

# MACX MCR-EX-SL-SD-24-48-LFD - Solenoid driver



2906155

<https://www.phoenixcontact.com/nl/products/2906155>

Please be informed that the data shown in this PDF document is generated from our online catalog. Please find the complete data in the user documentation. Our general terms of use for downloads are valid.



Ex i solenoid driver for controlling Ex i solenoid valves in hazardous areas, logic input, open-circuit voltage 24.3 V, current limitation at 48 mA, line fault transparency, error message output, up to SIL 3 according to IEC 61508; screw connection.

## Your advantages

- Input: logic
- Output: intrinsically safe [Ex ia]; open-circuit voltage > 24.3 V DC; current limitation > 48 mA
- Line fault detection (can be enabled/disabled), via the signal circuit or via a separate error message output
- Transparent for test pulses
- Up to SIL 3 according to IEC/EN 61508
- Safe electrical isolation between output, input, supply, and error message output
- Power supply and error indication possible via DIN rail connector
- Plug-in connection terminals, screw connection technology
- Installation in zone 2 permitted
- Housing width: 12.5 mm

## Commercial data

|                                      |               |
|--------------------------------------|---------------|
| Item number                          | 2906155       |
| Packing unit                         | 1 pc          |
| Minimum order quantity               | 1 pc          |
| Sales key                            | DK1214        |
| Product key                          | DK1214        |
| GTIN                                 | 4055626041490 |
| Weight per piece (including packing) | 182,4 g       |
| Weight per piece (excluding packing) | 155,6 g       |
| Customs tariff number                | 85437090      |
| Country of origin                    | DE            |

## Technical data

### Product properties

|                 |              |
|-----------------|--------------|
| Product family  | MACX Analog  |
| No. of channels | 1            |
| Configuration   | DIP switches |

### Electrical properties

|                                               |     |
|-----------------------------------------------|-----|
| Electrical isolation between input and output | yes |
|-----------------------------------------------|-----|

#### Electrical isolation

|                      |    |
|----------------------|----|
| Overvoltage category | II |
| Pollution degree     | 2  |

#### Electrical isolation Output/input, error message output IEC/EN 60079-11

|                          |                         |
|--------------------------|-------------------------|
| Standards/regulations    | IEC/EN 60079-11         |
| Rated insulation voltage | 375 V <sub>PP</sub>     |
| Test voltage             | 2.5 kV AC (50 Hz, 60 s) |

#### Electrical isolation Output/input, error message output IEC/EN 61010-1

|                          |                         |
|--------------------------|-------------------------|
| Standards/regulations    | IEC/EN 61010-1          |
| Rated insulation voltage | 300 V <sub>rms</sub>    |
| Test voltage             | 2.5 kV AC (50 Hz, 60 s) |
| Insulation               | Safe isolation          |

#### Electrical isolation Output/supply, DIN rail connector IEC/EN 60079-11

|                          |                         |
|--------------------------|-------------------------|
| Standards/regulations    | IEC/EN 60079-11         |
| Rated insulation voltage | 375 V <sub>PP</sub>     |
| Test voltage             | 2.5 kV AC (50 Hz, 60 s) |

#### Electrical isolation Output/supply, DIN rail connector IEC/EN 61010-1

|                          |                         |
|--------------------------|-------------------------|
| Standards/regulations    | IEC/EN 61010-1          |
| Rated insulation voltage | 300 V <sub>rms</sub>    |
| Test voltage             | 2.5 kV AC (50 Hz, 60 s) |
| Insulation               | Safe isolation          |

#### Electrical isolation Input/error message output/supply

|              |                         |
|--------------|-------------------------|
| Test voltage | 1.5 kV AC (50 Hz, 60 s) |
|--------------|-------------------------|

#### Supply

|                        |                         |
|------------------------|-------------------------|
| Nominal supply voltage | 24 V DC -20 % ... +25 % |
| Supply voltage range   | 19.2 V DC ... 30 V DC   |
| Power dissipation      | < 1.62 W                |

### Input data

Signal: Logic

|                            |                                                                   |
|----------------------------|-------------------------------------------------------------------|
| Number of inputs           | 1                                                                 |
| Switching level "0" signal | 0 V DC ... 5 V DC (or open)                                       |
| Switching level "1" signal | 15 V DC ... 30 V DC                                               |
| Input current              | < 12 mA                                                           |
| Input impedance            | 3 MΩ (high-resistance in the event of a line fault at the output) |
| Immune to test pulses      | Yes                                                               |

