HARMONISED FLEXIBLE CABLE 450/750 V · DIN VDE 0282 / EN 50525 | 450/750 V | 2 sizes | halogen-free FRNC, low-temp | TINNED COPPER | LOW-TEMPERATURE GRADE

# H07ZZ-F 19G 450/750 V

Halogen-Free Flexible Cable 450/750 V 450/750 V – 19 cores of equal cross-section in concentric layers with a short lay length. Low-temperature halogen-free FRNC sheath. Complete technical data sheet: construction, dimensions, weights, current ratings, voltage drop and installation guidance for 2 sizes.

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## 01 Application and Product Overview

H07ZZ-F is the harmonised halogen-free flexible cable for 450/750 V. Cross-linked halogen-free insulation and a halogen-free flame-retardant sheath give a flexible, oil-resistant cable that does not release halogen acids in a fire, for installations where people or equipment must be protected.

### Design

The conductors are class 5 fine-wire copper, bare or tinned. The cores are insulated with a cross-linked halogen-free compound for 90 °C at the conductor. The sheath is a halogen-free flame-retardant elastomer; multi-core cables from 7 cores and cables from 10 mm² carry an inner sheath. The type is covered by DIN EN 50525-3-21.

### Typical applications

- Exhibition halls, theatres and venues with high safety requirements
- Public transport, tunnels and underground installations
- Data centres, control rooms and clean production areas
- Ships and offshore installations where halogen-free cables are specified
- Mobile power distribution for events in enclosed buildings
- Machine connections in plants with halogen-free requirements
- Cable for hospitals, airports and schools
- Cold-climate duty: sites, cold stores and open-cast operations where the cable is moved at temperatures down to 40 °C

| 2 sizes | 450/750 V | +90 °C | Halogen-free |
|---|---|---|---|
| Cross-section 1.5 – 2.5 mm² | Rated voltage $U_0/U$ | Maximum conductor temperature | Sheath: halogen-free FRNC, low-temp |

### Key features

- Halogen-free insulation and sheath (IEC 60754-1/-2)
- Rated 90 °C at the conductor; short-circuit temperature 250 °C
- Rated voltage 450/750 V, test voltage 2.5 kV
- Class 5 conductors for flexible use
- Flame-retardant to IEC 60332-1-2; low smoke development
- Oil-resistant sheath
- 2 sizes from 1.5 to 2.5 mm²; weight from 790 to 1,130 kg/km; copper from 274 to 460 kg/km

### Core layout and conductor

19 cores of equal cross-section in concentric layers with a short lay length. Core colours: black with white numbers; one green-yellow core (DIN VDE 0293-308); the green-yellow core is the protective conductor. With 19 cores the cable combines power, brake, heater and signal circuits in one connection. The conductors are tinned: each copper wire carries a thin tin coating. Tinning protects the copper against oxidation and corrosion in damp, salty or sulphurous atmospheres and keeps the conductor solderable, which is an advantage in outdoor, marine and mining installations. The resistance limits of tinned class 5 conductors are marginally higher than for bare copper; the $R_{20}$ column shows the tinned values.


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## Standard background

H07ZZ-F and H05ZZ-F are harmonised halogen-free types covered by DIN EN 50525-3-21 (VDE 0285-525-3-21). ZZ identifies the thermoset halogen-free insulation and sheath.

The low-temperature grade of the sheath compound remains flexible down to 40 °C in motion and 50 °C in fixed installation, so the cable can be reeled and trailed on cold sites, in cold stores and in northern open-cast operations. The mechanical and electrical ratings are those of the standard grade; only the cold-flexing limit is extended.

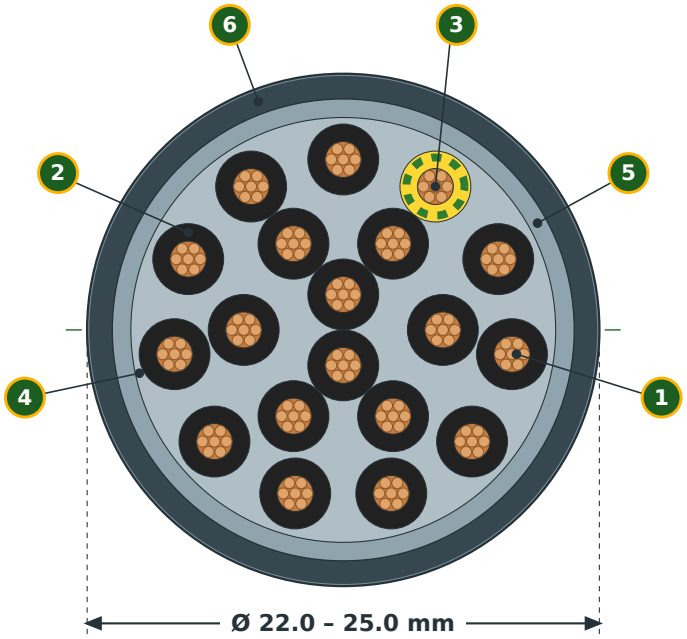
450/750 V is the common rating for industrial and building-site distribution on 400 V systems and allows a margin for DC and rectified supplies. The test voltage is 2.5 kV.

