz: \(10 \text{ mOhm/m}\)

### Test voltage (wire/wire/screen rms 50Hz 1min)
- 700 V

### Frequency (MHz)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>1</th>
<th>4</th>
<th>10</th>
<th>16</th>
<th>20</th>
<th>31.25</th>
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<td>Next (dB)</td>
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<td>59.3</td>
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### Return loss (dB)

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<td>18.8</td>
<td>18.0</td>
<td>17.3</td>
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### Mechanical and thermal characteristics

- Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table 2/A (HD 624.3) (02Y)
- I-Jacket material acc. to DIN EN 50290-2-27 (HD 624.7)
- Jacket material acc. to IEC 60092-359 / SHF2
- Flame retardant acc. to IEC 60332-1-2
- Flame retardant acc. to IEC 60332-3-22 (Cat. A)
- Mud resistant acc. to NEK606

### Approval for Marine and Offshore applications possible

### Other characteristics:
- RoHS compliant (Directive 2011/65/EC)
- Fire retardant, Zero Halogen
- Halogen free acc. to IEC 60754-1
- UV-resistant

### Permissible temperature range
- Transport, installation and operating: \(-40 \, {^\circ\text{C}} \, (-40 \, {^\circ\text{F}})\) up to \(80 \, {^\circ\text{C}} \, (176 \, {^\circ\text{F}})\)

### Min. bending radius allowed
- Repeated: 20X φ, single: 10X φ

### Weight about
- 201 kg/km (135 lb/1000ft)

### Designation of order:
- L45467-J417-C156
- 226642
- 02YSCH(Z)H 4X2X0.76/1.8-100 LI PIMF
- 1000 m (3281 ft) on non-returnable reel
Cables with functional integrity during fire type PH 120*

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<td>SWB</td>
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<td>SHF1</td>
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<tr>
<td>4 x 2 x AWG23/1</td>
<td>02YS(FE)C(FE)HX 4X2X0.7/1.8-100 PIMF</td>
<td>-</td>
<td>SHF2</td>
<td></td>
<td></td>
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<tr>
<td>4 x 2 x AWG23/1</td>
<td>02YS(FE)C(FE)H</td>
<td>Z</td>
<td>HX 4X2X0.7/1.8-100 PIMF</td>
<td>SWB</td>
<td>SHF2</td>
</tr>
<tr>
<td>4 x 2 x AWG23/1</td>
<td>02YS(FE)C(FE)HBHX 4X2X0.7/1.8-100 PIMF</td>
<td>SWA</td>
<td>SHF2</td>
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</tr>
<tr>
<td>4 x 2 x AWG23/1</td>
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<td>-</td>
<td>SHF2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*) SWB - Steel wire braid  
SWA - Steel wire armoring  
**) If no order number is marked the data sheet must be created.  
The same type range is available for:  
- Specification Cat 6A  
- Specification Cat 6  
- Specification Cat 5
SEA LiNe®
CAT 7 (PH120 = CAT 6A)
Cable type: 02YS(FE)C(FE)H 4X2X0.6/1.67-100 PIMF BK

Design

Wire
Solid bare copper wire (23/1 AWG)
Insulation of foamed Polyethylene (PE) with skin
Flame retardant foil, overlapped
ø 0.6 mm (0.024 in dia)
ø 1.4 mm (0.055 in dia)

Screened pair
2 wires twisted to a pair
Alulaminate foil overlapped, applied longitudinally

Core
Central element: Strain relief (≥ 300N)
4 screened pairs
Sequence of colors: WH/BU-WH/OG-WH/GN-WH/BN
Shield braiding of tinned copper wires
Coverage about 65%
Flame retardant foil, overlapped
ø 8.4 mm (0.331 in dia)

Jacket
Thermoplastic copolymer (FRNC) BK
ø (10.4 ±0.3) mm (0.409 ±0.012 in dia)

Printing: "sequential length in metres" LEONI L SEA LiNe® * L45467-J416-C616 02YS(FE)C(FE)H 4X2X0.60/1.67-100 PIMF CAT7 FIRE RESISTANT FE90 IEC 60331-23 * IEC 60332-3-22 SHF1 * "internal lot number"

Electrical data at 20°C

Loop resistance
≤ 150 Ohm/km

Insulation resistance
≥ 500 MOhm*km

Signal run time
≤ 5.3 ns/m

Capacitance (1 kHz)
≈ 42 nF/km

Operating voltage (peak)
≤ 100 V

Characteristic impedance 100 MHz
100 MHz

Surface transfer impedance 10 MHz
10 mOhm/m

Test voltage (wire/wire/screen rms 50Hz 1min)
700 V
Frequency (MHz) | 1  | 4  | 10 | 16 | 20 | 31.25 | 62.5 | 100 | 155 | 200 | 300 | 600
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
Next (dB) | 80 | 80 | 80 | 80 | 80 | 75.1 | 72.4 | 69.6 | 67.9 | 65.3 | 60.8 |
PSNext (dB) | 77 | 77 | 77 | 77 | 77 | 72.5 | 69.4 | 66.6 | 64.9 | 62.3 | 57.8 |
ELFext (dB) | 80 | 80 | 74.0 | 69.9 | 68 | 64.1 | 58.1 | 54 | 50.2 | 48 | 44.5 | 38.4 |
PSELFext (dB) | 77 | 77 | 71 | 66.9 | 65 | 61.1 | 55.1 | 51 | 47.2 | 45.0 | 41.5 | 35.4 |
Attenuation (dB/100m) | 2.0 | 3.6 | 5.7 | 7.2 | 8.1 | 10.1 | 14.5 | 18.5 | 23.4 | 26.8 | 33.3 | 48.9 |

**Electrical requirements acc. to EN 50288-4-1**

**Mechanical and thermal characteristics**

Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table 2/8 (HD 624.3) (02Y)
Jacket material acc. to IEC 60092-360 (IEC 60092-359) SHF1
Functional integrity under fire conditions similar to EN 50200 (> PH120), EN 50289-4-16 and IEC 61156-5 (Cat 6a)
Insulation effect under fire conditions acc. to IEC 60331-23, FE180
Flame retardant acc. to IEC 60332-3-22 (Cat. A)
Flame retardant acc. to IEC 60332-3-24 (Cat. C)
Flame retardant acc. to IEC 60332-1-2

Internal Specification F45052-F6400

Approved for Marine and Offshore Applications
DNV - GL Certificate No. TAE000019E

**Other characteristics:**
RoHS compliant (Directive 2011/65/EC)
Fire retardant, Zero Halogen
Halogen free acc. to IEC 60754-1/2
Smoke-density acc. to IEC 61034-1/2
UV-resistant

Permissible temperature range
Transport, installation and operating: -40 °C (-40 °F) up to 80 °C (176 °F)

Min. bending radius allowed: repeated 15X ø, single 10X ø
Weight about 129 kg/km (87 lb/1000ft)

**Designation of order:**
L45467-J416-C616
231491
02YS(FE)(FE)H 4X2X0.6/1.67-100 PIMF SW
500 m (1640 ft) on non-returnable reel
SeaLine®

CAT 7 (FE180)

Cable type: 02YS(FE)C(FE)H 4X2X0.6/1.67-100 PIMF OG

Design

Wire
Solid bare copper wire (23/1 AWG) ø 0.6 mm (0.024 in dia)
Insulation of foamed Polyethylene (PE) with skin ø 1.4 mm (0.055 in dia)
Flame retardant foil, overlapped

Screened pair
2 wires twisted to a pair
Alulaminate foil overlapped, applied longitudinally

Core
Central element: Strain relief (≥ 300N)
4 screened pairs
Sequence of colors: WH/BU-WH/OG-WH/GN-WH/BN
Shield braiding of tinned copper wires
Coverage about 65%
Flame retardant foil, overlapped ø 8.4 mm (0.331 in dia)

Jacket
Thermoplastic copolymer (FRNC) OG ø (10.4 ±0.3) mm (0.409 ±0.012 in dia)

Printing: “sequential length in metres” LEONI L SeaLine® * L45467-J416-C626 02YS(FE)C(FE)H 4X2X0.60/1.67-100 PIMF CAT7 FIRE RESISTANT FE180 IEC 60331-23 * IEC 60332-3-22 SHF1 * "internal lot number"

Electrical data at 20°C

Loop resistance ≤ 150 Ohm/km
Insulation resistance ≥ 500 MOhm*km
Signal run time ≤ 5.3 ns/m
Capacitance (1 kHz) ≈ 42 nF/km
Operating voltage (peak) ≤ 100 V

Characteristic impedance 100 MHz (100 ±5) Ohm
Surface transfer impedance 10 MHz 10 mOhm/m
Test voltage (wire/wire/screen rms 50Hz 1min) 700 V
### Technical Data Sheet

**LEONI Special Cables GmbH**

#### Mechanical and thermal characteristics

- **Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table 2/A (HD 624.3) (02Y)**
- **Jacket material acc. to IEC 60092-360 (IEC 60092-359) SHF1**
- **Functional integrity under fire conditions similar to EN 50200 (≥ PH120), EN 50289-4-16 and IEC 61156-5 (Cat 6a)**
- **Insulation effect under fire conditions acc. to IEC 60331-23, FE180**
- **Flame retardant acc. to IEC 60332-3-22 (Cat. A)**
- **Flame retardant acc. to IEC 60332-3-24 (Cat. C)**
- **Flame retardant acc. to IEC 60332-1-2**

**Internal Specification F45052-F6400**

**Approval for Marine and Offshore applications possible**

#### Other characteristics:

- **RoHS compliant (Directive 2011/65/EC)**
- **Fire retardant, Zero Halogen**
- **Halogen free acc. to IEC 60754-1/2**
- **Smoke-density acc. to IEC 61034-1/2**
- **UV-resistant**

Permissible temperature range

- Transport, installation and operating: -40 °C (-40 °F) up to 80 °C (176 °F)

Min. bending radius allowed: repeated 15X ø, single 10X ø

Weight about: 129 kg/km (87 lb/1000ft)

**Designation of order:**

L45467-J416-C626

231492

02YS(FE)(C)(FE)H 4X2X0.60/1.67-100 PIMF OR

500 m (1640 ft) on non-returnable reel

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**Frequency (MHz)**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>4</th>
<th>10</th>
<th>16</th>
<th>20</th>
<th>31.25</th>
<th>62.5</th>
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<td>80</td>
<td>80</td>
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<td>PLSNext (dB)</td>
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<td>77</td>
<td>77</td>
<td>77</td>
<td>77</td>
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<td>69.4</td>
<td>66.6</td>
<td>64.9</td>
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<td>57.8</td>
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</tr>
<tr>
<td>ELFext (dB)</td>
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<td>80</td>
<td>74.0</td>
<td>69.9</td>
<td>68</td>
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<td>44.5</td>
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<tr>
<td>PSELfext (dB)</td>
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<td>77</td>
<td>71</td>
<td>66.9</td>
<td>65</td>
<td>61.1</td>
<td>55.1</td>
<td>51</td>
<td>47.2</td>
<td>45.0</td>
<td>41.5</td>
<td>35.4</td>
</tr>
</tbody>
</table>

**Attenuation dB/100m**

|        | 2.0 | 3.6 | 5.7 | 7.2 | 8.1 | 10.1 | 14.5 | 18.5 | 23.4 | 26.8 | 33.3 | 48.9|

---

**Frequency**

<table>
<thead>
<tr>
<th>4</th>
<th>8</th>
<th>10</th>
<th>16</th>
<th>20</th>
<th>31.25</th>
<th>62.5</th>
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<th>600</th>
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<td>25</td>
<td>25</td>
<td>25</td>
<td>23.6</td>
<td>21.5</td>
<td>20.1</td>
<td>18.8</td>
<td>17.3</td>
<td>17.3</td>
<td>17.3</td>
</tr>
</tbody>
</table>

**Electrical requirements acc. to EN 50288-4-1**

**Return loss (dB)**

- 23.1 dB
- 24.5 dB
- 25 dB
- 25 dB
- 25 dB
- 23.6 dB
- 21.5 dB
- 20.1 dB
- 18.8 dB
- 17.3 dB
- 17.3 dB
- 17.3 dB

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**Date of issue:** 26.05.2016

**Up-dating:** 20.09.2016

**Supersedes:** 00.0.0000 E: 26.05.2016 M: 26.05.2016

**Number:** L45467-J416-C626-EN
**SeaLine®**

**CAT 6A**

02YS(FE)C(FE)H 4X2X0.6/1.6-100 LI PIMF OG

**Design**

**Wire**
- Stranded bare copper wire (24 AWG)
- Insulation of foamed Polyethylene (PE) with skin
- Flame retardant foil, overlapped

**Screened pair**
- 2 wires twisted to a pair
- Plastic tape overlapped
- Alulaminate foil overlapped

**Core:**
- Central element: Strain relief (≥ 300N)
- 4 screened pairs
- Sequence of colors: WH/BU-WH/OG-WH/GN-WH/BN
- Shield braiding of tinned copper wires
- Coverage about 70%
- Flame retardant foil, overlapped

**Jacket:**
- Thermoplastic copolymer (FRNC) OG

**Electrical data at 20°C**

- Loop resistance ≤ 180 Ohm/km
- Insulation resistance ≥ 500 MOhm*km
- Signal run time ≤ 5.3 ns/m
- Capacitance (1 kHz) ≈ 42 nF/m
- Operating voltage (peak) ≤ 100 V
- Characteristic impedance (100 MHz) (100 ±5) Ohm
**Surface transfer impedance (10 MHz)**

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>1</th>
<th>4</th>
<th>8</th>
<th>10</th>
<th>16</th>
<th>20</th>
<th>25</th>
<th>31.25</th>
<th>62.5</th>
<th>100</th>
<th>200</th>
<th>250</th>
<th>300</th>
<th>400</th>
<th>500</th>
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<tr>
<td>Next (dB)</td>
<td>75.3</td>
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<td>61.8</td>
<td>60.3</td>
<td>57.2</td>
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<td>52.8</td>
<td>48.4</td>
<td>45.3</td>
<td>40.8</td>
<td>39.3</td>
<td>38.1</td>
<td>36.3</td>
<td>34.8</td>
</tr>
<tr>
<td>PSNext (dB)</td>
<td>72.3</td>
<td>63.3</td>
<td>58.8</td>
<td>57.3</td>
<td>54.2</td>
<td>52.8</td>
<td>51.3</td>
<td>49.9</td>
<td>45.4</td>
<td>42.3</td>
<td>37.8</td>
<td>36.3</td>
<td>35.1</td>
<td>33.3</td>
<td>31.8</td>
</tr>
<tr>
<td>ELFext (dB)</td>
<td>67.8</td>
<td>55.8</td>
<td>49.7</td>
<td>47.8</td>
<td>43.7</td>
<td>41.8</td>
<td>39.8</td>
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<td>19.8</td>
<td>18.3</td>
<td>15.8</td>
<td>13.8</td>
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<tr>
<td>PSELfext (dB)</td>
<td>64.8</td>
<td>52.8</td>
<td>46.7</td>
<td>44.8</td>
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<td>Attenuation</td>
<td>3.1</td>
<td>5.7</td>
<td>8</td>
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<td>46.6</td>
<td>51.4</td>
<td>60.1</td>
<td>67.9</td>
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<td>(dB/100m)</td>
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<tr>
<td>Return loss (dB)</td>
<td>20</td>
<td>23</td>
<td>24.5</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>24.2</td>
<td>23.3</td>
<td>20.7</td>
<td>19</td>
<td>16.4</td>
<td>15.6</td>
<td>15.6</td>
<td>15.6</td>
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</tbody>
</table>