## Output data

Signal: Error message output

|                           |                            |
|---------------------------|----------------------------|
| Contact switching type    | N/O contact                |
| Type of output signal     | Transistor output, passive |
| Maximum switching voltage | 30 V DC                    |
| Max. switching current    | 50 mA                      |
| Short-circuit-proof       | yes                        |

Signal: Voltage

|                      |                                       |
|----------------------|---------------------------------------|
| Output description   | intrinsically safe                    |
| Number of outputs    | 1                                     |
| Output voltage       | ≥ 9.7 V DC (48 mA)                    |
| Current limitation   | > 48 mA (with line fault detection)   |
| Response time        | < 30 ms                               |
| Open-circuit voltage | > 24.3 V DC                           |
| Short-circuit-proof  | yes                                   |
| Line fault detection | > 10 kΩ (Line break)                  |
|                      | < 50 Ω (Short circuit)                |
|                      | Activated /deactivated via DIP switch |

## Connection data

|                                  |                     |
|----------------------------------|---------------------|
| Connection method                | Screw connection    |
| Stripping length                 | 7 mm                |
| Screw thread                     | M3                  |
| Conductor cross-section rigid    | 0.2 mm² ... 2.5 mm² |
| Conductor cross-section flexible | 0.2 mm² ... 2.5 mm² |
| Conductor cross-section AWG      | 24 ... 14           |
| Tightening torque                | 0.5 Nm ... 0.6 Nm   |

Test socket

|               |        |
|---------------|--------|
| Max. diameter | 2.3 mm |
|---------------|--------|

## Ex data

|                       |        |
|-----------------------|--------|
| Ex installation (EPL) | Gc     |
|                       | Div. 2 |
| Ex i circuits (EPL)   | [Ga]   |
|                       | [Da]   |
|                       | [Ma]   |

# MACX MCR-EX-SL-SD-24-48-LFD - Solenoid driver



2906155

<https://www.phoenixcontact.com/nl/products/2906155>

[Div. 1]

## Safety data

|                                                                                              |                                                                                          |
|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Max. internal inductance $L_i$                                                               | negligible                                                                               |
| Max. internal capacitance $C_i$                                                              | 11 nF                                                                                    |
| Max. output voltage $U_o$                                                                    | 27.06 V                                                                                  |
| Max. output current $I_o$                                                                    | 91.11 mA                                                                                 |
| Max. output power $P_o$                                                                      | 616 mW                                                                                   |
| Maximum internal resistance $R_i$                                                            | 297 $\Omega$                                                                             |
| Safety-related maximum voltage $U_m$                                                         | 253 V AC                                                                                 |
|                                                                                              | 125 V DC                                                                                 |
| IIA/I (simple circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$    | 34.3 mH / 2.29 $\mu$ F                                                                   |
| IIB/IIIC (simple circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$ | 17.1 mH / 0.686 $\mu$ F                                                                  |
| IIC (simple circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$      | 4.3 mH / 0.078 $\mu$ F                                                                   |
| IIA (mixed circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$       | 20 mH / 0.47 $\mu$ F, 0.5 mH / 0.62 $\mu$ F, 0.2 mH / 0.8 $\mu$ F, 0.1 mH / 0.89 $\mu$ F |
| IIB/IIIC (mixed circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$  | 5 mH / 189 nF, 2 mH / 289 nF, 0.15 mH / 489 nF                                           |
| IIC (mixed circuit): Max. external inductivity $L_o$ / Max. external capacitance $C_o$       | 1 mH / 39 nF, 0.5 mH / 59 nF, 0.15 mH / 89 nF                                            |

## Signaling

|                |                              |
|----------------|------------------------------|
| Status display | Green LED (supply voltage)   |
|                | LED yellow (switching state) |
|                | Red LED (line errors)        |