# 02 Construction

**FEICHUN · CROSS-SECTION A-A · 450/750 V**

**H07ZZ-F**

Sample size 19G1.5 · Rev 0 · Illustrative, not to scale




| No. | Component | Material |
|---|---|---|
| 1 | Conductor | Tinned annealed fine-wire copper, class 5 to IEC 60228 / DIN VDE 0295 |
| 2 | Insulation | Halogen-free cross-linked compound, type HX |
| 3 | Protective (PE) core | Green-yellow insulation, same cross-section as the power cores |
| 4 | Filler and binder tape | Halogen-free filler with polyester binder tape |
| 5 | Inner sheath | Halogen-free compound, extruded over the stranded core |
| 6 | Outer sheath | Halogen-free flame-retardant elastomer, low-temperature grade |

The drawing shows size 19G1.5. Other sizes have the same construction with scaled dimensions; the layout of every size is checked for non-overlap of all elements.

## Construction details

| | |
|---|---|
| **Conductor** | Tinned annealed fine-wire copper, class 5 to DIN VDE 0295 / IEC 60228 |
| **Insulation** | Halogen-free cross-linked compound, type HX, maximum conductor temperature 90 °C |
| **Core identification** | Black with white numbers; one green-yellow core to DIN VDE 0293-308 |
| **Stranding** | Cores in concentric layers with a short lay length |
| **Inner sheath** | Halogen-free compound; thickness about 0.9 mm at this size |
| **Outer sheath** | Halogen-free flame-retardant elastomer, low-temperature grade; thickness about 1.2 mm at this size |


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## 03 Electrical, Thermal and Mechanical Characteristics

### Electrical data

| | |
|---|---|
| **Rated voltage $U_0/U$** | 450/750 V AC |
| **Test voltage** | 2.5 kV AC, 5 min |
| **Maximum operating voltage, three-phase** | 825 V |
| **Maximum operating voltage, DC (core-earth / core-core)** | 0.45/0.75 kV (DC 0.675/1.1 kV) |
| **Current-carrying capacity** | Design values by the method of DIN VDE 0298-4, free air, 30 °C ambient |
| **Conductor resistance** | Maximum at 20 °C, class 5, tinned |

### Thermal and mechanical data

| | |
|---|---|
| **Maximum conductor temperature** | +90 °C |
| **Maximum temperature at short circuit** | +250 °C (5 s maximum) |
| **Ambient temperature, fixed installation** | −50 °C to +90 °C |
| **Ambient temperature, in motion** | −40 °C to +90 °C |
| **Minimum bending radius** | Fixed: 3 × D (D ≤ 12 mm), 4 × D (D > 12 mm); moving: 3 × D (D ≤ 8 mm), 4 × D (D ≤ 12 mm), 5 × D (D > 12 mm) (DIN VDE 0298-3) |
| **Maximum tensile load** | 15 N/mm² continuous on the total copper cross-section |
| **Flame propagation** | IEC 60332-1-2 / DIN EN 60332-1-2 |
| **Halogen-free** | Yes (insulation and sheath), IEC 60754-1/-2 |
| **Mineral oil resistance** | Resistant, DIN EN 60811-404 |
| **UV and ozone resistance** | Resistant |
| **Water** | Damp and wet areas, spray water |

## 04 Dimensions, Weights and Rated Data – 450/750 V (2 sizes)

| Type designation cores × mm² | FeiChun article no. | Cond. Ø max mm | Outer Ø min mm | Outer Ø max mm | Bend radius fixed mm | Bend radius moving mm | Weight approx. kg/km | Copper kg/km | Max. pull N | $R_{20}$ max Ω/km | Rated current A | $I_k$ (1 s) kA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **19G1.5** | FC-H07Z-0941-01 | 1.7 | 22.0 | 25.0 | 100 | 125 | 790 | 274 | 430 | 13.7 | 10 | 0.214 |
| **19G2.5** | FC-H07Z-0941-02 | 2.2 | 26.0 | 30.0 | 120 | 150 | 1,130 | 460 | 710 | 8.21 | 14 | 0.357 |