**Electrical requirements acc. to IEC 61156-6**

**Mechanical and thermal characteristics**

- Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table 2/A (HD 624.3) (02Y)
- Jacket material acc. to DIN EN 50290-2-27 (HD 624.7)
- Functional integrity under fire conditions similar to EN 50200 (≥ PH120), EN 50289-4-16 and IEC 61156-6 (Cat 6a)
- Insulation effect under fire conditions acc. to IEC 60331-23, FE180
- Flame retardant acc. to IEC 60332-3-22 (Cat. A)
- Flame retardant acc. to IEC 60332-3-24 (Cat. C)
- Flame retardant acc. to IEC 60332-1-2

**Other characteristics:**

- RoHS compliant (Directive 2011/65/EC)
- Fire retardant, Zero Halogen
- Halogen free acc. to IEC 60754-1/2
- Smoke-density acc. to IEC 61034-1/2
- UV-resistant

**Permissible temperature range**

Transport, installation and operating: -40 °C (-40 °F) up to 80 °C (176 °F)

**Min. bending radius allowed:** repeated 15X ø, single 10X ø

**Weight about:** 140 kg/km (94 lb/1000ft)

**Designation of order:**

- L45467-J416-C646
- 231909
- 02YS(FE)(C)(FE)H 4X2X0.6/1.6-100 LI PIMF OR
- 1000 m (3281 ft) on non-returnable reel
SeaLine®
CAT 6 (FE180)
Cable type: 02YS(FE)C(FE)H  4X2X0.6/1.67-100 PIMF BK

Design

Wire
Solid bare copper wire (23/1 AWG)  \( \phi \ 0.6 \ \text{mm (0.024 in dia)} \)
Insulation of foamed Polyethylene (PE) with skin  \( \phi \ 1.4 \ \text{mm (0.055 in dia)} \)
Flame retardant foil, overlapped

Screened pair
2 wires twisted to a pair
Alumilaminate foil overlapped, applied longitudinally

Core
Central element: Strain relief \( (\geq 300N) \)
4 screened pairs
Sequence of colors: WH/BU-WH/OG-WH/GN-WH/BN
Shield braiding of tinned copper wires
Coverage about 65%
Flame retardant foil, overlapped  \( \phi \ 8.4 \ \text{mm (0.331 in dia)} \)

Jacket
Thermoplastic copolymer (FRNC) BK  \( \phi \ 10.4 \pm 0.3 \ \text{mm (0.409 \pm 0.012 in dia)} \)

Printing: "sequential length in metres" LEONI L SeaLine® * L45467-J416-C656 02YS(FE)C(FE)H  4X2X0.6/1.67-100 PIMF CAT6 FIRE RESISTANT FE90 IEC 60331-23 * IEC 60332-3-22 SHF1 *
"internal lot number"

Electrical data at 20°C

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loop resistance</td>
<td>( \leq 150 \ \text{Ohm/km} )</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>( \geq 500 \ \text{MOhm*km} )</td>
</tr>
<tr>
<td>Signal run time</td>
<td>( \leq 5.3 \ \text{ns/m} )</td>
</tr>
<tr>
<td>Capacitance (1 kHz)</td>
<td>( \approx 42 \ \text{nF/km} )</td>
</tr>
<tr>
<td>Operating voltage (peak)</td>
<td>( \leq 100 \ \text{V} )</td>
</tr>
<tr>
<td>Characteristic impedance</td>
<td>( 100 \ \text{MHz} )</td>
</tr>
</tbody>
</table>

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**Surface transfer impedance 10 MHz**

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>1</th>
<th>4</th>
<th>10</th>
<th>16</th>
<th>20</th>
<th>31.25</th>
<th>62.5</th>
<th>100</th>
<th>155</th>
<th>200</th>
<th>250</th>
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</thead>
<tbody>
<tr>
<td>Next (dB)</td>
<td>66.0</td>
<td>65.3</td>
<td>59.3</td>
<td>56.2</td>
<td>54.8</td>
<td>51.9</td>
<td>47.4</td>
<td>44.3</td>
<td>41.4</td>
<td>39.8</td>
<td>38.3</td>
</tr>
<tr>
<td>PSNext (dB)</td>
<td>64.0</td>
<td>63.3</td>
<td>57.3</td>
<td>54.2</td>
<td>52.8</td>
<td>49.9</td>
<td>45.4</td>
<td>42.3</td>
<td>39.4</td>
<td>37.8</td>
<td>36.3</td>
</tr>
<tr>
<td>ELFext (dB)</td>
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<td>58</td>
<td>50.0</td>
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<td>PSELfext (dB)</td>
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<td>47.0</td>
<td>43.0</td>
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<td>Attenuation typ. (dB/100m)</td>
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<td>19.9</td>
<td>25.3</td>
<td>29.1</td>
<td>33.0</td>
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**Electrical requirements acc. to EN 50288-5-1**

**Mechanical and thermal characteristics**

- Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table 2/A (HD 624.3) (02Y)
- Jacket material acc. to IEC 60092-360 (IEC 60092-359) SHF1
- Functional integrity under fire conditions similar to EN 50200 (> PH120), EN 50289-4-16 and IEC 61156-5 (Cat 6)
- Insulation effect under fire conditions acc. to IEC 60331-23, FE180
- Flame retardant acc. to IEC 60332-3-22 (Cat. A)
- Flame retardant acc. to IEC 60332-3-24 (Cat. C)
- Flame retardant acc. to IEC 60332-1-2

**Other characteristics:**

- RoHS compliant (Directive 2011/65/EC)
- Fire retardant, Zero Halogen
- Halogen free acc. to IEC 60754-1/2
- Smoke-density acc. to IEC 61034-1/2
- UV-resistant

**Permissible temperature range**

- Transport, installation and operating: -40 °C (-40 °F) up to 80 °C (176 °F)

**Min. bending radius allowed:**

- Repeated 15X ø, single 10X ø

**Weight about:**

- 129 kg/km (87 lb/1000ft)

**Designation of order:**

- L45467-J416-C656
- 232123
- 02YS(FC)(FE)H 4X2X0.6/1.67-100 PIMF SW
- 500 m (1640 ft) on non-returnable reel
**SeaLine®**

**CAT 7 (MUD RES)**

Cable type: 02YS(FE)C(FE)H  4X2X0.6/1.67-100 PIMF BK

**Design**

**Wire**
- Solid bare copper wire (23/1 AWG)  
  ø 0.6 mm (0.024 in dia)
- Insulation of foamed Polyethylene (PE) with skin  
  ø 1.4 mm (0.055 in dia)
- Flame retardant foil, overlapped

**Screened pair**
- 2 wires twisted to a pair
- Alulaminate foil overlapped, applied longitudinally

**Core**
- Central element: Strain relief (≥ 300N)
- 4 screened pairs
- Sequence of colors: WH/BU-WH/OG-WH/ZN-WH/BN
- Shield braiding of tinned copper wires
- Coverage about 65%
- Flame retardant foil, overlapped  
  ø 8.4 mm (0.331 in dia)

**Jacket**
- Thermoplastic copolymer (FRNC) BK  
  ø (10.4 ±0.3) mm (0.409 ±0.012 in dia)

**Electrical data at 20°C**

- Loop resistance  
  ≤ 150 Ohm/km
- Insulation resistance  
  ≥ 500 MΩhm*km
- Signal run time  
  ≤ 5.3 ns/m
- Capacitance (1 kHz)  
  ≈ 42 nF/m
- Operating voltage (peak)  
  ≤ 100 V
- Characteristic impedance  
  100 MHz  
  (100 ±5) Ohm
LEONI Special Cables GmbH

Technisches Datenblatt - Technical Data Sheet – Technisches Datenblatt – Technical Data Sheet – Technisches Datenblatt

LEONI Special Cables GmbH

Date of issue : 19.04.2017
Creator : LSC E / STRATMANN
Number : L45467-J416-C696-EN

Up-dating : 00.0.0000 Name: LM
Supersedes : 00.0.0000 E: 19.04.2017 M: 19.04.2017

Surface transfer impedance 10 MHz
Test voltage (wire/wire/screen rms 50Hz 1min)

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>1</th>
<th>4</th>
<th>10</th>
<th>16</th>
<th>20</th>
<th>31.25</th>
<th>62.5</th>
<th>100</th>
<th>155</th>
<th>200</th>
<th>300</th>
<th>600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Next (dB)</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>75.1</td>
<td>72.4</td>
<td>69.6</td>
<td>67.9</td>
<td>65.3</td>
<td>60.8</td>
<td></td>
</tr>
<tr>
<td>PSNext (dB)</td>
<td>77</td>
<td>77</td>
<td>77</td>
<td>77</td>
<td>77</td>
<td>72.5</td>
<td>69.4</td>
<td>66.6</td>
<td>64.9</td>
<td>62.3</td>
<td>57.8</td>
<td></td>
</tr>
<tr>
<td>ELFext (dB)</td>
<td>80</td>
<td>80</td>
<td>74.0</td>
<td>69.9</td>
<td>68</td>
<td>64.1</td>
<td>58.1</td>
<td>54</td>
<td>50.2</td>
<td>48</td>
<td>44.5</td>
<td>38.4</td>
</tr>
<tr>
<td>PSELFext (dB)</td>
<td>77</td>
<td>77</td>
<td>71</td>
<td>66.9</td>
<td>65</td>
<td>61.1</td>
<td>55.1</td>
<td>51</td>
<td>47.2</td>
<td>45.0</td>
<td>41.5</td>
<td>35.4</td>
</tr>
<tr>
<td>Attenuation dB/100m</td>
<td>2.0</td>
<td>3.6</td>
<td>5.7</td>
<td>7.2</td>
<td>8.1</td>
<td>10.1</td>
<td>14.5</td>
<td>18.5</td>
<td>23.4</td>
<td>26.8</td>
<td>33.3</td>
<td>48.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency</th>
<th>4</th>
<th>8</th>
<th>10</th>
<th>16</th>
<th>20</th>
<th>31.25</th>
<th>62.5</th>
<th>100</th>
<th>155</th>
<th>250</th>
<th>350</th>
<th>600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return loss (dB)</td>
<td>23.1</td>
<td>24.5</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>23.6</td>
<td>21.5</td>
<td>20.1</td>
<td>18.8</td>
<td>17.3</td>
<td>17.3</td>
<td>17.3</td>
</tr>
</tbody>
</table>

Electrical requirements acc. to EN 50288-4-1

Mechanical and thermal characteristics
Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table 2/A (HD 624.3) (02Y)
Jacket material acc. to IEC 60992-360 (IEC 60992-359) SHF2
Functional integrity under fire conditions similar to EN 50200 (- PH120), EN 50289-4-16 and IEC 61156-5 (Cat 6a)
Insulation effect under fire conditions acc. to IEC 60331-23, FE180
Mud resistant acc. to NEK606
Flame retardant acc. to IEC 60332-3-22 (Cat. A)
Flame retardant acc. to IEC 60332-3-24 (Cat. C)
Flame retardant acc. to IEC 60332-1-2

Approved for Marine and Offshore Applications
DNV - GL Certificate No. TAE000019D

Other characteristics:
RoHS compliant (Directive 2011/65/EC)
Fire retardant, Zero Halogen
Halogen free acc. to IEC 60754-1/2
Smoke-density acc. to IEC 61034-1/2
UV-resistant

Permissible temperature range
Transport, installation and operating: -40 °C (-40 °F) up to 80 °C (176 °F)

Min. bending radius allowed: repeated 15X ø, single 10X ø
Weight about : 131 kg/km (88 lb/1000ft)

Designation of order:
L45467-J416-C696 / 233459
02YS(FE)(C)(FE) 4X2X0.6/1.67-100 PIMF SW
500 m (1640 ft) on non-returnable reel
**CAT 7**

for explosive atmospheres

acc. to DIN EN 60079-14 appendix E

---

**Design**

**Wire**

Bare copper wire (23 AWG)  
ø 0.6 mm (0.024 in dia)

Insulation of foamed Polyethylene (PE) with skin  
ø 1.43 mm (0.056 in dia)

**Screened pair**

2 wires twisted to a pair  
Alulaminate foil overlapped, applied longitudinally

**Core:**

4 screened pairs

Sequence of colors: WH/BU-WH/OG-WH/GN-WH/BN

Gap filling material

Shield braiding of tinned copper

Coverage about 55%

**Jacket:**

Thermoplastic copolymer (FRNC) BK  
ø (7.8 ±0.3) mm (0.307 ±0.012 in dia)

Printing: To be defined

---

**Electrical data at 20°C**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loop resistance</td>
<td>≤ 140 Ohm/km</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>≥ 500 MOhm*km</td>
</tr>
<tr>
<td>Signal run time</td>
<td>≤ 5.13 ns/m</td>
</tr>
<tr>
<td>Capacitance (1 kHz)</td>
<td>≈ 42 nF/km</td>
</tr>
<tr>
<td>Operating voltage (peak)</td>
<td>≤ 100 V</td>
</tr>
<tr>
<td>Characteristic impedance at 100 MHz</td>
<td>(100 ±5) Ohm</td>
</tr>
<tr>
<td>Surface transfer impedance 10 MHz</td>
<td>10 mOhm/m</td>
</tr>
<tr>
<td>Test voltage (wire/wire/screen rms 50Hz 1min)</td>
<td>700 V</td>
</tr>
</tbody>
</table>

---

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Formular: W1-WW-PT-TDBL2-A-20

DEETMER

L45497-F7774-A1-EN
## MECHANICAL AND THERMAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Conductor material acc. to DIN EN 13602 Cu-ETP-A...</th>
<th>Screen material acc. to DIN EN 13602 Cu-ETP-A...-B</th>
<th>Insulating material acc. to DIN EN 50290-2-3 (VDE 0819), table 2/A (HD 624.3) (02Y)</th>
<th>Jacket material acc. to IEC 60092-360 (IEC 60092-359) SHF1</th>
<th>Oil resistant acc. to IEC 60811-2-1 (4 hours / 70°C)</th>
<th>Flame retardant acc. to IEC 60332-1-2 (must be testified)</th>
<th>Flame retardant acc. to IEC 60332-3-22 (Cat. A) (must be testified)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductor material acc. to DIN EN 13602 Cu-ETP-A...</td>
<td>Screen material acc. to DIN EN 13602 Cu-ETP-A...-B</td>
<td>Insulating material acc. to DIN EN 50290-2-3 (VDE 0819), table 2/A (HD 624.3) (02Y)</td>
<td>Jacket material acc. to IEC 60092-360 (IEC 60092-359) SHF1</td>
<td>Oil resistant acc. to IEC 60811-2-1 (4 hours / 70°C)</td>
<td>Flame retardant acc. to IEC 60332-1-2 (must be testified)</td>
<td>Flame retardant acc. to IEC 60332-3-22 (Cat. A) (must be testified)</td>
</tr>
</tbody>
</table>