## Dimensions

|                     |                                                                        |
|---------------------|------------------------------------------------------------------------|
| Dimensional drawing |                                                                        |
| Width               | 12.5 mm                                                                |
| Height              | 112.5 mm                                                               |
| Depth               | 113.7 mm                                                               |
| Depth NS 35/7,5     | 114.5 mm (Snapped onto DIN rail NS 35/7,5 in accordance with EN 60715) |

## Material specifications

|                                                  |                 |
|--------------------------------------------------|-----------------|
| Color                                            | gray (RAL 7042) |
| Flammability rating according to UL 94 (Housing) | V0 (Housing)    |
| Housing material                                 | PA 6.6-FR       |

## Environmental and real-life conditions

## Ambient conditions

|                                         |                                          |
|-----------------------------------------|------------------------------------------|
| Degree of protection                    | IP20 (not assessed by UL)                |
| Ambient temperature (operation)         | -20 °C ... 60 °C (Any mounting position) |
|                                         | -20 °C ... 70 °C (Derating)              |
| Ambient temperature (storage/transport) | -40 °C ... 80 °C                         |
| Permissible humidity (operation)        | 10 % ... 95 % (non-condensing)           |

Altitude range ( $\leq 2000$  m)

|                                      |                                                                                                                                                                   |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Altitude                             | $\leq 2000$ m (The technical data refers to altitudes $\leq 2000$ m above mean sea level. For altitudes $>2000$ m above mean sea level, refer to the data sheet.) |
| Ambient temperature (operation)      | -20 °C ... 70 °C                                                                                                                                                  |
| Safety-related maximum voltage $U_m$ | 253 V AC                                                                                                                                                          |
|                                      | 125 V DC                                                                                                                                                          |
| Rated insulation voltage             | 375 V <sub>PP</sub>                                                                                                                                               |
|                                      | 300 V AC/DC                                                                                                                                                       |

Altitude range ( $\leq 3000$  m)

|                                      |                       |
|--------------------------------------|-----------------------|
| Height range                         | $> 2000$ m ... 3000 m |
| Ambient temperature (operation)      | -20 °C ... 63 °C      |
| Safety-related maximum voltage $U_m$ | 190 V AC              |
|                                      | 110 V DC              |
| Rated insulation voltage             | 190 V                 |

Altitude range ( $\leq 4000$  m)

|                                      |                       |
|--------------------------------------|-----------------------|
| Height range                         | $> 3000$ m ... 4000 m |
| Ambient temperature (operation)      | -20 °C ... 56 °C      |
| Safety-related maximum voltage $U_m$ | 60 V AC/DC            |
| Rated insulation voltage             | 60 V AC/DC            |

Altitude range ( $\leq 5000$  m)

|                                      |                       |
|--------------------------------------|-----------------------|
| Height range                         | $> 4000$ m ... 5000 m |
| Ambient temperature (operation)      | -20 °C ... 49 °C      |
| Safety-related maximum voltage $U_m$ | 60 V AC/DC            |
| Rated insulation voltage             | 60 V AC/DC            |

## Approvals

## CE

|             |              |
|-------------|--------------|
| Certificate | CE-compliant |
| Note        | and EN 61326 |

## ATEX

|                |                                                                                                                     |
|----------------|---------------------------------------------------------------------------------------------------------------------|
| Identification | <div> <div></div> <div>I (M1) [Ex ia Ma] I</div> </div> <div> <div></div> <div>II (1) G [Ex ia Ga] IIC</div> </div> |
|----------------|---------------------------------------------------------------------------------------------------------------------|

# MACX MCR-EX-SL-SD-24-48-LFD - Solenoid driver



2906155

<https://www.phoenixcontact.com/nl/products/2906155>

|             |                                     |
|-------------|-------------------------------------|
| Certificate | II (1) D [Ex ia Da] IIIC            |
|             | II 3(1) G Ex ec [ia Ga] IIC T4 Gc X |
|             | IBExU 13 ATEX1045X                  |

## IECEX

|                |                         |
|----------------|-------------------------|
| Identification | [Ex ia Ma] I            |
|                | [Ex ia Ga] IIC          |
|                | [Ex ia Da] IIIC         |
|                | Ex ec [ia Ga] IIC T4 Gc |
| Certificate    | IECEX IBE 13.0014X      |