Current-carrying capacity: design values by the method of DIN VDE 0298-4, free air, 30 °C ambient; for other ambient temperatures use the factors below and the multi-core reduction factor already included in the table. Copper weight = 9.6 kg/(km·mm²) of copper cross-section (VDE copper index). Pull force = 15 N/mm² × total copper cross-section of the power cores. Diameters, dimensions and weights are nominal design values calibrated to published type tables; they vary within manufacturing tolerances. Confirm critical dimensions before dimensioning reels, glands or festoon systems. Other sizes and configurations are produced to order.

### Ambient temperature factors (conductor 90 °C)

| °C | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
|---|---|---|---|---|---|---|---|---|---|
| Factor | 1.08 | 1.04 | 1.00 | 0.96 | 0.91 | 0.87 | 0.82 | 0.76 | 0.71 |

### Short-circuit current rating

$I_k$ = 0.143 kA/mm² × cross-section of the power core (conductor 90 °C → 250 °C). For another duration t: $I_{k,t} = I_{k,1s} / \sqrt{t}$ (0.1 s ≤ t ≤ 5 s).


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## 05 Voltage Drop, Losses and Short-Circuit Data

Voltage drop per 100 m of cable at rated current with the conductor at 90 °C, cos φ = 0.8 and reactance 0.08 Ω/km (three-phase). The percentage refers to a system voltage of 400 V. Loss is the total I²R loss of the loaded cores per 100 m. The short-circuit columns give the permitted current for four durations.

| Type designation cores × mm² | Rated current A | R at 90 °C Ω/km | Voltage drop V / 100 m | Voltage drop % of 400 V | Loss kW / 100 m | $I_k$ 0.1 s kA | $I_k$ 0.5 s kA | $I_k$ 1 s kA | $I_k$ 3 s kA |
|---|---|---|---|---|---|---|---|---|---|
| 19G1.5 | 10 | 17.5 | 24.29 | 6.07 | 0.52 | 0.678 | 0.303 | 0.214 | 0.124 |
| 19G2.5 | 14 | 10.5 | 20.42 | 5.11 | 0.62 | 1.13 | 0.506 | 0.357 | 0.206 |

## 06 Selection Guide and Sizing Aid

H07ZZ-F 19G covers 2 sizes. The smallest, 19G1.5, has an outer diameter of up to 25.0 mm and weighs about 790 kg/km; the largest, 19G2.5, has an outer diameter of up to 30.0 mm and weighs about 1,130 kg/km, 1.4 times as much. Across the range the rated current rises from 10 A to 14 A at 30 °C and the fixed bending radius from 100 mm to 120 mm.

**Example 1.** A circuit draws 7 A continuously at 40 °C ambient temperature, in a group of two cables. Temperature factor 0.91, grouping factor 0.80: required table current = 7 / (0.91 × 0.80) = 10 A. The smallest suitable size is 19G1.5 with 10 A.

**Example 2.** A circuit draws 12 A continuously at 35 °C ambient temperature, on its own. Temperature factor 0.96: required table current = 12 / (0.96) = 13 A. The smallest suitable size is 19G2.5 with 14 A.

## 07 Engineering Profile by Size

Every size of H07ZZ-F 19G with the dimensions that decide how it behaves in a circuit: layers, weight, copper share, heat, voltage drop, bending, termination and pull.

**19G1.5.** This size has with a conductor of Ø 1.7 mm under 0.80 mm of insulation (core Ø 3.3 mm) and 0.9 mm inner and 1.2 mm outer sheath; outer diameter 22.0–25.0 mm, weight about 790 kg/km of which copper 274 kg/km (35 %). Rated current 10 A at 30 °C; at that load the voltage drop is 24.29 V per 100 m (6.07 % of 400 V) and the loss 0.52 kW per 100 m. Bending radius 100 mm fixed, 125 mm moving; gland M32, lug bolt M5. Short-circuit rating 0.214 kA for 1 s; permitted pull 430 N, free-hanging length 55 m.

