

# TOXFREE® ZH N2XH Flex

Halogen free (LSHF) power cable for public places.

ACCORDING TO: IEC 60502-1

BASED ON: VDE 0276-604

**B2<sub>ca</sub>**  
**C<sub>ca</sub>**



## APPLICATION

Toxfree® ZH N2XH Flex is a LSHF safety cable for fixed installations. In the event of fire, it does not emit toxic or corrosive gases, preventing any possible harm to people or electronic equipment. For these reasons this cable is highly recommended for use in public places such as hospitals, schools, museums, airports, bus terminals, shopping centers, offices, laboratories, etc.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Cross-linked polyethylene, type XLPE according to IEC 60502-1 and type 2XII according to VDE 0276-604.

The standard identification of insulated conductors according to HD 308 is the following:

|         |                                                     |
|---------|-----------------------------------------------------|
| 1 x     | Natural                                             |
| 2 x     | Blue + Brown                                        |
| 3 G     | Blue + Brown + Green/Yellow                         |
| 3 x     | Brown + Black + Grey                                |
| 3 x+1 x | Brown + Black + Grey + Blue (reduced cross-section) |
| 4 G     | Brown + Black + Grey + Green/Yellow                 |
| 4 x     | Brown + Black + Grey + Blue                         |
| 5 G     | Brown + Black + Grey + Blue + Green/Yellow          |

### Outer sheath

Low smoke halogen free polyolefin, type ST8 according to IEC 60502-1 and type HM4 according to VDE 0276-604. Black colour.

## CHARACTERISTICS

### Electrical performance

Low voltage: 0,6/1 kV

### Thermal performance

Maximum conductor temperature: 90°C.  
Maximum short-circuit temperature: 250°C (max. 5 s).  
Minimum service temperature: -40°C (fixed and protected installations).  
Minimum installation and handling temperature: 0°C (on cable surface).

### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.  
Fire non-propagation according to EN 60332-3-24 / IEC 60332-3-24 and EN 50399.  
Reaction to fire CPR: B2<sub>ca</sub>-s1a, d1, a1 or C<sub>ca</sub>-s1a, d1, a1, according to EN 50575 (see cross-section).  
Halogen free according to EN 60754-1 / IEC 60754-1.  
Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.  
Low smoke emission according to EN 61034 / IEC 61034:  
Light transmittance > 80%.

### Mechanical performance

Minimum bending radius: 5x cable diameter.  
Impact resistance: AG2 Medium severity.

### Environmental performance

Chemical & Oil resistance: acceptable.  
UV Resistant according to EN 50618.  
Water resistance: AD8 Submersion.

### Installation conditions

Open Air.  
Buried.  
In conduit.

## STANDARDS / COMPLIANCE



According to  
IEC 60502-1

Based on  
VDE 0276-604



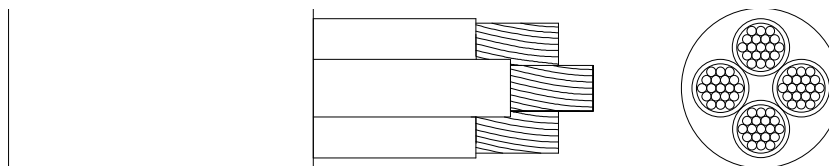
Standards and approvals  
KEMA-KEUR / / RoHS / CE



CPR (Construction Products Regulation)  
B2<sub>ca</sub>-s1a, d1, a1 (according to cross-section) or  
C<sub>ca</sub>-s1a,d1,a1 (according to cross-section)



