

Catalogue

CONDUCTORS FOR RAILWAY ELECTRIFICATION

Electrifying the transport that moves us with
the most sustainable copper solutions

2025 Edition









WE ARE YOUR PARTNER

Innovation and efficiency to contribute to a more sustainable transport

We are a **family-run industrial company with more than 215 years' experience, specialising in the manufacture of semi-finished copper solutions**. World leaders in copper recycling technology and processes, with our first patent registered in 1986.

Copper is essential for the future of our society. The mineral par excellence, as it ensures maximum conductivity and exponentially reduces greenhouse gas emissions, contributing to the decarbonisation of our society.

Our innovative spirit and experience in the sector position us as a world reference in technology and copper processing, which we get from

cathode and also directly from recycled copper. Our facilities cover the entire manufacturing process, from copper smelting to the conductor.

This makes us **the best partner to develop all types of high-performance copper and copper alloy solutions** for railway applications.

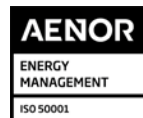
We have a wide portfolio of conductors for railway electrification for several infrastructures: passenger and freight lines, high-speed lines, metros and tramways.

Our production process is subject to exhaustive and meticulous quality control, from the smelting of the copper to the final product. The

entire organisation is geared towards ensuring maximum quality, complying with customer requirements and supervising each stage of the process, to achieve total customer satisfaction.

Present in more than 74 countries, it is thanks to our internationalisation capacity that we can continue to promote the circular model in the international railway sector, offering circularity of copper materials at the end of their useful life.

We guarantee the highest quality standards and compliance with international requirements





Conductors for railway electrification / **People**

OUR TEAM, LA FARGA'S DRIVING FORCE

At La Farga we are fully confident in our team's ability to transform reality and to be agents of change by generating value. They are the driving force that moves the company, positioning us as industry leaders thanks to their talent and commitment.

Collaboration and teamwork have been key to facing opportunities and challenges for more than 215 years. For La Farga, what we do is as important as how we do it.

We are a company with a purpose, which makes us unique. We are committed to people and our values. Our positioning and conviction make us stand out in the metallurgical sector as an active company that generates shared value.

We work with a long-term vision to ensure the viability and sustainability of the company.





Conductors for railway electrification / La Farga

WE CONTRIBUTE TO THE DECARBONISATION OF THE PLANET AND THE ECONOMY

We are aware of the environmental impact that our industry has, but it is also true that our activity is essential for human development and energy transition.

One of our values is innovation, and from our beginnings, we have invested and worked to place innovation at the service of sustainability.

We incorporate technologies that allow us to reduce emissions throughout the value chain and work more efficiently.

2030 goal: To reduce GHG emissions into the atmosphere by 55% (compared to 2019).

2050 goal: To achieve NetZero goals with minimal greenhouse gas emissions offsets.





Conductors for railway electrification / **La Farga**

SOLUTIONS WITH THE LOWEST IMPACT

Contributing to global decarbonisation goals

OUR BRANDS



La Farga, our legacy.

Our more than 215 years' experience has made us a recognised brand, a sign of quality and present on almost all continents.

LA FARGA's solutions stand out both for our own manufactured products (wire rod, wire drawing, tubes, welding wire, railway electrification, etc.), as well as for our knowledge and new copper processing technologies.

The strictest quality and efficiency processes, from raw materials and their treatment to customer service, have made us what we are today.



Genius, 100% recycled and 100% recyclable copper with the lowest carbon footprint.

We offer the most sustainable copper solutions with the lowest impact, producing 100% recycled copper with the lowest carbon footprint on the market and contributing to the most efficient use of natural resources.

We ensure product traceability. This evolution highlights the objective of offering a unique value proposition, thanks to the company's innovation and excellence.

We are proud to be the first company in the copper sector that has been awarded certification for its wire rod with an Environmental Product Declaration (EPD), endorsing the GENIUS solution as the most sustainable on the market.

We continue working to certify the traceability of all our solutions and offer our clients the lowest environmental impact.