## OTHER CHARACTERISTICS:

- RoHS compliant (Directive 2011/65/EC)
- Requirements acc. to DIN EN 60079-14 appendix E (must be testified)
- UV-resistant

## PERMISSIBLE TEMPERATURE RANGE

Transport, installation and operating: -40 °C (-40 °F) up to 80 °C (176 °F)

## MINIMUM BENDING RADIUS ALLOWED:

- Repeated: 10X ø
- Single: 5X ø

## WEIGHT ABOUT

- 80 kg/km (53.6 lb/1000ft)

## DESIGNATION:

- 1000 m (3281 ft) on non-returnable reel
**Profibus**

Cable type: 02YSH(ST)CH  1X2X0.75/2.55-150 LI VI FRNC

**Design**

**Wire**
Stranded bare copper wire 7 X 0.25 (22 AWG)  (0.34mm²)  ø 0.76 mm (0,030 in)
Insulation of foamed Polyethylene (PE) with skin  ø 2.55 mm (0,100 in)

**Core**
2 wires, RD and GN twisted
Plastic tape, overlapped
Inner-Jacket: Thermoplastic copolymer (FRNC)  ø 5.5 mm (0,217 in)
Alulaminate foil overlapped, applied longitudinally
Shield braiding of tinned copper wires 0.15 mm dia (35 AWG)
Coverage about 85%  ø 6.2 mm (0,244 in)

**Jacket:**
Thermoplastic copolymer (FRNC) VT
Wall thickness about 0.9 mm  ø (8.0 ±0.4) mm (0.315 ±0.016 in)

Printing: “sequential length in metres” LEONI SeaLine Profibus 02YSH(ST)CH  1X2X0.75/2.55-150 LI FRNC
Textintervals about 1000 mm

**Electrical data at 20°C**

<table>
<thead>
<tr>
<th>Loop resistance</th>
<th>Insulation resistance</th>
<th>Characteristic Impedance</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 110 Ohm/km</td>
<td>≥ 16000 MOhm*km</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Impedance</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 - 20 MHz</td>
<td>(150 ± 15) Ohm</td>
</tr>
<tr>
<td>31.25 - 38.4 kHz</td>
<td>(185 ± 18.5) Ohm</td>
</tr>
<tr>
<td>9.6 kHz</td>
<td>(270 ± 27) Ohm</td>
</tr>
</tbody>
</table>
LEONI Special Cables GmbH

Attenuation

<table>
<thead>
<tr>
<th>Frequency (kHz)</th>
<th>Attenuation (dB/km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 MHz</td>
<td>&lt; 42 dB/km</td>
</tr>
<tr>
<td>4 MHz</td>
<td>&lt; 22 dB/km</td>
</tr>
<tr>
<td>38.4 kHz</td>
<td>&lt; 4 dB/km</td>
</tr>
<tr>
<td>9.6 kHz</td>
<td>&lt; 2.5 dB/km</td>
</tr>
</tbody>
</table>

Capacitance

<table>
<thead>
<tr>
<th>Frequency (kHz)</th>
<th>Capacitance (nF/km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 kHz</td>
<td>28.5 nF/km</td>
</tr>
</tbody>
</table>

Capacitance unbalance to ground

<table>
<thead>
<tr>
<th>Capacitance (pF/km)</th>
<th>≤ 1500 pF/km</th>
</tr>
</thead>
</table>

Operating voltage

<table>
<thead>
<tr>
<th>Voltage (V)</th>
<th>≤ 60 V</th>
</tr>
</thead>
</table>

Test voltage (wire/wire/screen rms 50Hz 1min)

<table>
<thead>
<tr>
<th>Voltage (V)</th>
<th>= 1000 V</th>
</tr>
</thead>
</table>

Mechanical and thermal characteristics

Conductor material acc. to DIN EN 13602 Cu-ETP-A...
Screen material acc. to DIN EN 13602 Cu-ETP-A...-B
Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table 2/A (HD 624.3) (02Y)
Jacket material acc. to DIN EN 50290-2-27 (HD 624.7) (IEC 60092-359 / SHF1)
Flame retardant acc. to IEC 60332-1-2
Oil resistant acc. to IEC 60811-2-1 (4 hours / 70°C)

Approved for Marine and Offshore Applications

- Germanischer Lloyd Certificate No. 33 997-06 HH
- Lloyds Register Certificate No. 07/20047
- Bureau Veritas Certificate No. 20147/00 BV
- ABS Certificate No. 06-HG271929-PDA
- Det Norske Veritas Certificate No. E-11827

Other characteristics:

- Flame retardant acc. to IEC 60332-3-22 (Cat. A/F)
- Halogen free acc. IEC 60754-1
- Smoke-density acc. to IEC 61034
- RoHS compliant (Directive 2011/65/EC)
- UV-resistant

Permissible temperature range: -25 °C (-13 °F) up to 80 °C (176 °F)
Min. bending radius allowed: repeated 10X ø, single 5X ø
Weight about: 84 Kg/km (56 lb/1000ft)

Designation of order:

L45467-G17-C46
211958
02YSH(ST)CH 1X2X0.75/2.55-150 LI VI FRNC
1000 m (3281 ft) on non-returnable reel
**Profibus**

Cable type: 02YSH(ST)CHX 1X2X0.75/2.55-150 LI VI FRNC

### Design

**Wire**
- Stranded bare copper wire 7 X 0.25 (22 AWG) (0.34mm²)  
  ø 0.75 mm (0.030 in)
- Insulation of foamed Polyethylene (PE) with skin  
  ø 2.55 mm (0.100 in)

**Core**
- 2 wires, RD and GN twisted
- Plastic tape, overlapped
- Inner-Jacket: Thermoplastic copolymer (FRNC)  
  ø 5.5 mm (0.217 in)
- Aluminate foil overlapped, applied longitudinally
- Shield braiding of tinned copper wires 0.15 mm dia (35 AWG)  
  Coverage about 85%  
  ø 6.2 mm (0.244 in)

**Jacket:**
- Thermoplastic copolymer (FRNC) VT (cross-linked)  
  Wall thickness about 0.9 mm  
  ø (8.0 ±0.4) mm (0.315 ±0.016 in)

Printing: "sequential length in metres"  
LEONI SeaLine Profibus 02YSH(ST)CHX 1X2X0.75/2.55-150 LI FRNC SHF2  
Textintervals about 1000 mm
LEONI Special Cables GmbH

**Electrical data at 20°C**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loop resistance</td>
<td>≤ 110 Ohm/km</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>≥ 16000 MOhm*km</td>
</tr>
<tr>
<td>Characteristic Impedance 3-20 MHz</td>
<td>(150 ± 15) Ohm</td>
</tr>
<tr>
<td></td>
<td>(185 ± 18.5) Ohm</td>
</tr>
<tr>
<td></td>
<td>(270 ± 27) Ohm</td>
</tr>
<tr>
<td>Attenuation 16 MHz</td>
<td>&lt; 42 dB/km</td>
</tr>
<tr>
<td>Attenuation 4 MHz</td>
<td>&lt; 22 dB/km</td>
</tr>
<tr>
<td>Attenuation 38.4 kHz</td>
<td>&lt; 4 dB/km</td>
</tr>
<tr>
<td>Attenuation 9.6 kHz</td>
<td>&lt; 2.5 dB/km</td>
</tr>
<tr>
<td>Capacitance 1 kHz</td>
<td>≤ 28.5 nF/km</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>≤ 1500 pF/km</td>
</tr>
<tr>
<td>Test voltage (wire/wire/screen rms 50Hz 1min)</td>
<td>= 1000 V</td>
</tr>
</tbody>
</table>

**Mechanical and thermal characteristics**

Conductor material acc. to DIN EN 13602 Cu-ETP-A...
Screen material acc. to DIN EN 13602 Cu-ETP-A...-B
Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table 2/A (HD 624.3) (02Y)
Jacket material acc. to DIN EN 50290-2-27 (HD 624.7) (IEC 60092-359 / SHF2)
Oil resistant acc. to EN 60811-2-1 (24 hours / 100°C)
Flame retardant acc. to IEC 60332-1-2

Approved for Marine and Offshore Applications
Germanischer Lloyd Certificate No. 33 997-06 HH
Lloyds Register Certificate No. 07/20047
Bureau Veritas Certificate No. 20147/80 BV
ABS Certificate No. 06-HG271929-PDA
Det Noske Veritas Certificate No. E-11825

**Other characteristics:**

Flame retardant acc. to IEC 60332-3-22 (Cat. A/F)
Halogen free acc. IEC 60754-1
Smoke-density acc. to IEC 61034
RoHS compliant (Directive 2011/65/EC)
Sunlight resistant acc. to UL 2556 Sec. 4.2.8.5

Permissible temperature range: -25 °C (-13 °F) up to 80 °C (176 °F)
Min. bending radius allowed: repeated 10X Ø, single 5X Ø
Weight about: 84 Kg/km (56 lb/1000ft)

**Designation of order:**

L45467-G17-C56
212758
02YSH(ST)CHX 1X2X0.75/2.55-150 LI VI FRNC
1000 m (3281 ft) on non-returnable reel
LEONI Special Cables GmbH

LEONI SeaLine®

CAN-BUS

Cable type: 09YSH(ST)CH 1X2X0.9/2.4-120 LI VZN SW FRNC

Design

Wire
Stranded tinned copper wire 19 X 0.18 (21 AWG) (0.48mm²)  
ø  0.9   mm (0,035 in)
Insulation of foamed Polypropylene (PP) with Skin  
ø  2.4   mm (0,094 in)

Core:
2 wires, RD and BU twisted to a pair with fillers in gaps  
Plastic tape, overlapped  
Inner-Jacket: Thermoplastic copolymer (FRNC)  
ø  5.2   mm (0,205 in)
Alulaminate foil overlapped, applied longitudinally  
Shield braiding of tinned copper wires 0.13 mm dia (36 AWG)  
Coverage about  85%  
ø  5.8   mm (0,228 in)

Jacket:
Thermoplastic copolymer (FRNC) BK  
Wall thickness about 0.95 mm  
ø  (7.7 ±0.2) mm (0,303 ±0,008 in)

Printing: LEONI L SeaLine CAN Marine Cable * 09YSH(ST)CH 1X2X0.9/2.4-120 LI * L45467-F19-C16  
"sequential length in metres"
Electrical data at 20°C

Conductor resistance
≤ 44 Ohm/km

Insulation resistance
≥ 5 GOhm*km

Capacitance (1 kHz)
= 36 nF/km

Characteristic impedance (1 MHz)  (120 ±18) Ohm

Surface transfer impedance of screen up to 30 MHz
≤ 250 mOhm/m

Relative velocity of propagation
= 80 %

Operating voltage (peak)
≤ 300 V

Test voltage (wire/wire/screen rms 50Hz 5min)
≤ 5000 V

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>0.1</th>
<th>1</th>
<th>5</th>
<th>10</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attenuation typ. (dB/100m)</td>
<td>0,3 (0,1)</td>
<td>1,1 (0,3)</td>
<td>2,8 (0,9)</td>
<td>3,9 (1,2)</td>
<td>5,7 (1,7)</td>
</tr>
</tbody>
</table>

Mechanical and thermal characteristics

Conductor material acc. to DIN EN 13602 Cu-ETP-A...

Screen material acc. to DIN EN 13602 Cu-ETP-A...-B

Insulating material acc. to DIN EN 50290-2-25 (09YS)

Jacket material acc. to DIN EN 50290-2-27 (HD 624.7) (IEC 60092-359 / SHF1)

Approved for Marine and Offshore Applications

Germanischer Lloyd Certificate No. 32 525-06 HH

Det Norske Veritas Certificate No. E-11826

Lloyds Register Certificate No. 10/20035

Other characteristics:

Flame retardant acc. to IEC 60332-3-22 (Cat. A/F)

Adapted for use in RS485 applications

Permissible temperature range : -30 °C (-22 °F) up to 80 °C (176 °F)

Min. bending radius allowed : repeated 8X ø, single 4X ø

Weight about : 79 Kg/km (53 lb/1000ft)

Designation of order:

L45467-F19-C16

211385

09YS(ST)CH 1X2X0.9/2.4-120 LI VZN SW FRNC

1000 m (3281 ft) on non-returnable reel
LEONI Special Cables GmbH

LEONI SeaLine®
CAN-BUS
Cable type: 09YSH(ST)CH 2X2X0.9/2.2-120 LI VZN SW FRNC

Design

Wire
Stranded tinned copper wire 19 X 0.18 (21 AWG) (0.48mm²)  ø 0.9 mm (0,035 in)
Insulation of foamed Polypropylene (PP) with Skin  ø 2.2 mm (0,087 in)

Core:
Filler as central element
1. layer: 4 wires  RD (Printing: L1 Hi),  BU (Printing: L2 Lo),  BN (Printing: L1 Lo),  GN (Printing: L2 Hi)
Plastic tape, overlapped
Inner-Jacket: Thermoplastic copolymer (FRNC)  ø 5.8 mm (0,228 in)
Alulaminate foil overlapped
Shield braiding of tinned copper wires 0.13 mm dia (36 AWG)  Coverage about 85%

Jacket:
Thermoplastic copolymer (FRNC) BK
Wall thickness about 1.0 mm  ø (8.4 ±0.2) mm (0,331 ±0,008 in)

Printing: LEONI L SeaLine CAN Marine Cable * 09YSH(ST)CH 2X2X0.9/2.2-120 LI * L45467-F19-C26
"sequential length in metres"
Textintervals about 1000 mm
**Electrical data at 20°C**

Conductor resistance \( \leq 44 \ \text{Ohm/km} \)

Insulation resistance \( \geq 5 \ \text{GOhm/km} \)

Capacitance (1 kHz) \( = 36 \ \text{nF/km} \)

Characteristic impedance (1 MHz) \( (120 \pm 18) \ \text{Ohm} \)

Surface transfer impedance of screen up to 30 MHz \( \leq 250 \ \text{mOhm/m} \)

Relative velocity of propagation \( = 80 \% \)

Operating voltage (peak) \( \leq 300 \ \text{V} \)

Test voltage (wire/wire/screen rms 50Hz 1min) \( 2000 \ \text{V} \)

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>0.1</th>
<th>1</th>
<th>5</th>
<th>10</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attenuation typ. (dB/100m)</td>
<td>0.3 (0,1)</td>
<td>1.1 (0,3)</td>
<td>2.8 (0,9)</td>
<td>3.9 (1,2)</td>
<td>5.7 (1,7)</td>
</tr>
</tbody>
</table>

**Mechanical and thermal characteristics**

Conductor material acc. to DIN EN 13602 Cu-ETP-A...