## CCC / China-Ex

|                |                             |
|----------------|-----------------------------|
| Identification | [Ex ia Ga] IIB              |
|                | [Ex ia Da] IIIC             |
|                | Ex ec [ia IIB Ga] IIC T4 Gc |
| Certificate    | 2022122316115979            |

## UL, USA/Canada

|                |                     |
|----------------|---------------------|
| Identification | UL 61010 Listed     |
| Certificate    | UL C.D.-No 83104549 |

## Shipbuilding approval

|             |                   |
|-------------|-------------------|
| Certificate | DNV GL TAA000020C |
|-------------|-------------------|

## Safety Integrity Level (SIL, IEC 61508)

|                |   |
|----------------|---|
| Identification | 3 |
|----------------|---|

## INMETRO

|                |                         |
|----------------|-------------------------|
| Identification | [Ex ia Ma] I            |
|                | [Ex ia Ga] IIC          |
|                | [Ex ia Da] IIIC         |
|                | Ex ec [ia Ga] IIC T4 Gc |
| Certificate    | DNV 18.0145 X           |

## Shipbuilding data

|             |                                                                                         |
|-------------|-----------------------------------------------------------------------------------------|
| Temperature | B                                                                                       |
| Humidity    | B                                                                                       |
| Vibration   | A                                                                                       |
| EMC         | A                                                                                       |
| Enclosure   | Required protection according to the Rules shall be provided upon installation on board |

## EMC data

|                               |                                                                      |
|-------------------------------|----------------------------------------------------------------------|
| Electromagnetic compatibility | Conformance with EMC directive                                       |
| Noise immunity                | EN 61000-6-2                                                         |
| Note                          | When being exposed to interference, there may be minimal deviations. |

# MACX MCR-EX-SL-SD-24-48-LFD - Solenoid driver



2906155

<https://www.phoenixcontact.com/nl/products/2906155>

### Noise emission

|                       |              |
|-----------------------|--------------|
| Standards/regulations | EN 61000-6-4 |
|-----------------------|--------------|

### Standards and regulations

#### GB Standard

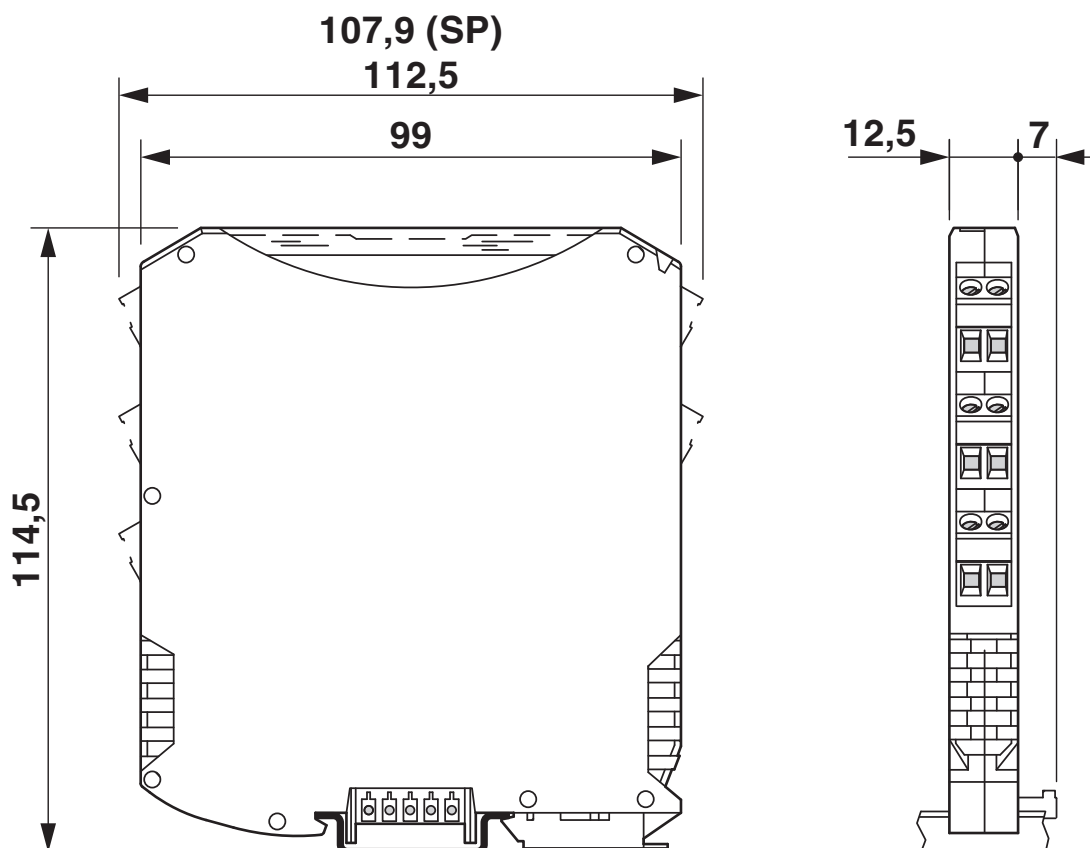
|                       |             |
|-----------------------|-------------|
| Standards/regulations | GB/T 3836.1 |
|                       | GB/T 3836.3 |
|                       | GB/T 3836.4 |