**19G2.5.** This size has with a conductor of Ø 2.1 mm under 0.90 mm of insulation (core Ø 3.9 mm) and 0.9 mm inner and 1.4 mm outer sheath; outer diameter 26.0–30.0 mm, weight about 1,130 kg/km of which copper 460 kg/km (41 %). Rated current 14 A at 30 °C; at that load the voltage drop is 20.42 V per 100 m (5.11 % of 400 V) and the loss 0.62 kW per 100 m. Bending radius 120 mm fixed, 150 mm moving; gland M40, lug bolt M5. Short-circuit rating 0.357 kA for 1 s; permitted pull 710 N, free-hanging length 64 m.

Averaged over all sizes copper makes up 38 % of the cable weight; the share rises from 35 % at 19G1.5 to 41 % at 19G2.5, which is why the larger sizes are costed mostly on the copper market price.

## 08 Construction Dimensions by Size

Wall thicknesses and diameters of the layers at each size, taken from the validated cross-section layout; the overall diameter in section 04 is the sum of these layers within tolerance. The insulation wall follows the voltage class 450/750 V.

| Type designation cores × mm² | Conductor Ø mm | Core Ø over insulation, mm | Insulation wall mm | Laid-up core Ø mm | Inner sheath mm | Outer sheath mm | Screen + braid mm | Sheath share of Ø, % |
|---|---|---|---|---|---|---|---|---|
| 19G1.5 | 1.65 | 3.25 | 0.80 | 19.5 | 0.85 | 1.15 | – | 17 |
| 19G2.5 | 2.13 | 3.93 | 0.90 | 23.4 | 0.90 | 1.40 | – | 16 |

## 09 Termination Planning (indicative)

| Type designation cores × mm² | Outer Ø or W × H mm | Cable gland thread | Lug / ferrule bolt | Strip length mm | Straight length behind gland, mm |
|---|---|---|---|---|---|
| 19G1.5 | 25.0 | M32 | M5 | 10 | 50 |
| 19G2.5 | 30.0 | M40 | M5 | 10 | 60 |

Gland threads, lug bolts and strip lengths are planning guides computed from the dimensions above; confirm them with the accessory manufacturer.


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## 10 Comparison with Related Variants at Size 19G1.5

| Variant | Differs in | Outer Ø / H mm | Weight kg/km | Pull N | Current A |
|---|---|---|---|---|---|
| **This datasheet** H07ZZ-F 19G 450/750 V | – | 25.0 | 790 | 430 | 10 |
| H07ZZ-F 18G 450/750 V 18G1.5 | core configuration | 25.5 (+2%) | 780 (-1%) | 400 (-7%) | 10 (+0%) |
| H07ZZ-F 24G 450/750 V 24G1.5 | core configuration | 28.0 (+12%) | 910 (+15%) | 540 (+26%) | 9 (-10%) |
| H07ZZ-F 19G 450/750 V 19G1.5 | tinned vs bare copper | 25.0 (+0%) | 790 (+0%) | 430 (+0%) | 10 (+0%) |
| H07ZZ-F 19G 450/750 V 19G1.5 | low-temperature sheath | 25.0 (+0%) | 790 (+0%) | 430 (+0%) | 10 (+0%) |
| H07ZZ-F 12G 450/750 V 12G1.5 | core configuration | 20.4 (-18%) | 510 (-35%) | 270 (-37%) | 12 (+20%) |
| H07ZZ-F 7G 450/750 V 7G1.5 | core configuration | 17.0 (-32%) | 359 (-55%) | 158 (-63%) | 16 (+60%) |
| H07ZZ-F 6G 450/750 V 6G1.5 | core configuration | 15.0 (-40%) | 291 (-63%) | 135 (-69%) | 17 (+70%) |
| H07ZZ-F 5G 450/750 V 5G1.5 | core configuration | 13.4 (-46%) | 245 (-69%) | 112 (-74%) | 19 (+90%) |

Percentages show the change against this datasheet; where a variant does not offer the exact size, the nearest listed size is used.

## 11 Standards and Testing

| Standard | Scope |
|---|---|
| **DIN EN 50525-3-21 (VDE 0285-525-3-21)** | Halogen-free thermoset flexible cables |
| **IEC 60754-1 / -2** | Halogen content and acidity |
| **DIN VDE 0293-308** | Core identification |
| **DIN VDE 0295 / IEC 60228** | Conductors, class 5 |
| **DIN EN 60332-1-2 / IEC 60332-1-2** | Flame propagation |

### Routine and type tests

- AC voltage test on every drum length (routine test): 2.5 kV, 5 min
- Conductor resistance and checks of dimensions, insulation thickness and sheath thickness
- Continuity of conductors and protective earth
- Flame propagation test (IEC 60332-1-2) on type-test samples
- Verification of the halogen-free compounds (IEC 60754-1/-2)

**Test documentation:** every delivery is accompanied by a test certificate from FeiChun’s own laboratory. Third-party witnessed tests can be arranged at the buyer’s cost.