Screen material acc. to DIN EN 13602 Cu-ETP-A...-B

Insulating material acc. to DIN EN 50290-2-25 (09YS)

Jacket material acc. to DIN EN 50290-2-27 (HD 624.7) (IEC 60092-359 / SHF1)

Approved for Marine and Offshore Applications

- Germanischer Lloyd Certificate No. 32S25-06 HH
- Det Norske Veritas Certificate No. E-11826
- Lloyds Register Certificate No. 10/20035

**Other characteristics:**

Flame retardant acc. to IEC 60332-3-22 (Cat. A/F)

Adapted for use in RS485 applications

Permissible temperature range: -30 °C (-22 °F) up to 80 °C (176 °F)

Min. bending radius allowed: repeated 8X Ø, single 4X Ø

Weight about: 90 Kg/km (61 lb/1000ft)

**Designation of order:**

L45467-F19-C26

212004

09YSH(ST)CH 2X2X0.9/2.2-120 LI VZN SW FRNC

1000 m (3281 ft) on non-returnable reel
**Design**

**Wire**
- Stranded wire highly flexible to DIN VDE 0295, class 6: ø 1.5 mm
- Insulation of thermoplastic polypropylene copolymer (FRNC): ø 2.5 mm
- Wall thickness: 0.5 mm

**Jacket:**
- Polyurethane (PUR) BK
- Wall thickness about 0.6 mm
- The brown wire should lay on the broadside of the profile

**Outer dimensions**
- Thickness: 4.0 ± 0.2 mm
- Thickness of leading edge: 2.0 ± 0.1 mm
- Width 1: 6.5 ± 0.2 mm
- Width 2: 10.0 ± 0.2 mm
- Grid dimension conductor/conductor: 3.6 ± 0.2 mm

**Printing:** "ASI-LOGO" LEONI L VDE-REG.-NR.9971 FLI-9Y11Y 2X1.5 VZN FRNC OIL RESISTANT 24V + marking every meter

**Electrical and mechanical characteristics**
- Acc. to specification AS-I KO1-E, version 12.09.96 / speci_4E
- Flame retardant acc. to IEC 60332-1-2

**Use:** Acc. to guide to use AS-I AR 01-E, version 12.09.96, anwen_4e
- VDE-Reg.-Nr. 9971
Approved for Marine and Offshore Applications

Germanischer Lloyd: Certificate No. 99 160-97 HH
Lloyds Register of Shipping: Certificate No. 97/20069 (E3)
ABS Europe LTD: Certificate No. 02-HG338429/2-PDA
Bureau Veritas: Certificate No. 07162/DO BV
Det Norske Veritas: Certificate No. E-10399

Other characteristics:
RoHS compliant (Directive 2011/65/EC)
Halogen free acc. to IEC 60754-1

Reversed bending strength (horizontal on broadside)
- Bending: 10 million
- Maximum acceleration: 4 m/s²
- Maximum horizontal speed: 4 m/s
- Minimum bending radius: 50 mm
- Maximum length horizontal of cable: 10 m

Torsional strength for > 10 million cycles (angle ±180° on 0.5 m)

Permissible temperature range:
before and after Laying: -40°C up to +85°C
during Laying: -30°C up to +85°C

Designation of order:
L45587-M21-B48
201206
FLI-9Y11Y 2X1X1.5 VZN FRNC SW
100 m on ring

Weight about: 67 Kg/km
Design

Wire
Stranded tinned copper wire (18 AWG)  \( \phi \ 1.2 \ \text{mm} \ (0.047 \ \text{in dia}) \)
Insulation of Polyethylene (PE) (cross-linked) - number printed  \( \phi \ 2.9 \ \text{mm} \ (0.114 \ \text{in dia}) \)

Core
2 wires, BK/1 and WH/1 twisted to a pair
Plastic tape overlapped
Stranded tinned copper drain wire (18 AWG)
Aluminate foil (\( \geq \) 25% overlap)  \( \phi \ 6.1 \ \text{mm} \ (0.240 \ \text{in dia}) \)

Inner-Jacket:
Cross-linked FRNC Copolymer (SHF2) BK  \( \phi \ (7.5 \pm 0.3) \ \text{mm} \ (0.295 \pm 0.012 \ \text{in dia}) \)
Braiding of stainless steel (1.4571) wires 0.3 mm dia

Jacket:
Cross-linked FRNC Copolymer (SHF2) BK  \( \phi \ (10.8 \pm 0.3) \ \text{mm} \ (0.425 \pm 0.012 \ \text{in dia}) \)

Printing: "sequential length in metres" \ LEONI L * L45467-J20-B6 * 2X(ST)HX(Z)HX 1X2X1.2/2.9-100 VZN LI *
"internal lot number"

Electrical data at 20°C
Conductor resistance  \( \leq \ 24 \ \text{Ohm/km} \)
Insulation resistance  \( \geq \ 200 \ \text{MOhm}^*\text{km} \)
Characteristic impedance (31.25 kHz)  \( (100 \pm 20) \ \text{Ohm} \)
Capacitance (1 kHz)  \( = \ 60 \ \text{nF/km} \)
Inductance (31.25 kHz)  \( 0.65 \ \mu\text{H/m} \)
Capacity unbalanced to ground  \( \leq \ 2 \ \text{nF/km} \)
Attenuation (38.4 kHz)  \( \leq \ 3.0 \ \text{dB/km} \)
Propagation delay change (7.8 …39 kHz) ≤ 1.7 µs/km
Operating voltage (peak) ≤ 300 V
Test voltage (wire/wire/screen rms 50Hz 1min) 1500 V

Electrical requirements acc. to IEC 61158-2

**Mechanical and thermal characteristics**
Conductor material acc. to DIN EN 13602 Cu-ETP-A...
Insulating material acc. to DIN EN 50290-2-29 (VDE 0819) (HD 624.9 S1) (2X)
Jacket material acc. to IEC 60092-359 / SHF2
Flame retardant acc. to IEC 60332-3-22 (Cat. A)
Flame retardant acc. to IEC 60332-1-2

Approved for Marine and Offshore Applications
ABS  Certificate No. 13-GB1068981-PDA

**Other characteristics:**
RoHS compliant (Directive 2011/65/EC)
UV-resistant
Halogen free

Permissible temperature range
Transport, installation and operating: -25 °C (-13 °F) up to 90 °C (194 °F)

Min. bending radius allowed: repeated 20X ø, single 10X ø
Weight about 189 kg/km (127 lb/1000ft)

**Designation of order:**
L45467-J20-B6
225798
2X(ST)HX(Z)HX 1X2X1.2/2.9-100 VZN LI
500 m (1640 ft) on non-returnable reel
Design

Wire
Stranded tinned copper wire (18 AWG) \(\phi 1.2 \text{ mm (0.047 in dia)}\)
Insulation of Polyethylene (PE) (cross-linked) - number printed \(\phi 2.9 \text{ mm (0.114 in dia)}\)

Shielded pair
2 wires twisted to a pair
Plastic tape overlapped
Stranded tinned copper drain wire (18 AWG) \(\phi 6.1 \text{ mm (0.240 in dia)}\)
Alulaminate foil (\(\geq 25\%\) overlap)

Core:
2 shielded pairs
Sequence of colors: BK-1/WH-1 and BK-2/WH-2

Inner-Jacket:
Cross-linked FRNC Copolymer (SHF2) BK \(\phi 13.1 \text{ mm (0.516 in dia)}\)
Braiding of stainless steel (1.4571) wires 0.3 mm dia

Jacket:
Cross-linked FRNC Copolymer (SHF2) BK \(\phi (17.0 \pm 0.3) \text{ mm (0.669 \pm 0.012 in dia)}\)
Printing: “sequential length in metres” LEONI L * L45467-J220-B6 * 2X(ST)HX(Z)HX 2X2X1.2/2.9-100 VZN LI * “internal lot number”

Electrical data at 20°C
Conductor resistance \(\leq 24 \text{ Ohm/km}\)
Insulation resistance \(\geq 200 \text{ MOhm*km}\)
Characteristic impedance (31.25 kHz) \((100 \pm 20) \text{ Ohm}\)
Capacitance (1 kHz) \(= 60 \text{ nF/km}\)
Inductance (31.25 kHz) \(= 0.65 \text{ \mu H/m}\)
LEONI Special Cables GmbH

Capacity unbalanced to ground \( \leq 2 \text{ nF/km} \)
Attenuation (38.4 kHz) \( \leq 3.0 \text{ dB/km} \)
Propagation delay change (7.8 … 39 kHz) \( \leq 1.7 \mu\text{s/km} \)
Operating voltage (peak) \( \leq 300 \text{ V} \)
Test voltage (wire/wire/screen rms 50Hz 1min) 1500 V

Electrical requirements acc. to IEC 61158-2

**Mechanical and thermal characteristics**
Conductor material acc. to DIN EN 13602 Cu-ETP-A...
Insulating material acc. to DIN EN 50290-2-29 (VDE 0819) (HD 624.9 S1) (2X)
Jacket material acc. to IEC 60092-359 / SHF2
Flame retardant acc. to IEC 60332-3-22 (Cat. A)
Flame retardant acc. to IEC 60332-1-2

Approved for Marine and Offshore Applications
ABS Certificate No. 13-GB1068981-PDA

**Other characteristics:**
RoHS compliant (Directive 2011/65/EC)
UV-resistant
Halogen free

Permissible temperature range
Transport, installation and operating: -25 °C (-13 °F) up to 90 °C (194 °F)

Min. bending radius allowed: repeated 20X ø, single 10X ø
Weight about: 397 kg/km (267 lb/1000ft)

**Designation of order:**
L45467-J220-B6
226027
2X(ST)HX(Z)HX 2X2X1.2/2.9-100 VZN LI SW
500 m (1640 ft) on non-returnable reel
<table>
<thead>
<tr>
<th>RG type</th>
<th>Order Number</th>
<th>Type designation</th>
<th>Cross section</th>
<th>AWG</th>
<th>Outer diameter</th>
<th>SHF-type</th>
</tr>
</thead>
<tbody>
<tr>
<td>RG6</td>
<td>L45466-D15-B256</td>
<td>2YCCH 0.74/4.8-75 STAKU FRNC</td>
<td>0.43 mm²</td>
<td>21</td>
<td>8.4</td>
<td>SHF1</td>
</tr>
<tr>
<td>RG6</td>
<td>L45466-D15-B266</td>
<td>2YCCHX 0.74/4.8-75 STAKU FRNC</td>
<td>0.43 mm²</td>
<td>21</td>
<td>8.4</td>
<td>SHF2</td>
</tr>
<tr>
<td>RG6</td>
<td>L45466-D15-B276</td>
<td>2YCH(Z)H 0.74/4.8-75 STAKU FRNC</td>
<td>0.43 mm²</td>
<td>21</td>
<td>11.2</td>
<td>SHF1</td>
</tr>
<tr>
<td>RG6</td>
<td>L45466-D15-B286</td>
<td>2YCH(Z)HX 0.74/4.8-75 STAKU FRNC</td>
<td>0.43 mm²</td>
<td>21</td>
<td>11.2</td>
<td>SHF2</td>
</tr>
<tr>
<td>RG11</td>
<td>L45466-D18-B156</td>
<td>2YCH 1.2/7.25-75 LI VZN FRNC</td>
<td>0.9 mm²</td>
<td>18</td>
<td>10.3</td>
<td>SHF1</td>
</tr>
<tr>
<td>RG11</td>
<td>L45466-D18-B166</td>
<td>2YCHX 1.2/7.25-75 LI VZN FRNC</td>
<td>0.9 mm²</td>
<td>18</td>
<td>10.3</td>
<td>SHF2</td>
</tr>
<tr>
<td>RG11</td>
<td>L45466-D18-B176</td>
<td>2YCH(Z)H 1.2/7.25-75 LI VZN FRNC</td>
<td>0.9 mm²</td>
<td>18</td>
<td>13.6</td>
<td>SHF1</td>
</tr>
<tr>
<td>RG11</td>
<td>L45466-D18-B186</td>
<td>2YCH(Z)HX 1.2/7.25-75 LI VZN FRNC</td>
<td>0.9 mm²</td>
<td>18</td>
<td>13.6</td>
<td>SHF2</td>
</tr>
<tr>
<td>RG12</td>
<td>L45466-D18-B196</td>
<td>2YCH(Z) 1.2/7.25-75 LI VZN FRNC</td>
<td>0.9 mm²</td>
<td>18</td>
<td>11.5</td>
<td>SHF1</td>
</tr>
<tr>
<td>RG12</td>
<td>L45466-D18-B206</td>
<td>2YCHX(Z) 1.2/7.25-75 LI VZN FRNC</td>
<td>0.9 mm²</td>
<td>18</td>
<td>11.5</td>
<td>SHF2</td>
</tr>
<tr>
<td>RG22</td>
<td>L45467-E21-B6</td>
<td>2Y2YCCH 1X2X1.2/2.3-95 LI VZN</td>
<td>0.9 mm²</td>
<td>18</td>
<td>10.7</td>
<td>SHF1</td>
</tr>
<tr>
<td>RG22</td>
<td>L45467-E21-B16</td>
<td>2Y2YCCHX 1X2X1.2/2.3-95 LI VZN</td>
<td>0.9 mm²</td>
<td>18</td>
<td>10.7</td>
<td>SHF2</td>
</tr>
<tr>
<td>RG58</td>
<td>L45466-B13-B266</td>
<td>2YCH 0.9/2.85-50 LI VZN FRNC</td>
<td>0.51 mm²</td>
<td>21</td>
<td>4.95</td>
<td>SHF1</td>
</tr>
<tr>
<td>RG58</td>
<td>L45466-B13-B276</td>
<td>2YCHX 0.9/2.85-50 LI VZN FRNC</td>
<td>0.51 mm²</td>
<td>21</td>
<td>4.95</td>
<td>SHF2</td>
</tr>
<tr>
<td>RG58</td>
<td>L45466-B13-B286</td>
<td>2YCH(Z)H 0.9/2.85-50 LI VZN FRNC</td>
<td>0.51 mm²</td>
<td>21</td>
<td>7.8</td>
<td>SHF1</td>
</tr>
<tr>
<td>RG58</td>
<td>L45466-B13-B296</td>
<td>2YCH(Z)HX 0.9/2.85-50 LI VZN FRNC</td>
<td>0.51 mm²</td>
<td>21</td>
<td>7.8</td>
<td>SHF2</td>
</tr>
<tr>
<td>RG59</td>
<td>L45466-D14-B136</td>
<td>2YCH 0.6/3.7-75 FRNC</td>
<td>0.29 mm²</td>
<td>23</td>
<td>6.0</td>
<td>SHF1</td>
</tr>
<tr>
<td>RG59</td>
<td>L45466-D14-B146</td>
<td>2YCHX 0.6/3.7-75 FRNC</td>
<td>0.29 mm²</td>
<td>23</td>
<td>6.0</td>
<td>SHF2</td>
</tr>
<tr>
<td>RG59</td>
<td>L45466-D14-B156</td>
<td>2YCH(Z)H 0.6/3.7-75 FRNC</td>
<td>0.29 mm²</td>
<td>23</td>
<td>9.2</td>
<td>SHF1</td>
</tr>
<tr>
<td>RG59</td>
<td>L45466-D14-B166</td>
<td>2YCH(Z)HX 0.6/3.7-75 FRNC</td>
<td>0.29 mm²</td>
<td>23</td>
<td>9.2</td>
<td>SHF2</td>
</tr>
<tr>
<td>RG213</td>
<td>L45466-B18-B56</td>
<td>2YCH 2.25/7.25-50 LI FRNC</td>
<td>3.1 mm²</td>
<td>13</td>
<td>10.3</td>
<td>SHF1</td>
</tr>
<tr>
<td>RG213</td>
<td>L45466-B18-B66</td>
<td>2YCHX 2.25/7.25-50 LI FRNC</td>
<td>3.1 mm²</td>
<td>13</td>
<td>10.3</td>
<td>SHF2</td>
</tr>
<tr>
<td>RG213</td>
<td>L45466-B18-B96</td>
<td>2YCH(Z)H 2.25/7.25-50 LI FRNC</td>
<td>3.1 mm²</td>
<td>13</td>
<td>13.6</td>
<td>SHF1</td>
</tr>
<tr>
<td>RG213</td>
<td>L45466-B18-B106</td>
<td>2YCH(Z)HX 2.25/7.25-50 LI FRNC</td>
<td>3.1 mm²</td>
<td>13</td>
<td>13.6</td>
<td>SHF2</td>
</tr>
<tr>
<td>RG214</td>
<td>L45466-B18-B76</td>
<td>2YCH 2.25/7.25-50 LI VS FRNC</td>
<td>3.1 mm²</td>
<td>13</td>
<td>10.8</td>
<td>SHF1</td>
</tr>
<tr>
<td>RG214</td>
<td>L45466-B18-B86</td>
<td>2YCHX 2.25/7.25-50 LI VS FRNC</td>
<td>3.1 mm²</td>
<td>13</td>
<td>10.8</td>
<td>SHF2</td>
</tr>
<tr>
<td>RG214</td>
<td>L45466-B18-B116</td>
<td>2YCH(Z)H 2.25/7.25-50 LI VS FRNC</td>
<td>3.1 mm²</td>
<td>13</td>
<td>13.6</td>
<td>SHF1</td>
</tr>
<tr>
<td>RG214</td>
<td>L45466-B18-B126</td>
<td>2YCH(Z)HX 2.25/7.25-50 LI VS FRNC</td>
<td>3.1 mm²</td>
<td>13</td>
<td>13.6</td>
<td>SHF2</td>
</tr>
</tbody>
</table>
SeaLine®