### Mounting

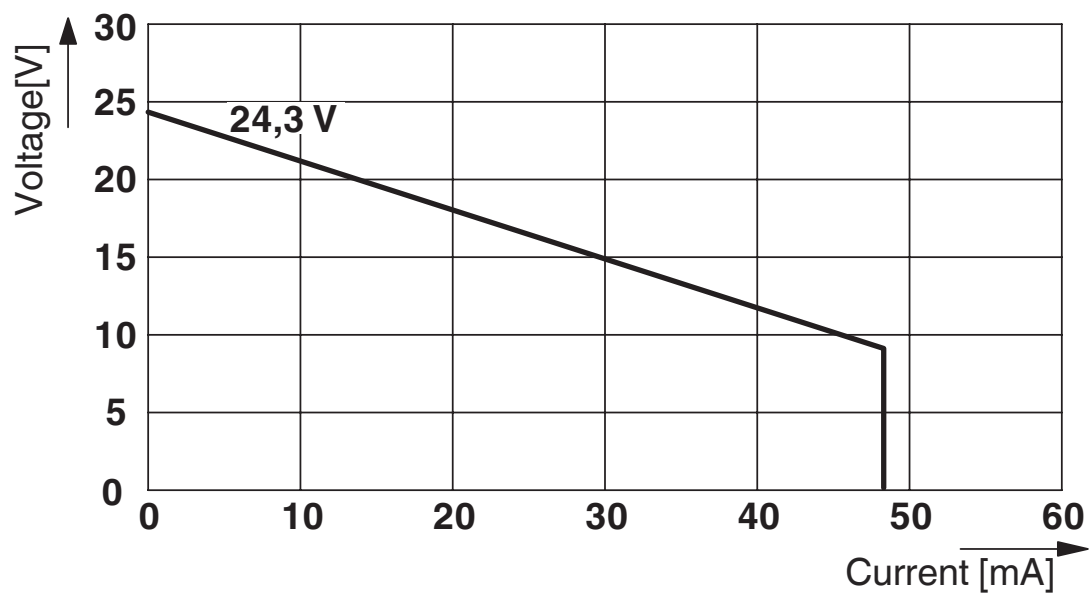
|               |                   |
|---------------|-------------------|
| Mounting type | DIN rail mounting |
|---------------|-------------------|