### DIMENSIONS & ADMISSIBLE INTENSITIES



| Cross-section (mm <sup>2</sup> ) | Diameter (mm) | Weight (kg/km) | Open air (A) <sup>1</sup> | Buried (A) <sup>2</sup> | Voltage drop (V/A · km) <sup>3</sup> |
|----------------------------------|---------------|----------------|---------------------------|-------------------------|--------------------------------------|
| 1 x 2,5                          | 7,1           | 75             | 29                        | 30                      | 17,7                                 |
| 1 x 4                            | 7,6           | 95             | 40                        | 39                      | 11,0                                 |
| 1 x 6                            | 8,2           | 115            | 53                        | 49                      | 7,32                                 |
| 1 x 10                           | 9,2           | 165            | 74                        | 65                      | 4,23                                 |
| 1 x 16                           | 10,2          | 225            | 101                       | 84                      | 2,68                                 |
| 1 x 25                           | 11,8          | 320            | 135                       | 107                     | 1,73                                 |
| 1 x 35                           | 12,1          | 390            | 169                       | 129                     | 1,23                                 |
| 1 x 50                           | 13,9          | 535            | 207                       | 153                     | 0,86                                 |
| 1 x 70                           | 15,7          | 730            | 268                       | 188                     | 0,603                                |
| 1 x 95                           | 17,3          | 930            | 328                       | 226                     | 0,457                                |
| 1 x 120                          | 19,1          | 1.165          | 383                       | 257                     | 0,357                                |
| 1 x 150                          | 21,0          | 1.445          | 444                       | 287                     | 0,286                                |
| 1 x 185                          | 23,1          | 1.740          | 510                       | 324                     | 0,235                                |
| 1 x 240                          | 26,1          | 2.260          | 607                       | 375                     | 0,178                                |
| 1 x 300                          | 28,8          | 2.815          | 703                       | 419                     | 0,142                                |
| 1 x 400                          | 33,8          | 3.760          | 823                       | 493                     | 0,108                                |
| 1 x 500                          | 37,9          | 4.835          | 946                       | 558                     | 0,085                                |
| 1 x 630                          | 43,7          | 6.385          | 1.088                     | 634                     | 0,064                                |
| 2 x 1,5                          | 9,8           | 130            | 26                        | 26                      | 34,0                                 |
| 2 x 2,5                          | 10,7          | 165            | 36                        | 34                      | 20,4                                 |
| 2 x 4                            | 11,1          | 190            | 49                        | 44                      | 12,7                                 |
| 2 x 6                            | 12,2          | 245            | 63                        | 56                      | 8,45                                 |
| 2 x 10                           | 13,6          | 355            | 86                        | 73                      | 4,89                                 |
| 2 x 16                           | 15,3          | 495            | 100                       | 84                      | 3,1                                  |
| 3 G 1,5                          | 11,3          | 170            | 26                        | 26                      | 34,0                                 |
| 3 G 2,5                          | 12,1          | 210            | 36                        | 34                      | 20,4                                 |
| 3 G 4                            | 12,2          | 240            | 49                        | 44                      | 12,7                                 |
| 3 G 6                            | 13,4          | 315            | 63                        | 56                      | 8,45                                 |
| 3 G 10                           | 14,8          | 450            | 86                        | 73                      | 4,89                                 |
| 3 x 16                           | 16,8          | 645            | 100                       | 84                      | 2,68                                 |
| 3 x 25                           | 21,4          | 1.020          | 127                       | 107                     | 1,73                                 |
| 3 x 35                           | 23,8          | 1.345          | 158                       | 129                     | 1,23                                 |
| 3 x 50                           | 27,2          | 1.825          | 192                       | 153                     | 0,86                                 |
| 3 x 70                           | 30,3          | 2.470          | 246                       | 188                     | 0,603                                |
| 3 x 16 + 1 x 10                  | 19,1          | 800            | 100                       | 84                      | 2,68                                 |
| 3 x 25 + 1 x 16                  | 22,5          | 1.165          | 127                       | 107                     | 1,73                                 |
| 3 x 35 + 1 x 16                  | 24,4          | 1.480          | 158                       | 129                     | 1,23                                 |
| 3 x 50 + 1 x 25                  | 28,6          | 2.050          | 192                       | 153                     | 0,86                                 |
| 3 x 70 + 1 x 35                  | 32,9          | 2.815          | 246                       | 188                     | 0,603                                |
| 3 x 95 + 1 x 50                  | 37,1          | 3.690          | 298                       | 226                     | 0,457                                |
| 3 x 120 + 1 x 70                 | 40,8          | 4.700          | 346                       | 257                     | 0,357                                |
| 3 x 150 + 1 x 70                 | 45,9          | 5.725          | 399                       | 287                     | 0,286                                |
| 3 x 185 + 1 x 95                 | 51,4          | 7.000          | 456                       | 324                     | 0,235                                |
| 3 x 240 + 1 x 120                | 58,6          | 9.185          | 538                       | 375                     | 0,178                                |
| 3 x 300                          | 61            | 10.180         | 621                       | 419                     | 0,142                                |
| 4 G 1,5                          | 11,7          | 185            | 23                        | 23                      | 29,3                                 |
| 4 G 2,5                          | 12,2          | 225            | 32                        | 30                      | 17,7                                 |
| 4 G 4                            | 13,2          | 290            | 42                        | 39                      | 11,0                                 |
| 4 G 6                            | 14,7          | 385            | 54                        | 49                      | 7,32                                 |
| 4 G 10                           | 16,3          | 565            | 75                        | 65                      | 4,23                                 |