Cable type: 2YCCH 0.74/4.8-75 STAKU FRNC RG6 SHF1

Design

Inner conductor: Bare copper-clad steel wire (21 AWG)                             ø  0.74  mm (0,029 in)
Insulation of Polyethylene (PE)                                               ø   4.8   mm (0,189 in)
1. Shield braiding of bare copper wires 0.15 mm dia (35 AWG) Coverage about  95%  ø   5.4   mm (0,213 in)
2. Shield braiding of bare copper wires 0.15 mm dia (35 AWG) Coverage about  95%  ø   6.0   mm (0,236 in)

Jacket:
Thermoplastic copolymer (FRNC) BK
Wall Thickness about 1.2 mm                                               ø  (8.4 ±0.2) mm (0,331 ±0,008 in)

Printing: "sequential length in metres" LEONI L SeaLine® * L45466-D15-B256 * 2YCCH 0.74/4.8-75 STAKU FRNC RG6 SHF1 * "internal lot number"
Textintervals about 1000 mm

Electrical data at 20°C

Conductor resistance ≤ 110 Ohm/km
Insulation resistance ≥ 10 GOhm*km
Operating voltage (peak) ≤ 250 V
Characteristic impedance (75 ±3) Ohm
Capacitance 1 kHz ≈ 67 nF/km
rel. velocity of propagation 66 %
Test voltage (wire/screen rms 50Hz 1min) = 2000 V
### Frequency (MHz)

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>50</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>500</th>
<th>1000</th>
<th>2000</th>
<th>2500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attenuation typ. (dB/100m)</td>
<td>8,9 (2,71)</td>
<td>12,5 (3,81)</td>
<td>15,5 (4,72)</td>
<td>16,3 (4,97)</td>
<td>21,6 (6,58)</td>
<td>32,2 (9,81)</td>
<td>49 (14,93)</td>
<td>56,5 (17,22)</td>
</tr>
<tr>
<td>(dB/100ft)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Mechanical and thermal characteristics

- Screen material acc. to DIN EN 13602 Cu-ETP-A...-B
- Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table HD (HD 624.3) (2Y)
- Jacket material acc. to IEC 60092-359 / SHF1
- Flame retardant acc. to IEC 60332-3-22 (Cat. A)

- Approved for Marine and Offshore Applications
- Germanischer Lloyd Certificate No. 59 435-08 HH

### Other characteristics:

- Similar RG6
- RoHS compliant (Directive 2011/65/EC)
- Halogen free
- UV-resistant

- Permissible temperature range : -25 °C (-13 °F) up to 80°C (176 °F)
- Min. bending radius allowed : repeated 10X ø, single 5X ø
- Weight about : 115 kg/km (77 lb/1000ft)

### Designation of order:

L45466-D15-B256
2YCCCH 0.74/4.8-75 STAKU FRNC
1000 m (3281 ft) on non-returnable reel
SeaLine®

Cable type: 2YCHX 1.2/7.25-75 LI VZN FRNC RG11 SHF2

**Design**

- Inner conductor: Stranded tinned copper wire 7 X 0.4 (18 AWG) 1.21 mm (0.048 in)
- Insulation of Polyethylene (PE) 7.25 mm (0.285 in)
- Shield braiding of bare copper wires 0.18 mm dia (33 AWG) 8.0 mm (0.315 in)
- Coverage about 95%

**Jacket:**
- Thermoplastic copolymer (FRNC) (cross-linked) BK
- Wall thickness about 1.1 mm 10.3 ±0.3 mm (0.406 ±0.012 in)

Printing: "sequential length in metres" LEONI L SeaLine® * L45466-D18-B166 * 2YCHX 1.2/7.25-75 LI VZN FRNC RG11 SHF2 * "internal lot number"

**Textintervals about 1000 mm**

**Electrical data**

- Conductor resistance ≤ 22 Ohm/km
- Insulation resistance ≥ 10 GOhm*km
- Operating voltage (peak) ≤ 300 V
- Characteristic impedance (75 ±3) Ohm
- Capacitance 1 kHz = 68 nF/km
- Relative velocity of propagation = 66 %
- Test voltage (wire/screen rms 50Hz 1min) = 2000 V
**Mechanical and thermal characteristics**

Conductor/Screen material acc. to DIN EN 13602 Cu-ETP-A...-B

Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table HD (HD 624.3) (2Y)

Jacket material acc. to IEC 60092-359 / SHF2

Flame retardant acc. to IEC 60332-3-22 (Cat. A)

Approved for Marine and Offshore Applications

Germanischer Lloyd Certificate No. 59 435-08 HH

**Other characteristics:**

Similar RG11

RoHS compliant (Directive 2011/65/EC)

Halogen free

UV-resistant

Permissible temperature range: -40 °C (-40 °F) up to 80 °C (176 °F)

Min. bending radius allowed: repeated 10X ø, single 5X ø

Weight about: 145 Kg/km (97 lb/1000ft)

**Designation of order:**

L45466-D18-B166

214589

2YCHX 1.2/7.25-75 LI VZN FRNC

1000 m (3281 ft) on non-returnable reel
SeaLine®

Cable type: 2YCH 0.9/2.85-50 LI VZN FRNC RG58 SHF1

**Design**

Inner conductor: Stranded tinned copper wire 19 X 0.19 (21 AWG)  
Ø 0.93 mm (0.037 in)

Insulation of Polyethylene (PE)  
Ø 2.85 mm (0.112 in)

Shield braiding of tinned copper wires 0.13 mm dia (36 AWG)  
Coverage about 95%  
Ø 3.4 mm (0.134 in)

**Jacket:**

Thermoplastic copolymer (FRNC) BK  
Wall thickness about 0.75 mm  
Ø (4.95 ±0.15) mm (0.195 ±0.006 in)

Printing: "sequential length in metres" LEONI L SeaLine® * L45466-B13-B266 * 2YCH 0.9/2.85-50 LI VZN FRNC RG58 SHF1 * "internal lot number"  
Textintervals about 1000 mm

**Electrical data at 20°C**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductor resistance</td>
<td>≤ 37 Ohm/km</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>≥ 10 GOhm/km</td>
</tr>
<tr>
<td>Operating voltage (peak)</td>
<td>≤ 300 V</td>
</tr>
<tr>
<td>Characteristic impedance</td>
<td>(50 ±2) Ohm</td>
</tr>
<tr>
<td>Capacitance 1 kHz</td>
<td>= 105 nF/km</td>
</tr>
<tr>
<td>Relative velocity of propagation</td>
<td>66 %</td>
</tr>
<tr>
<td>Test voltage (wire/screen rms 50Hz 1min)</td>
<td>2000 V</td>
</tr>
</tbody>
</table>
Frequency (MHz) | 50 | 100 | 200 | 300 | 500 | 1000 | 2000 | 2500
---|---|---|---|---|---|---|---|---
Attenuation typ. (dB/100m) (dB/100ft) | 12 (3,66) | 17 (5,18) | 27 (8,23) | 34 (10,36) | 41 (12,50) | 65 (19,81) | 95 (28,95) | 110 (33,53)

**Mechanical and thermal characteristics**

Conductor/Screen material acc. to DIN EN 13602 Cu-ETP-A...-B

Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table HD (HD 624.3) (2Y)

Jacket material acc. to IEC 60092-359 / SHF1

Flame retardant acc. to IEC 60332-3-22 (Cat. A)

Approved for Marine and Offshore Applications

Germanischer Lloyd Certificate No. 59 435-08 HH

**Other characteristics:**

Similar RG58

RoHS compliant (Directive 2011/65/EC)

Determination of the amount of halogen acid gas acc. IEC 60754-1

Corrosivity of fumes acc. to IEC 60754-2

UV-resistant

Permissible temperature range : -25 °C (-13 °F) up to 80 °C (176 °F)

Min. bending radius allowed : repeated 10X ø, single 5X ø

Weight about : 39 Kg/km (26 lb/1000ft)

**Designation of order:**

L45466-B13-B266

214590

2YCH 0.9/2.85-50 LI VZN FRNC

1000 m (3281 ft) on non-returnable reel
**Design**

Inner conductor: Bare copper wire (23 AWG)  
Ø 0.61 mm (0.024 in)

Insulation of Polyethylene (PE)  
Ø 3.7 mm (0.146 in)

Shield braiding of bare copper wires 0.15 mm dia (35 AWG)  
Coverage about 90%  
Ø 4.3 mm (0.169 in)

**Jacket:**

Thermoplastic copolymer (FRNC) BK  
Wall thickness about 0.85 mm  
Ø (6.0 ±0.2) mm (0.236 ±0.008 in)

Printing: "sequential length in metres” LEONI L SeaLine® * L45466-D14-B136 * 2YCH 0.6/3.7-75  
FRNC RG59 SHF1 * "internal lot number”  
Textintervals about 1000 mm

**Electrical data at 20°C**

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>50</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>500</th>
<th>1000</th>
<th>2000</th>
<th>2500</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Attenuation typ. (dB/100m)  
(dB/100ft) | 7.8 | 11.2 | 16.3 | 20.5 | 26.7 | 39.5 | 59.4 | 67.3 |
|                | (2.4) | (3.4) | (5.0) | (6.2) | (8.1) | (12.0) | (18.1) | (20.5) |

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>50</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>500</th>
<th>1000</th>
<th>2000</th>
<th>2500</th>
</tr>
</thead>
</table>
| Attenuation typ. (dB/100m)  
(dB/100ft) | 7.8 | 11.2 | 16.3 | 20.5 | 26.7 | 39.5 | 59.4 | 67.3 |
|                | (2.4) | (3.4) | (5.0) | (6.2) | (8.1) | (12.0) | (18.1) | (20.5) |
**Mechanical and thermal characteristics**

Conductor material acc. to DIN EN 13602 Cu-ETP-R...

Screen material acc. to DIN EN 13602 Cu-ETP-A...

Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table HD (HD 624.3) (2Y)

Jacket material acc. to IEC 60092-359 / SHF1

Flame retardant acc. to IEC 60332-3-22 (Cat. A)

Approved for Marine and Offshore Applications

Germanischer Lloyd Certificate No. S9 435-08 HH

**Other characteristics:**

Similar RG59

RoHS compliant (Directive 2011/65/EC)

Halogen free

UV-resistant

Permissible temperature range: -25 °C (-13 °F) up to 80 °C (176 °F)

Min. bending radius allowed: repeated 10X ø, single 5X ø

Weight about: 52 Kg/km (35 lb/1000ft)

**Designation of order:**

L45466-D14-B136 / 214587 / 2000 m (6562 ft) on non-returnable reel

L45466-D14-B136-L7 / 227991 / 1000 m (3281 ft) on non-returnable reel

2YCH 0.6/3.7-75 FRNC
Cable type: 2YCCHX 2.25/7.25-50 LI VS FRNC RG214 SHF2

Design

Inner conductor: Stranded silver-plated copper wire 7 X 0.75 (13 AWG)  
ø 2.25 mm (0.089 in)
Insulation of Polyethylene (PE)  
ø 7.25 mm (0.285 in)
1. Shield braiding of silver-plated copper wires 0.15 mm dia (35 AWG)  
Coverage about 90%  
ø 7.9 mm (0.311 in)
2. Shield braiding of silver-plated copper wires 0.15 mm dia (35 AWG)  
Coverage about 95%  
ø 8.5 mm (0.335 in)

Jacket:
Thermoplastic copolymer (FRNC) (cross-linked) BK  
Wall thickness about 1.15 mm  
ø (10.8 ±0.3) mm (0.425 ±0.012 in)

Printing: "sequential length in metres" LEONI L SeaLine® * L45466-B18-B86 * 2YCCHX 2.25/7.25-50 LI VS FRNC RG214 SHF2 * "internal lot number"  
Textintervals about 1000 mm

Electrical data at 20°C

Conductor resistance  
≤ 6.5 Ohm/km
Insulation resistance  
≥ 10 GOhm*km
Capacitance (1 kHz wire/screen)  
= 101 nF/km
Characteristic impedance  
(50 ±2) Ohm
Operating voltage (peak)  
≤ 300 V
Test voltage (wire/screen rms 50Hz 1min)  
2000 V
**Mechanical and thermal characteristics**

Conductor/Screen material acc. to DIN EN 13602 Cu-ETP-A...
Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table HD (HD 624.3) (2Y)
Jacket material acc. to IEC 60092-359 / SHF2
Flame retardant acc. to IEC 60332-3-22 (Cat. A)

Approved for Marine and Offshore Applications
Germanischer Lloyd Certificate No. 59 435-08 HH

**Other characteristics:**

Similar RG214
RoHS compliant (Directive 2011/65/EC)
Halogen free
UV-resistant

Permissible temperature range
Transport, installation and operating: -40 °C (-40 °F) up to 80 °C (176 °F)