## Drawings

Dimensional drawing



Diagram



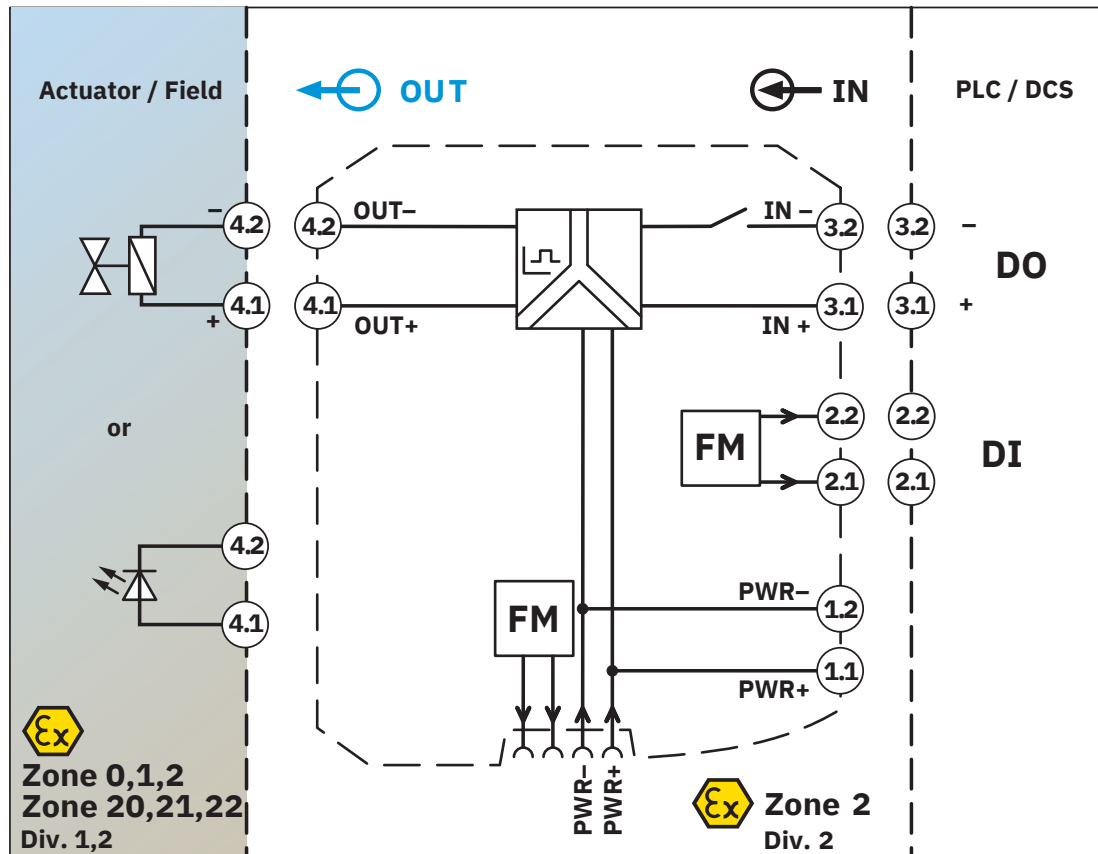
# MACX MCR-EX-SL-SD-24-48-LFD - Solenoid driver



2906155

<https://www.phoenixcontact.com/nl/products/2906155>

Block diagram



## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/nl/products/2906155>

### Functional Safety

Approval ID: BVS Pb 11/13

### DNV

Approval ID: TAA000020C



### IECEX

Approval ID: IECEX IBE 13.0014X

### INMETRO

Approval ID: DNV 18.0145 X



### CCC

Approval ID: 2022122316115979



### ATEX

Approval ID: IBExU13ATEX1045 X

# MACX MCR-EX-SL-SD-24-48-LFD - Solenoid driver



2906155

<https://www.phoenixcontact.com/nl/products/2906155>

## Classifications

### ECLASS

|             |          |
|-------------|----------|
| ECLASS-13.0 | 27210120 |
| ECLASS-15.0 | 27210120 |

### ETIM

|          |          |
|----------|----------|
| ETIM 9.0 | EC002653 |
|----------|----------|

### UNSPSC

|             |          |
|-------------|----------|
| UNSPSC 21.0 | 39121000 |
|-------------|----------|

## Environmental product compliance

## EU RoHS

|                                         |              |
|-----------------------------------------|--------------|
| Fulfills EU RoHS substance requirements | Yes          |
| Exemption                               | 7(a), 7(c)-I |

## China RoHS

|                                        |                                                                                                                                                                                                                                   |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Environment friendly use period (EFUP) | EFUP-50                                                                                                                                                                                                                           |
|                                        | An article-related China RoHS declaration table can be found in the download area for the respective article under "Manufacturer declaration". For all articles with EFUP-E, no China RoHS declaration table issued and required. |

## EU REACH SVHC

|                                     |                                                                |
|-------------------------------------|----------------------------------------------------------------|
| REACH candidate substance (CAS No.) | Lead(CAS: 7439-92-1)                                           |
|                                     | 2,2',6,6'-tetrabromo-4,4'-isopropylidenediphenol(CAS: 79-94-7) |
| SCIP                                | 284db9a3-e743-46bd-b499-0defa5d832bf                           |