The design follows DIN EN 50525-3-21. This datasheet does not claim the VDE approval mark; mark or approval certificates, where required for a project, are arranged on request and apply only to the type tested.


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## 12 Installation, Marking and Delivery

### Installation guidance

- Observe the bending radii in section 04.
- Do not exceed the tensile load of 15 N/mm² of the copper cross-section.
- Select halogen-free glands and fittings to maintain the halogen-free concept of the installation.
- Do not use below the rated minimum temperature when moving the cable.
- Unwind from the drum completely before applying full load.
- Protect the sheath from permanent abrasion.

### Sheath marking

FEICHUN H07ZZ-F [cross-section] 450/750 V [year] [serial no.] [metre mark]

### Packing and delivery

| | |
|---|---|
| **Drum** | Steel or fumigated wooden drums; cable ends sealed with heat-shrink caps |
| **Delivery length** | As ordered, in one continuous length without joints |
| **Lead time** | 2–3 weeks after technical approval |
| **Warranty** | At least 3 years against manufacturing defects |
| **Drum label** | Type, cross-section, length, gross/net weight, batch no., drum no. |

### Ordering information

**Order example: H07ZZ-F 19G1.5 450/750 V** – 500 m on one drum. When requesting a quotation, state the cable type, configuration, cross-section, voltage, conductor (tinned), length per piece, required standards and installation conditions.

## 13 Certification and Quality

All cable is subject to FeiChun’s quality control, with routine testing over 100 % of the delivered length. Declarations of conformity, type-test reports and third-party tests (for example for a mine, a tunnel or a rail project) are provided per project requirement; copies of the records are available on request. FeiChun holds CE, EAC and UKCA documentation for certain product groups. Whether a certificate covers this specific construction must be confirmed with FeiChun before it is quoted in a tender.

VDE, mine-specific (for example coal-mine safety marks, MSHA) and ATEX / IECEx approvals are not implied by this datasheet. They depend on the project, the machine and the country and are arranged with the end user.

## 14 Related Datasheets and Frequently Asked Questions

Variants of this cable with a different configuration, conductor, temperature grade, screen or voltage. All datasheets are PDF files.

- H07ZZ-F 18G 450/750 V – core configuration, halogen-free FRNC, low-temp, tinned
- H07ZZ-F 24G 450/750 V – core configuration, halogen-free FRNC, low-temp, tinned
- H07ZZ-F 19G 450/750 V – tinned vs bare copper, halogen-free FRNC, low-temp
- H07ZZ-F 19G 450/750 V – low-temperature sheath, halogen-free FRNC, tinned
- H07ZZ-F 12G 450/750 V – core configuration, halogen-free FRNC, low-temp, tinned
- H07ZZ-F 7G 450/750 V – core configuration, halogen-free FRNC, low-temp, tinned
- H07ZZ-F 6G 450/750 V – core configuration, halogen-free FRNC, low-temp, tinned
- H07ZZ-F 5G 450/750 V – core configuration, halogen-free FRNC, low-temp, tinned

Overview of all H07ZZ-F datasheets: H07 Series Flexible Cables 450/750 V

### Frequently asked questions

**What does ZZ mean in H07ZZ-F?**
Halogen-free thermoset insulation (Z) and halogen-free thermoset sheath (Z); F means flexible conductors.

**Is H07ZZ-F suitable for outdoor use?**
Yes, within the temperature range; for permanent outdoor exposure check the sheath for UV and weather suitability.

**What sizes are available for H07ZZ-F 19G?**
2 sizes from 1.5 to 2.5 mm². The outer dimension of the largest size, 19G2.5, is 30.0 mm and the weight is about 1,130 kg/km.

**What current can 19G2.5 carry?**
14 A in free air at 30 °C ambient, with the conductor at 90 °C. Other temperatures and grouping change the value; use the factors in section 04.


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## 15 Trademark Notice and Intellectual Property

Cable type designations such as H07ZZ-F are standardised, descriptive designations defined in DIN VDE and EN standards; they are used to state which standard this product is designed to. References to other manufacturers' trade names, where made, serve only for technical comparison; FeiChun Cables is not affiliated with them.

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