Min. bending radius allowed: repeated 10X ø, single 5X ø
Weight about: 193 kg/km (130 lb/1000ft)

**Designation of order:**

L45466-B18-B86
214586
2YCCHX 2.25/7.25-50 LI VS FRNC
2000 m (6562 ft) on non-returnable reel

---

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>500</th>
<th>1000</th>
<th>1300</th>
<th>2000</th>
<th>2500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attenuation typ. (dB/100m) (dB/100ft)</td>
<td>6,9 (2,10)</td>
<td>10 (3,05)</td>
<td>12,5 (3,81)</td>
<td>15 (4,57)</td>
<td>16,8 (5,12)</td>
<td>25 (7,62)</td>
<td>29,8 (9,08)</td>
<td>41,6 (12,68)</td>
<td>49,6 (15,12)</td>
</tr>
<tr>
<td>Mean. Power (kW) at 40°C</td>
<td>2,2</td>
<td>1,5</td>
<td>1,3</td>
<td>1,1</td>
<td>0,98</td>
<td>0,69</td>
<td>0,60</td>
<td>0,48</td>
<td>0,44</td>
</tr>
</tbody>
</table>
**Design**

**Wire LI2Y 1.0/2.2**
- Stranded bare copper wire (18 AWG)
- Insulation of Polyethylene (PE)
  - Ø 1.36 mm (0.054 in dia)
  - Ø 2.2 mm (0.087 in dia)

**02YS(ST)C 1X2X0.75/2.55-150 LI (PROFIBUS)**
- Wire
  - Stranded bare copper wire (22 AWG)
  - Insulation of foamed Polyethylene (PE) with skin
    - Ø 0.76 mm (0.030 in dia)
    - Ø 2.56 mm (0.101 in dia)
- 2 wires, RD and GN twisted to a pair with fillers in gaps
- Plastic tape overlapped
- Alulaminate foil overlapped
- Shield braiding of tinned copper wires
- Coverage about 70%
- Plastic tape overlapped
  - Ø 6.3 mm (0.248 in dia)

**Core:**
- 1 pair 02YS(ST)C 1X2X0.75/2.55-150 LI RD, GN
- 2 wires LI2Y 2X1X1.0/2.2 BK, BU + fillers
- Plastic tape overlapped
  - Ø 8.3 mm (0.327 in dia)

**Inner-Jacket:**
- Thermoplastic copolymer (FRNC) BK
  - Ø (10.5 ±0.2) mm (0.413 ±0.008 in dia)
- Braiding of stainless steel wires 0.3 mm dia

**Jacket:**
- Special thermoplastic copolymer (FRNC) VT
  - Ø (13.5 ±0.3) mm (0.531 ±0.012 in dia)

Printing: "sequential length in metres" LEONI L SeaLine® * L45467-G117-W6 * PROFIBUS 1x2x0.75 + 2x1.0mm²
IEC 60332-3-24 Mud-Res * "internal lot number"
**LEONI Special Cables GmbH**

**Technical Data Sheet**

**Electrical data at 20°C**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loop resistance</td>
<td>≤ 110 Ohm/km</td>
</tr>
<tr>
<td>Insulation-Resistance</td>
<td>≥ 16000 MΩ/km</td>
</tr>
<tr>
<td>Characteristic Impedance</td>
<td></td>
</tr>
<tr>
<td>3 - 20 MHz</td>
<td>(150 ± 15) Ohm</td>
</tr>
<tr>
<td>31.25 - 38.4 kHz</td>
<td>(185 ± 18.5) Ohm</td>
</tr>
<tr>
<td>9.6 kHz</td>
<td>(270 ± 27) Ohm</td>
</tr>
<tr>
<td>Attenuation</td>
<td></td>
</tr>
<tr>
<td>16 MHz</td>
<td>&lt; 42 dB/km</td>
</tr>
<tr>
<td>4 MHz</td>
<td>&lt; 22 dB/km</td>
</tr>
<tr>
<td>38.4 kHz</td>
<td>&lt; 4 dB/km</td>
</tr>
<tr>
<td>9.6 kHz</td>
<td>&lt; 3 dB/km</td>
</tr>
<tr>
<td>Capacitance</td>
<td></td>
</tr>
<tr>
<td>1 kHz</td>
<td>28 nF/km</td>
</tr>
<tr>
<td>Capacitance unbalance to ground</td>
<td></td>
</tr>
<tr>
<td>Operating voltage (effective value)</td>
<td>≤ 1500 pF/km</td>
</tr>
<tr>
<td>Test voltage (wire/wire rms 50Hz 1min)</td>
<td>1500 V</td>
</tr>
<tr>
<td>Test voltage (wire/screen rms 50Hz 1min)</td>
<td>1000 V</td>
</tr>
</tbody>
</table>

**Mechanical and thermal characteristics**

<table>
<thead>
<tr>
<th>Material Description</th>
<th>Property</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table 2/A (HD 624.3) (02Y)</td>
<td></td>
</tr>
<tr>
<td>Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table HD (HD 624.3) (2Y)</td>
<td></td>
</tr>
<tr>
<td>I-Jacket material acc. to DIN EN 50290-2-27 (HD 624.7)</td>
<td></td>
</tr>
<tr>
<td>Jacket material acc. to IEC 60992-359 / SHF2</td>
<td></td>
</tr>
<tr>
<td>Flame retardant acc. to IEC 60332-2-1</td>
<td></td>
</tr>
<tr>
<td>Flame retardant acc. to IEC 60332-3-24 (Cat. C)</td>
<td></td>
</tr>
<tr>
<td>Mud resistant acc. to NEK606</td>
<td></td>
</tr>
</tbody>
</table>

**Other characteristics:**

- RoHS compliant (Directive 2011/65/EC)
- Permissible temperature range: -40 °C (-40 °F) up to 80 °C (176 °F)
- Min. bending radius allowed: repeated 20X ø, single 10X ø
- Weight about: 247 kg/km (165.5 lb/1000ft)

**Designation of order:**

L45467-G117-W6
226592
02YS(ST)C 1X2X0.75/2.55-150 LI
LI2Y H(Z)H 2X1X1.0 VI
1000 m (3281 ft) on non-returnable reel
LEONI Special Cables GmbH

LEONI SeaLine®
EthernetLink-Cable

Cable type: 09YS(ST)C 2X2X0.75/1.5-100 LI
LIH-Z CH 4X1X1.5 GN

Design

Wire LIH 1.5/2.4
Stranded bare copper wire 84 X 0.15 (1,5 mm²) ø 1.65 mm (0,065 in)
Insulation of Thermoplastic copolymer (FRNC) BK, number printed ø 2.4 mm (0,094 in)
Wall thickness about 0.38 mm

09YS(ST)C 1X2X0.75/1.5-100 LI
Wire 09YS 1X0.75/1.5 LI
Stranded bare copper wire 7 X 0.25 (0,34 mm²) ø 0.75 mm (0.030 in)
Insulation of foamed Polypropylen (PP) with skin ø 1.5 mm (0.059 in)
2 wires twisted to a pair
Plastic tape, overlapped
Alumalinate foil overlapped, applied longitudinally
Shield braiding of tinned copper wires 0.1 mm dia
Coverage about 75% ø 3.7 mm (0.146 in)

Core:
Filler as central element
2 screened pairs WH/BU - YE/OG
4 wires LIH 1.5/2.4 BK number 1-2-3-4
Plastic tape, overlapped
Stranded bare copper drain wire 24 X 0.2 (0.75 mm²)
Shield braiding of bare copper wires 0.2 mm dia (35 AWG)
Coverage about 90% ø 9.4 mm (0.370 in)
Jacket:
Thermoplastic copolymer (FRNC) GN, RAL 6018
Wall thickness about 2.0 mm Ø (13.4 – 0.5) mm (0.528 – 0.020 in)

Printing: "sequential length in metres" LEONI L SeaLine EthernetLink-Cable GL32561-06HH
Textintervals about 1000 mm

Electrical data at 20°C
09YS(ST)C 1X2X0.75/1.5-100 LI
Loop resistance ≤ 120 Ohm/km
Signal run time 4.4 ns/m
Insulation resistance ≥ 500 MOhm*km
Characteristic impedance (1 - 100 MHz) (100 ±15) Ohm
Surface transfer impedance (1 MHz) ≤ 50 mOhm/m
Surface transfer impedance (10 - 100 MHz) ≤ 10 mOhm/m
Test voltage (wire/wire/screen rms 50Hz 1min) = 700 V

Near-end crosstalk attenuation

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>1</th>
<th>4</th>
<th>10</th>
<th>16</th>
<th>20</th>
<th>31.25</th>
<th>62.5</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>(dB - 100m)</td>
<td>65.3</td>
<td>56.3</td>
<td>50.3</td>
<td>47.2</td>
<td>45.8</td>
<td>42.9</td>
<td>38.4</td>
<td>35.3</td>
</tr>
</tbody>
</table>

Attenuation

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>1</th>
<th>4</th>
<th>10</th>
<th>16</th>
<th>20</th>
<th>31.25</th>
<th>62.5</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>(dB / 100m)</td>
<td>2.1</td>
<td>4.0</td>
<td>6.3</td>
<td>8.0</td>
<td>9.0</td>
<td>11.4</td>
<td>16.5</td>
<td>21.3</td>
</tr>
</tbody>
</table>

The electrical requirements acc. to EN 50288-2-1

Wire LIH 1.5/2.4
Conductor resistance ≤ 14 Ohm/km
Insulation resistance ≥ 20 MOhm*km
Operating voltage (peak) ≤ 100 V
Test voltage (wire/wire/screen rms 50Hz 1min) = 1000 V

Mechanical and thermal characteristics
Conductor material acc. to DIN EN 13602 Cu-ETP1-A...
Screen material acc. to DIN EN 13602 Cu-ETP1-A...-B
Insulating material acc. to DIN EN 50290-2-25 (09YS)
Insulating material acc. to DIN EN 50290-2-26 (VDE 0819) (HD 624.6)
Jacket material acc. to DIN EN 50290-2-27 (HD 624.7) (IEC 60092-359 / SHF1)
Flame retardant acc. to IEC 60332-3-22 (Cat. A/F)
Flame retardant acc. to IEC 60332-1-2
Other characteristics:
Sunlight resistant acc. to UL 1581 Sec.1200
Halogen-free acc. to IEC 60754-2
Smoke-density acc. to IEC 61034-1/2

Approved for Marine and Offshore Applications
Germanischer Lloyd Certificate No. 32 561-06 HH

Permissible temperature range: -20 °C (-4 °F) up to 70 °C (158 °F)
Min. bending radius allowed: repeated 10X ø, single 5X ø
Tensile strength: ≤ 200 N
Weight about: 281 Kg/km (188,3 lb/1000ft)

Application / Special feature:
PROFinet hybrid line to CAT 5 for use: flexible, occasional movement or vibration

Designation of order:
L45467-J217-W16
212322
09YS(ST)C   2X2X0.75/1.5-100 LI
LiH-Z   CH   4X1X1.5    GN
500 m (1640 ft) on non-returnable reel
**LEONI SeaLine®**

Cable type: LI9Y(ST)C  4X2X0.6/1.2-100  
LIH  H  3X1X1.5  GN FRNC

**Design**

**Wire LIH 1.5/2.2 (Power)**
- Stranded bare copper wire 19 X 0.32 (16 AWG) (1.5 mm²)  
- Insulation of Thermoplastic copolymer (FRNC)  
- Wall thickness about 0.3 mm  
  
- ø 1.6 mm (0.063 in)  
- ø 2.2 mm (0.087 in)

**LI9Y(ST)C  4X2X0.6/1.2-100 (Cat5)**
- Stranded bare copper wire 7 X 0.2 (24 AWG) (0.22mm²)  
- Insulation of Polypropylene  
- Wall thickness about 0.3 mm  
  
- ø 0.6 mm (0.024 in)  
- ø 1.2 mm (0.047 in)

2 wires twisted to a pair  
4 pairs twisted  

Sequence of colors: WHBU/BU - WHOG/OG - WHGN/GN - WHBN/BN  
Plastic tape, overlapped  
Alulaminete foil overlapped  
Shield braiding of tinned copper wires 0.13 mm dia (36 AWG)  
Coverage about 85%

**Core**

- Element LI9Y(ST)C  4X2X0.6/1.2-100 (Cat5)  
- 3 wires LIH 1.5/2.2  BK-BN-BU  
- + fillers  
  
- ø 8.2 mm (0.323 in)
**Jacket:**
Thermoplastic copolymer (FRNC) GN
Wall thickness about 1.0 mm
\( \varnothing \ (10.2 \pm 0.3) \text{ mm} (0,402 \pm 0,012 \text{ in}) \)

Printing: "sequential length in metres" LEONI L SeaLine Cat5+ * LI9Y(ST)CH 4X2X0.22mm² +
LIH 3x1.5mm² FRNC * "year/internal order number"

**Electrical data at 20°C**

<table>
<thead>
<tr>
<th>Wire</th>
<th>LIH 1.5/2.2 (Power)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductor resistance</td>
<td>( \leq 14 ) Ohm/km</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>( \geq 20 ) MOhm*km</td>
</tr>
<tr>
<td>Operating voltage (peak)</td>
<td>( \leq 100 ) V</td>
</tr>
<tr>
<td>Test voltage (wire/wire/screen rms 50Hz 1min)</td>
<td>( = 1000 ) V</td>
</tr>
</tbody>
</table>

**LI9Y(ST)C 4X2X0.6/1.2-100 (Cat5)**

| Loop resistance | \( \leq 180 \) Ohm/km |
| Insulation resistance | \( \geq 5 \) GOhm*km |
| Signal run time | \( \leq 5.3 \) ns/m |
| Capacitance (1 kHz) | \( = 50 \) nF/km |
| Characteristic impedance 4 -100 MHz | \( (100 \pm 15) \) Ohm |
| Surface transfer impedance 10 MHz | \( \leq 100 \) mOhm/m |
| Operating voltage | \( = 100 \) V |
| Test voltage (wire/wire/screen rms 50Hz 1min) | \( = 1000 \) V |

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>4</th>
<th>8</th>
<th>10</th>
<th>16</th>
<th>20</th>
<th>31.25</th>
<th>62.5</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Next (dB)</td>
<td>65.3</td>
<td>56.3</td>
<td>50.3</td>
<td>47.2</td>
<td>45.8</td>
<td>42.9</td>
<td>38.4</td>
<td>35.3</td>
</tr>
<tr>
<td>PSNext (dB)</td>
<td>62.3</td>
<td>53.3</td>
<td>47.3</td>
<td>44.2</td>
<td>42.8</td>
<td>39.9</td>
<td>35.4</td>
<td>32.3</td>
</tr>
<tr>
<td>ELFext (dB)</td>
<td>63.8</td>
<td>51.8</td>
<td>43.8</td>
<td>39.7</td>
<td>37.8</td>
<td>33.9</td>
<td>27.9</td>
<td>23.8</td>
</tr>
<tr>
<td>PSELFext (dB)</td>
<td>60.8</td>
<td>48.8</td>
<td>40.8</td>
<td>36.7</td>
<td>34.8</td>
<td>30.9</td>
<td>24.9</td>
<td>20.8</td>
</tr>
<tr>
<td>Attenuation typ. (dB/100m)</td>
<td>2.1</td>
<td>4.0</td>
<td>6.3</td>
<td>8.0</td>
<td>9.0</td>
<td>11.4</td>
<td>16.5</td>
<td>21.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>4</th>
<th>8</th>
<th>10</th>
<th>16</th>
<th>20</th>
<th>31.25</th>
<th>62.5</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return loss (dB)</td>
<td>23.0</td>
<td>24.5</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>23.6</td>
<td>21.5</td>
<td>20.1</td>
</tr>
</tbody>
</table>