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## N2XH Flex

| Cross-section (mm <sup>2</sup> ) | Diameter (mm) | Weight (kg/km) | Open air (A) <sup>1</sup> | Buried (A) <sup>2</sup> | Voltage drop (V/A · km) <sup>3</sup> |
|----------------------------------|---------------|----------------|---------------------------|-------------------------|--------------------------------------|
| 4 x 16                           | 18,8          | 815            | 100                       | 84                      | 2,68                                 |
| 4 x 25                           | 23,8          | 1.275          | 127                       | 107                     | 1,73                                 |
| 4 x 35                           | 25,9          | 1.700          | 158                       | 129                     | 1,23                                 |
| 4 x 50                           | 30,1          | 2.310          | 192                       | 153                     | 0,86                                 |
| 4 x 70                           | 34,8          | 3.185          | 246                       | 188                     | 0,603                                |
| 4 x 95                           | 39,9          | 4.184          | 298                       | 226                     | 0,457                                |
| 4 x 120                          | 44,8          | 5.305          | 346                       | 257                     | 0,357                                |
| 4 x 150                          | 49,3          | 6.548          | 399                       | 287                     | 0,286                                |
| 4 x 185                          | 54,8          | 7.965          | 456                       | 324                     | 0,235                                |
| 4 x 240                          | 62,2          | 10.305         | 538                       | 375                     | 0,178                                |
| 5 G 300                          | 68,5          | 12.745         | 621                       | 419                     | 0,142                                |
| 5 G 1,5                          | 13,1          | 235            | 23                        | 23                      | 29,3                                 |
| 5 G 2,5                          | 14,4          | 300            | 32                        | 30                      | 17,7                                 |
| 5 G 4                            | 14,8          | 360            | 42                        | 39                      | 11,0                                 |
| 5 G 6                            | 16,3          | 470            | 54                        | 49                      | 7,32                                 |
| 5 G 10                           | 18,0          | 685            | 75                        | 65                      | 4,23                                 |
| 5 G 16                           | 20,9          | 1.000          | 100                       | 84                      | 2,68                                 |
| 5 G 25                           | 25,9          | 1.550          | 127                       | 107                     | 1,73                                 |
| 5 G 35                           | 28,3          | 2.050          | 158                       | 129                     | 1,23                                 |
| 5 G 50                           | 33,7          | 2.840          | 192                       | 153                     | 0,86                                 |
| 5 G 70                           | 38,6          | 3.905          | 246                       | 188                     | 0,603                                |
| 5 G 95                           | 43,5          | 5.080          | 298                       | 226                     | 0,457                                |
| 5 G 120                          | 49,3          | 6.395          | 346                       | 257                     | 0,357                                |
| 5 G 150                          | 55,1          | 7.935          | 399                       | 287                     | 0,286                                |
| 5 G 185                          | 61,1          | 9.665          | 456                       | 324                     | 0,235                                |
| 5 G 240                          | 68,8          | 12.620         | 538                       | 375                     | 0,178                                |

<sup>1</sup> Reference method F for single-core and method E for multicore cables according to IEC 60364-5-52 in open air at 30°C ambient temperature.

<sup>2</sup> Reference method D2 according to IEC 60364-5-52. Directly buried at 0,7 m depth with soil thermal resistivity of 2,5 K·m/W and 20°C of ground temperature.

<sup>3</sup> At maximum conductor temperature and cosφ=1.

Cables having 2 and 3 conductors up to 10 mm<sup>2</sup> are supposed a single-phase circuit. The rest of the cables are supposed a three-phase circuit.

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## N2XH Flex

### SHORT-CIRCUIT CURRENT-CARRYING CAPACITIES

| Time (s)          | 0,1 | 0,2 | 0,3 | 0,5 | 1   | 1,5 | 2   | 2,5 | 3  |
|-------------------|-----|-----|-----|-----|-----|-----|-----|-----|----|
| A/mm <sup>2</sup> | 452 | 320 | 261 | 202 | 143 | 117 | 101 | 90  | 83 |

### CORRECTION FACTORS FOR AIR TEMPERATURE

| Air T. (°C) | 20   | 25   | 30 | 35   | 40   | 45   | 50   | 55   | 60   |
|-------------|------|------|----|------|------|------|------|------|------|
| Factor      | 1,08 | 1,04 | 1  | 0,96 | 0,91 | 0,87 | 0,82 | 0,76 | 0,71 |

### CORRECTION FACTORS FOR GROUND TEMPERATURE

| Ground T. (°C) | 10   | 15   | 20 | 25   | 30   | 35   | 40   | 45   | 50   |
|----------------|------|------|----|------|------|------|------|------|------|
| Factor         | 1,07 | 1,04 | 1  | 0,96 | 0,93 | 0,89 | 0,85 | 0,80 | 0,76 |

### CORRECTION FACTORS FOR SOIL THERMAL RESISTIVITY

| Moisture degree of soil | Very damp | Slightly damp | Slightly dry | Dry | Very dry |
|-------------------------|-----------|---------------|--------------|-----|----------|
| Thermal Resist. (K·m/W) | 1         | 1,5           | 2            | 2,5 | 3        |
| Factor                  | 1,50      | 1,28          | 1,12         | 1   | 0,90     |

Other correction factors (for grouping cables, for harmonic currents), that are not in this specification, can be applied. Further information can be found in IEC 60364-5-52.