Electrical requirements at max. 90m installites cable of the category 5 (EN 50288-2-1)
Mechanical and thermal characteristics
Conductor material acc. to DIN EN 13602 Cu-ETP-A...
Screen material acc. to DIN EN 13602 Cu-ETP-A-...-B
Insulating material acc. to DIN EN 50290-2-25, compound type full PP (HD 624.5)
Insulating material acc. to DIN EN 50290-2-26 (VDE 0819) (HD 624.6)
Jacket material acc. to IEC 60092-359 (SHF1)
Flame retardant acc. to IEC 60332-3-22 (Cat. A/F)

Other characteristics:
RoHS compliant
Permissible temperature range : -25 °C (-13 °F) up to 90 °C (194 °F)
Min. bending radius allowed : repeated 7X ø, single 5X ø
Weight about : 150 Kg/km (101 lb/1000ft)

Designation of order:
L45467-J316-W6
211802
LI9Y(ST)C 4X2X0.6/1.2-100
LIH H 3X1X1.5 GN FRNC
1000 m (3281 ft) on non-returnable reel
**SeaLine®**

2X PU compressed-air hose
LIH H 2X2X0.75mm² VZN

---

**Design**

**Compressed-air hose**

PUR (4.0/6.0)  
(Working pressure max. 8 bar)

**Pair LIH 1X0.75/2.3 VZN**

Wire:
- Stranded tinned copper wire 19 X 0.22 (19 AWG) (0.75mm²)  
- Insulation of Thermoplastic copolymer (FRNC)  
- Wall thickness about 0.6 mm (IEC 60092-376)

2 wires twisted to a pair

**Core:**
- 2 pairs LIH 2X1X0.75/2.3 VZN WH/BN- GN/YE
- 2 compressed-air hose RD-BU + fillers
- Plastic tape, overlapped

**Jacket:**
Thermoplastic copolymer (FRNC) BK  
Wall thickness about 1.2 mm

Mix:
- 2X PU compressed-air hose  
- "sequential length in metres" LEONI L SeaLine® * L45493-D49-A219 * LIH H 2X2X0.75 VZN +  
- "internal lot number"

---

Date of issue: 05.08.2010  
Up-dating: 26.05.2011  
Creator: LIEBEL

Number: L45493-D49-A219-EN
LEONI Special Cables GmbH

**Electrical data at 20°C**
- Conductor resistance: \( \leq 28 \, \text{Ohm/km} \)
- Insulation resistance: \( \geq 20 \, \text{MOhm*km} \)
- Operating voltage: \( \leq 100 \, \text{V} \)
- Test voltage (wire/wire/screen rms 50Hz 1min): \( 1000 \, \text{V} \)

**Mechanical and thermal characteristics**
- Conductor/Screen material acc. to DIN EN 13602 Cu-ETP-A...-B
- Insulating material acc. to DIN EN 50290-2-26 (VDE 0819) (HD 624.6)
- Jacket material acc. to IEC 60092-359 / SHF1

Approved for Marine and Offshore Applications
- Germanischer Lloyd Certificate No. 11 578 -10 HH

**Other characteristics:**
- RoHS compliant (Directive 2011/65/EC)
- Flame retardant acc. to IEC 60332-3-22 (Cat. A)
- Cold impact test acc. to IEC 60811-1-4 -30°C
- Flame retardant acc. to IEC 60332-1-2
- Halogen free

- Temperature range (during operation): -30 °C (-22 °F) up to 80 °C (176 °F)
- Temperature range (during installation): -5 °C (23 °F) up to 80 °C (176 °F)

Max. pulling force: 450 N
Min. bending radius allowed: repeated 8X ø, single 4X ø
Weight about: 166 kg/km (112 lb/1000ft)

**Designation of order:**
- L45493-D49-A219
- 217926
- 2X PU compressed-air hose
- LiH H 2X2X0.75 VZN
- 430 m (1411 ft) on non-returnable reel
Design

Compressed-air hose
PUR (4.0/6.0) (Working pressure max. 8 bar)

Unit LIHCH 4X1X1X0.75 VZN
Wire
Stranded tinned copper wire 19 X 0.22 (19 AWG) (0.75mm²)
Insulation of Thermoplastic copolymer (FRNC)
Wall thickness about 0.6 mm (IEC 60092-376)

Core:
4 Wire LIH 1X0.75/2.30 VZN
Sequence of colors: WH-BN-GN-YE
Plastic tape, overlapped
Shield braiding of tinned copper wires 0.15 mm dia (35 AWG)
Coverage about 85%

Jacket:
Thermoplastic copolymer (FRNC) BK
Wall thickness about 1.05 mm (IEC 60092-376)

Core:
1 unit LIHCH 4X1X1X0.75 VZN
2 compressed-air hose RD-BU + fillers
Plastic tapes, overlapped

Design

Compressed-air hose
PUR (4.0/6.0) (Working pressure max. 8 bar)

Unit LIHCH 4X1X1X0.75 VZN
Wire
Stranded tinned copper wire 19 X 0.22 (19 AWG) (0.75mm²)
Insulation of Thermoplastic copolymer (FRNC)
Wall thickness about 0.6 mm (IEC 60092-376)

Core:
4 Wire LIH 1X0.75/2.30 VZN
Sequence of colors: WH-BN-GN-YE
Plastic tape, overlapped
Shield braiding of tinned copper wires 0.15 mm dia (35 AWG)
Coverage about 85%

Jacket:
Thermoplastic copolymer (FRNC) BK
Wall thickness about 1.05 mm (IEC 60092-376)

Core:
1 unit LIHCH 4X1X1X0.75 VZN
2 compressed-air hose RD-BU + fillers
Plastic tapes, overlapped

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LEONI Special Cables GmbH

Jacket:
Thermoplastic copolymer (FRNC) BK
Wall thickness about 1.4 mm (IEC 60092-376)  \( \varnothing (18.0 \pm 0.5) \text{ mm} (0.709 \pm 0.020 \text{ in dia}) \)

Printing: "sequential length in metres" LEONI L SeaLine\(^\text{®}\) * L45493-D49-A229 * LIHCH H 4X1X0.75 VZN + 2X PU compressed-air hose * "internal lot number"

Electrical data at 20°C
Conductor resistance \( \leq 28 \text{ Ohm/km} \)
Insulation resistance \( \geq 20 \text{ MOhm*km} \)
Operating voltage \( \leq 100 \text{ V} \)
Test voltage (wire/wire/screen rms 50Hz 1min) \( 1000 \text{ V} \)

Mechanical and thermal characteristics
Conductor/Screen material acc. to DIN EN 13602 Cu-ETP-A...-B
Insulating material acc. to DIN EN 50290-2-26 (VDE 0819) (HD 624.6)
Jacket material acc. to IEC 60092-359 / SHF1

Approved for Marine and Offshore Applications
Germanischer Lloyd Certificate No. 11 578 -10 HH

Other characteristics:
RoHS compliant (Directive 2011/65/EC)
Flame retardant acc. to IEC 60332-3-22 (Cat. A)
Cold impact test acc. to IEC 60811-1-4 -30°C
Flame retardant acc. to IEC 60332-1-2
Halogen free

Temperature range (during operation) : -30 °C (-22 °F) up to 80 °C (176 °F)
Temperature range (during installation) : -5 °C (23 °F) up to 80 °C (176 °F)

Max. pulling force : 800 N
Min. bending radius allowed: repeated 8X \( \varnothing \), single 4X \( \varnothing \)
Weight about : 272 kg/km (183 lb/1000ft)

Designation of order:
L45493-D49-A229
218038
2X PU compressed-air hose
LIHCH H 4X1X0.75 VZN
500 m (1640 ft) on non-returnable reel
Design

a) Coaxial element
- Inner conductor: Bare copper wire
  - ø 0.8 mm (0.031 in)
- Insulation of foamed Polyethylene (PE) with skin
  - ø 3.5 mm (0.138 in)
- Shield braiding of bare copper wires 0.13 mm dia
  - Coverage about 95%
- Inner jacket: Thermoplastic copolymer (FRNC) BK
  - ø 4.0 mm (0.157 in)
- Wall thickness about 0.4 mm
  - ø 4.8 mm (0.189 in)

b) Pair
- Wire LIH 0.56/1.6
- Stranded bare copper wire 7 X 0.32
  - ø 0.96 mm (0.038 in)
- Insulation of Thermoplastic copolymer (FRNC)
  - ø 1.6 mm (0.063 in)
- Wall thickness about 0.3 mm
- 2 wires twisted to a pair
- Sequence of colors: Pair 1: GN/YE; Pair 2: WH/BN
- Stranded tinned copper drain wire 7X0.25 (0.34 mm²)
  - Alulaminate foil overlapped

b) Triple
- Wire LIH 1.5/2.2
- Stranded bare copper wire 19 X 0.32
  - ø 1.6 mm (0.063 in)
- Insulation of Thermoplastic copolymer (FRNC)
  - ø 2.2 mm (0.087 in)
- Wall thickness about 0.3 mm
- 3 wires twisted to a triple
- Sequence of colors: BK-BU-GNYE
  - Plastic tape, overlapped
Core:
1 coaxial element to a)
1 triple to c)
2 pairs to b)
fillers
Sequence of colors: Coaxial element - Pair WH/BN - Triple BK/BU/GNYE - Pair GN/YE
Plastic tape, overlapped
Shield braiding of tinned copper wires 0.15 mm dia
Coverage about 80%
Ø 10.3 mm (0,406 in)

Jacket:
Thermoplastic copolymer (FRNC) GN
Wall thickness about 0.8 mm
Ø (11.9 ±0.3) mm (0,469 ±0,012 in)
Printing: CCTV FRNC IEC 332-3 "sequential length in metres"

Electrical data at 20°C
Coaxial element
Conductor resistance ≤ 36 Ohm/km
Insulation resistance ≥ 10 GOhm*km
Capacitance (1 kHz) = 54 nF/km
Characteristic impedance (75 ±4) Ohm
Test voltage (wire/screen rms 50Hz 1min) = 2000 V

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>10</th>
<th>50</th>
<th>100</th>
<th>200</th>
<th>500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attenuation typ. (dB/100m) (dB/100ft)</td>
<td>2,8</td>
<td>6,2</td>
<td>8,9</td>
<td>12,8</td>
<td>23,3</td>
</tr>
<tr>
<td></td>
<td>(0,9)</td>
<td>(1,9)</td>
<td>(2,7)</td>
<td>(3,9)</td>
<td>(7,0)</td>
</tr>
</tbody>
</table>

Conductor resistance Pair to b) ≤ 33 Ohm/km
Conductor resistance Triple to c) ≤ 13 Ohm/km
Insulation resistance ≥ 20 MOhm*km
Nominal voltage (effective value) ≤ 100 V
Test voltage (wire/wire rms 50Hz 1min) = 1000 V
Test voltage (wire/screen rms 50Hz 1min) = 500 V

Mechanical and thermal characteristics
Conductor material acc. to DIN EN 13602 Cu-ETP-A...
Screen material acc. to DIN EN 13602 Cu-ETP-A...B
Insulating material acc. to DIN EN 50290-2-26 (VDE 0819) (HD 624.6)
Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table 2/A (HD 624.3)
Jacket material acc. to DIN EN 50290-2-27 (HD 624.7)
Flame retardant acc. to IEC 60332-3-24 (Cat. C)
**Other characteristics:**
Permissible temperature range: -40 °C (-40 °F) up to 70 °C (158 °F)
Min. bending radius allowed: repeated 8X ø, single 4X ø
Weight about: 206 Kg/km (138 lb/1000ft)

**Designation of order:**
L45466-D114-W36
200499
02YSCH 0.8/3.5-75
L-H 3X1.5
L-H CH 2X2X0.56 PIMF GN FRNC
1500 m (4921 ft) on non-returnable reel
LEONI SeaLine®

Cable type: LI9Y(ST)C 4X2X0.6/1.2-100
LIH   H   3X1X1.5 GN FRNC

Design

**Wire LIH 1.5/2.2 (Power)**
Stranded bare copper wire 19 X 0.32 (16 AWG) (1.5 mm²) μ 1.6 mm (0.063 in)
Insulation of Thermoplastic copolymer (FRNC) μ 2.2 mm (0.087 in)
Wall thickness about 0.3 mm

**LI9Y(ST)C 4X2X0.6/1.2-100 (Cat5)**
Stranded bare copper wire 7 X 0.2 (24 AWG) (0.22mm²) μ 0.6 mm (0.024 in)
Insulation of Polypropylen μ 1.2 mm (0.047 in)
Wall thickness about 0.3 mm
2 wires twisted to a pair
4 pairs twisted
Sequence of colors: WHBU/BU - WHOG/OG - WHGN/GN - WHBN/BN
Plastic tape, overlapped
Alulaminate foil overlapped
Shield braiding of tinned copper wires 0.13 mm dia (36 AWG)
Coverage about 85%

Core
Element  LI9Y(ST)C  4X2X0.6/1.2-100 (Cat5)
3 wires LIH  1.5/2.2  BK-BN-BU
+ fillers μ 8.2 mm (0.323 in)
Jacket:
Thermoplastic copolymer (FRNC) GN
Wall thickness about 1.0 mm  \( \phi \ (10.2 \pm 0.3) \text{ mm (0,402 }\pm 0,012 \text{ in)} \)

Printing: "sequential length in metres"  LEONI L SeaLine Cat5+ * LI9Y(ST)CH 4X2X0.22mm² + 
LIH 3x1.5mm² FRNC * "year/internal order number"

Electrical data at 20°C

<table>
<thead>
<tr>
<th>Wire</th>
<th>LIH 1.5/2.2 (Power)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductor resistance</td>
<td>( \leq 14 \text{ Ohm/km} )</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>( \geq 20 \text{ MOhm*km} )</td>
</tr>
<tr>
<td>Operating voltage (peak)</td>
<td>( \leq 100 \text{ V} )</td>
</tr>
<tr>
<td>Test voltage (wire/wire/screen rms 50Hz 1min)</td>
<td>1000 V</td>
</tr>
</tbody>
</table>

LI9Y(ST)C  4X2X0.6/1.2-100 (Cat5)

| Loop resistance | \( \leq 180 \text{ Ohm/km} \) |
| Signal run time | \( \leq 5 \text{ GOhm*km} \) |
| Capacitance (1 kHz) | \( \leq 30 \text{ nF/km} \) |
| Characteristic impedance 4 -100 MHz | \( (100 \pm 15) \text{ Ohm} \) |
| Surface transfer impedance 10 MHz | \( \leq 100 \text{ mOhm/m} \) |
| Operating voltage | 100 V |
| Test voltage (wire/wire/screen rms 50Hz 1min) | = 1000 V |

<table>
<thead>
<tr>
<th>Frequency (MHz)</th>
<th>1</th>
<th>4</th>
<th>10</th>
<th>16</th>
<th>20</th>
<th>31.25</th>
<th>62.5</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Next (dB)</td>
<td>65.3</td>
<td>65.3</td>
<td>50.3</td>
<td>47.2</td>
<td>45.8</td>
<td>42.9</td>
<td>38.4</td>
<td>35.3</td>
</tr>
<tr>
<td>PSNext (dB)</td>
<td>62.3</td>
<td>53.3</td>
<td>47.3</td>
<td>44.2</td>
<td>42.8</td>
<td>39.9</td>
<td>35.4</td>
<td>32.3</td>
</tr>
<tr>
<td>ELFext (dB)</td>
<td>63.8</td>
<td>51.8</td>
<td>43.8</td>
<td>39.7</td>
<td>37.8</td>
<td>33.9</td>
<td>27.9</td>
<td>23.8</td>
</tr>
<tr>
<td>PSELFext (dB)</td>
<td>60.8</td>
<td>48.8</td>
<td>40.8</td>
<td>36.7</td>
<td>34.8</td>
<td>30.9</td>
<td>24.9</td>
<td>20.8</td>
</tr>
<tr>
<td>Attenuation typ. (dB/100m)</td>
<td>2.1</td>
<td>4.0</td>
<td>6.3</td>
<td>8.0</td>
<td>9.0</td>
<td>11.4</td>
<td>16.5</td>
<td>21.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency</th>
<th>4</th>
<th>8</th>
<th>10</th>
<th>16</th>
<th>20</th>
<th>31.25</th>
<th>62.5</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return loss (dB)</td>
<td>23.0</td>
<td>24.5</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>23.6</td>
<td>21.5</td>
<td>20.1</td>
</tr>
</tbody>
</table>

Electrical requirements at max. 90m installites cable of the category 5 (EN 50288-2-1)
LEONI Special Cables GmbH

Mechanical and thermal characteristics
Conductor material acc. to DIN EN 13602 Cu-ETP-A...
Screen material acc. to DIN EN 13602 Cu-ETP-A...-B
Insulating material acc. to DIN EN 50290-2-25, compound type full PP (HD 624.5)
Insulating material acc. to DIN EN 50290-2-26 (VDE 0819) (HD 624.6)
Jacket material acc. to IEC 60092-359 (SHF1)
Flame retardant acc. to IEC 60332-3-22 (Cat. A/F)

Other characteristics:
RoHS compliant
Permissible temperature range: -25 °C (-13 °F) up to 90 °C (194 °F)
Min. bending radius allowed: repeated 7X ø, single 5X ø
Weight about: 150 Kg/km (101 lb/1000ft)

Designation of order:
L45467-J316-W6
211802
LI9Y(ST)C 4X2X0.6/1.2-100
LIH H 3X1X1.5 GN FRNC
1000 m (3281 ft) on non-returnable reel
Hybrid cables mud resistant according to NEK 606

<table>
<thead>
<tr>
<th>Type designation</th>
<th>Outer jacket</th>
<th>Outer diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>02YSCH LI2Y LIH (ZN)CH(Z)H</td>
<td>2x0.6/2.4-75 LI 2x2x0.22 PIMF VZN 4x1x2.5 VZN OR</td>
<td>FRNC 20.3</td>
</tr>
<tr>
<td>02YSCH LI2Y LIH CH(Z)H</td>
<td>2x6/2.4-75 LI 2x2x0.22 PIMF VZN 4x1x2.5 VZN OR</td>
<td>FRNC 18.6</td>
</tr>
<tr>
<td>I-V(ZN)H LIH (ZN)CH</td>
<td>2x1G62.5/125 STB 900H 3x1x1.5 VZN OG</td>
<td>Special thermoplastic copolymer 12.5</td>
</tr>
</tbody>
</table>

The listed cables are only an extract of the product range of our mud resistant types. If you need customized products, please contact

industrial-solutions@leoni.com
Hybrid Cable
MUD RES

Design

**Wire LIH 2.5/3.3 VZN**
Stranded tinned copper wire (14 AWG)  \(\varnothing 2.0\) mm (0,079 in dia)
Insulation of Thermoplastic copolymer (FRNC)  \(\varnothing 3.3\) mm (0,130 in dia)

**Screened pair**

Wire
Stranded tinned copper wire (24 AWG)  \(\varnothing 0.6\) mm (0,024 in dia)
Insulation of Polyethylene (PE)  \(\varnothing 1.2\) mm (0,047 in dia)

2 wires twisted to a pair
Plastic tape, overlapped
Stranded tinned copper drain wire (24 AWG)
Aluminate foil overlapped

**Coaxial element**

Inner conductor: Stranded bare copper wire
Insulation of foamed Polyethylene (PE) with skin  \(\varnothing 2.44\) mm (0,096 in dia)
Shield braiding of tinned copper wires
Coverage about 80%
Jacket: Thermoplastic copolymer (FRNC) BK – numbered  \(\varnothing (3.8 \pm 0.2)\) mm (0,150 ±0,008 in dia)

**Core:**

Central element: 1 coaxial element number 1
1. layer: 1 coaxial element number 2
2. screened pairs WH/BU-WH/OG
4 wires GN-YE-BU-RD
+ fillers
Plastic tape, overlapped
Braiding of kevlar yarn 0.42 mm dia (≥ 4000N)
Plastic tape, overlapped
Shield braiding of tinned copper wires
Coverage about 80%
Inner-Jacket: Thermoplastic copolymer (FRNC) OG  \(\varnothing (15.1 \pm 0.5)\) mm (0,594 ±0,020 in dia)
Braiding of stainless steel wires 0.3 mm dia
**Jacket:**
Special thermoplastic copolymer (FRNC) OG  
ø (20.3 ±0.5) mm (0.799 ±0.020 in dia)

**Electrical data at 20°C**
Wire LIH 2.5/3.3 VZN

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductor resistance</td>
<td>&lt;= 8.5 Ohm/km</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>&gt;= 10 MOhm*km</td>
</tr>
<tr>
<td>Operating voltage (peak)</td>
<td>&lt;= 300 V</td>
</tr>
<tr>
<td>Test voltage (rms 50Hz 1min)</td>
<td>1500 V</td>
</tr>
</tbody>
</table>

**Screened pair**
Conductor resistance   
Insulation resistance   
Operating voltage (peak)   
Test voltage (rms 50Hz 1min)   

**Coaxial element**
Conductor resistance   
Insulation resistance   
Capacitance (1 kHz)   
Characteristic impedance (5 MHz)   
Attenuation (5 MHz)   
Operating voltage (peak)   
Test voltage (rms 50Hz 1min)   

**Mechanical and thermal characteristics**
Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table 2/A (HD 624.3) (02Y)
Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table L/MD (HD 624.3) (2Y)
Insulating material acc. to DIN EN 50290-2-26 (VDE 0819) (HD 624.6)
Jacket material acc. to IEC 60092-359 / SHF2
Flame retardant acc. to IEC 60332-1-2 and IEC 60332-3-24
Mud resistant acc. to NEK606
Int. specification F45052-F5600

**Other characteristics:**
RoHS compliant (Directive 2011/65/EC)
Halogen free

Permissible temperature range
Transport, installation and operating: -25 °C (-13 °F) up to 80 °C (176 °F)

Min. bending radius allowed: repeated 20X ø, single 10X ø
Weight about : 580 kg/km (388.7 lb/1000ft)

**Designation of order:**
02YSCH  2X0.6/2.4-75 LI
LI2Y  2X2X0.22 PIMF VZN
LIH (ZN)CH(Z)H  4X1X2.5 VZN OR
500 m (1640 ft) on non-returnable reel
**Hybrid Cable**

**MUD RES**

### Design

#### Wire LIH 2.5/3.3 VZN
- Stranded tinned copper wire (14 AWG)  \( \phi \ 2.0 \ \text{mm} \ (0.079 \ \text{in dia}) \)
- Insulation of Thermoplastic copolymer (FRNC)  \( \phi \ 3.3 \ \text{mm} \ (0.130 \ \text{in dia}) \)

#### Screened pair
- Wire
  - Stranded tinned copper wire (24 AWG)  \( \phi \ 0.6 \ \text{mm} \ (0.024 \ \text{in dia}) \)
  - Insulation of Polyethylene (PE)  \( \phi \ 1.2 \ \text{mm} \ (0.047 \ \text{in dia}) \)
- 2 wires twisted to a pair
- Plastic tape, overlapped
- Stranded tinned copper drain wire (24 AWG)
- Aluminate foil overlapped
- Plastic tape, overlapped  \( \phi \ 2.7 \ \text{mm} \ (0.106 \ \text{in dia}) \)

#### Coaxial element
- Inner conductor: Stranded bare copper wire (24 AWG)  \( \phi \ 0.6 \ \text{mm} \ (0.024 \ \text{in dia}) \)
- Insulation of foamed Polyethylene (PE) with skin  \( \phi \ 2.44 \ \text{mm} \ (0.096 \ \text{in dia}) \)
- Shield braiding of tinned copper wires  \( \phi \ 2.95 \ \text{mm} \ (0.116 \ \text{in dia}) \)
- Coverage about 80%
- Jacket: Thermoplastic copolymer (FRNC) BK – numbered  \( \phi \ (3.8 \pm 0.2) \ \text{mm} \ (0.150 \pm 0.008 \ \text{in dia}) \)

#### Core
- 2 coaxial elements number 1 and 2
- 2 screened pairs WH/OG-WH/BU
- 2 wires BU-RD
- + filler
- Plastic tape, overlapped
- Shield braiding of tinned copper wires  \( \phi \ 10.2 \ \text{mm} \ (0.402 \ \text{in dia}) \)
- Coverage about 80%
- Inner-Jacket: Thermoplastic copolymer (FRNC) OG  \( \phi \ (13.6 \pm 0.5) \ \text{mm} \ (0.535 \pm 0.020 \ \text{in dia}) \)
- Braiding of stainless steel wires 0.3 mm dia
LEONI Special Cables GmbH

Technisches Datenblatt - Technical Data Sheet – Technisches Datenblatt – Technical Data Sheet – Technisches Datenblatt

Jacket:
Special thermoplastic copolymer (FRNC) OG

Electrical data at 20°C
Wire LIH 2.5/3.3 VZN

<table>
<thead>
<tr>
<th>Conductor resistance</th>
<th>≤ 8.5 Ohm/km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation resistance</td>
<td>≥ 10 MOhm*km</td>
</tr>
<tr>
<td>Operating voltage (peak)</td>
<td>≤ 300 V</td>
</tr>
<tr>
<td>Test voltage (rms 50Hz 1min)</td>
<td>1500 V</td>
</tr>
</tbody>
</table>

Screened pair
Conductor resistance
Insulation resistance
Operating voltage (peak)
Test voltage (rms 50Hz 1min)

Coaxial element
Conductor resistance
Insulation resistance
Capacitance (1 kHz)
Characteristics impedance (5 MHz)
Attenuation (5 MHz)
Operating voltage (peak)
Test voltage (rms 50Hz 1min)

Mechanical and thermal characteristics
Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table 2/A (HD 624.3) (02Y)
Insulating material acc. to DIN EN 50290-2-23 (VDE 0819), table L/MD (HD 624.3) (2Y)
Insulating material acc. to DIN EN 50290-2-26 (VDE 0819) (HD 624.6)
Jacket material acc. to IEC 60992-359 / SHF2
Flame retardant acc. to IEC 60332-1-2
Mud resistant acc. to NEK 606

Int. specification F45052-F5600

Other characteristics:
RoHS compliant (Directive 2011/65/EC)
Halogen free

Permissible temperature range
Transport, installation and operating: -25 °C (-13 °F) up to 80 °C (176 °F)

Min. bending radius allowed: repeated 20X Ø, single 10X Ø
Weight about: 503 kg/km (337.1 lb/1000ft)

Designation of order:
02YSCH 2X0.6/2.4-75 LI
LI2Y 2X2X0.22 PIMF VZN
LIH CH(Z)H 2X1X2.5 VZN OR
500 m (1640 ft) on non-returnable reel
**Hybrid Cable**

**MUD RES**

**Design**

**Optical fiber**
I-V(ZN)H 1G62.5/125 STB900H BU

∅ 2.8 mm (0.110 in dia)

**Optical fiber**
I-V(ZN)H 1E9/125 STB900H OG

∅ 2.8 mm (0.110 in dia)

**Wire LIH 1.5/2.8 VZN**
Stranded tinned copper wire (16 AWG)

∅ 1.55 mm (0.061 in dia)

Insulation of Thermoplastic copolymer (FRNC)

∅ 2.8 mm (0.110 in dia)

**Core:**

Central element: 1 wire LIH 1.5/2.8 VZN GNYE

1. layer:
- 2 wires LIH 1.5/2.8 VZN BN-BU
- 2 optical fiber I-V(ZN)H 1G62.5/125 STB900H
- 2 optical fiber I-V(ZN)H 1E9/125 STB900H

Plastic tape overlapped

Braiding of Kevlar yarns 0.42 mm dia (≥ 4000N)

Plastic tape overlapped

Shield braiding of tinned copper wires

Coverage about 85%

Plastic tape overlapped

∅ 9.5 mm (0.374 in dia)

**Jacket:**

Special thermoplastic copolymer OG

∅ (12.5 ±0.5) mm (0.492 ±0.020 in dia)
Electrical data at 20°C

- Conductor resistance: ≤ 13 Ohm/km
- Insulation resistance: ≥ 20 MOhm*km
- Operating voltage (peak): ≤ 100 V
- Test voltage (wire/wire rms 50Hz 1min): 1500 V
- Test voltage (wire/screen rms 50Hz 1min): 1000 V

Mechanical and thermal characteristics

- Insulating material acc. to DIN EN 50290-2-26 (VDE 0819) (HD 624.6)
- Jacket material acc. to IEC 60092-359 / SHF2
- Flame retardant acc. to IEC 60332-1-2
- Flame retardant acc. to IEC 60332-3-24 (Cat. C)
- Mud resistant acc. to NEK606

Int. specification F45052-F5600

Other characteristics:

- RoHS compliant (Directive 2011/65/EC)
- Halogen free

Permissible temperature range

Transport, installation and operating: -25 °C (-13 °F) up to 80 °C (176 °F)

Min. bending radius allowed: repeated 20X ø, single 10X ø

Weight about: 209 kg/km (140,1 lb/1000ft)

Designation of order:

I-V(ZN)H  2X1G62.5/125 STB900H
I-V(ZN)H  2X1E9/125 STB900H
LIH  (ZN)CH  3X1X1.5 VZN OG
500 m (1640 ft) on non-returnable reel
Find out more:

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www.leoni-industrial-solutions.com

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