WE PROMOTE THE CIRCULAR ECONOMY IN RAILWAY TRANSPORT

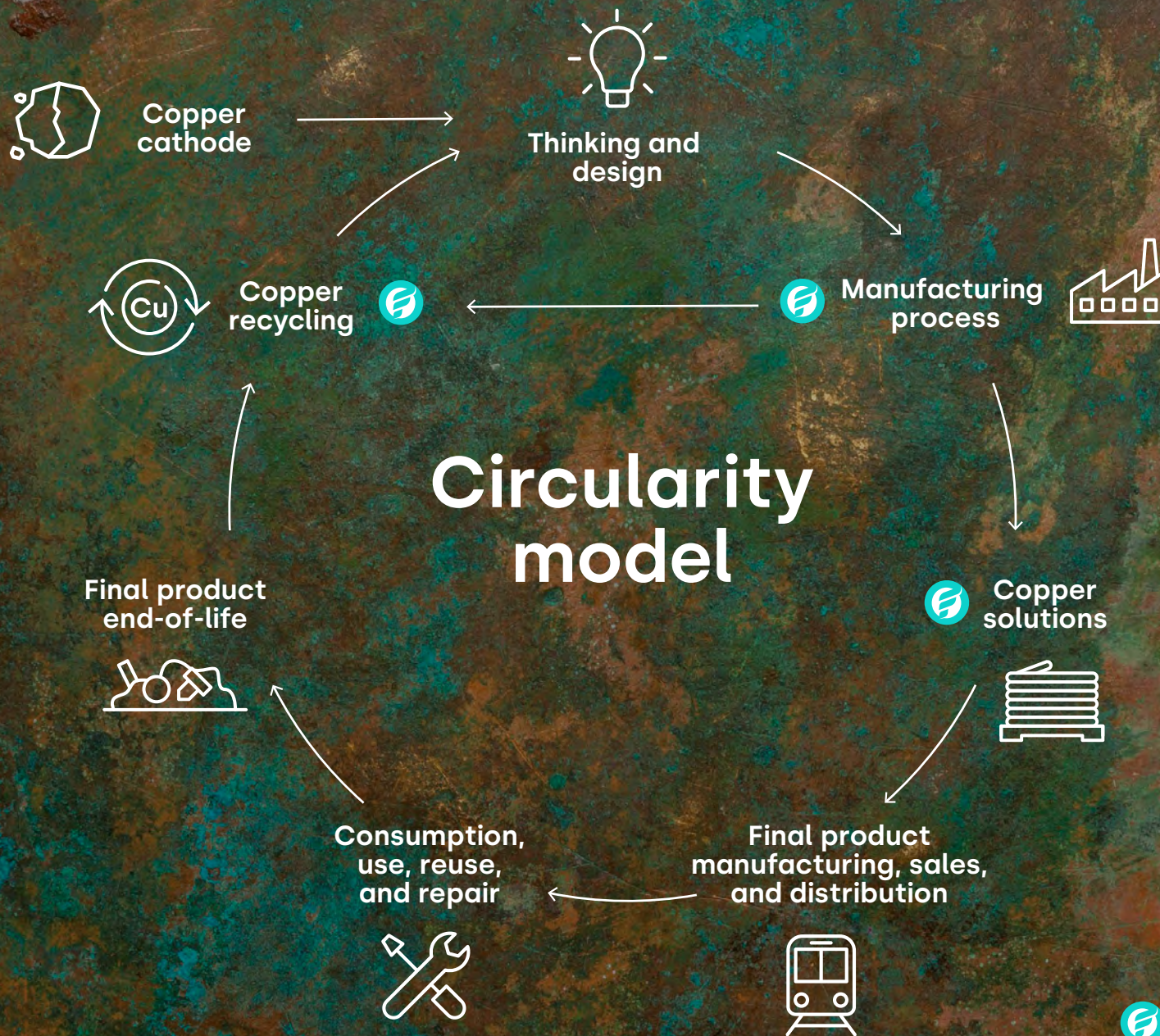
Our circularity model is interrelated with sustainability, contributing to the **efficient use of natural resources and process efficiency, extending the useful life of our solutions and maximising the reuse of copper when it has reached the end of its useful life** or copper left over from the industrial process.

We have been working on circular models for years with our clients, as well as providing solutions for eco-design and decarbonisation throughout the chain.

We actively participate in the influential groups of society where circularity is promoted.

We encourage other industries to get involved in the development of the circular economy, in the decarbonisation of activity and in reducing environmental impact.

 Conductors for railway electrification / La Farga





Conductors for railway electrification / **La Farga**

A WORLD LEADER IN RAILWAY PROJECTS

Present all over the world

● PASSENGER AND FREIGHT LINES

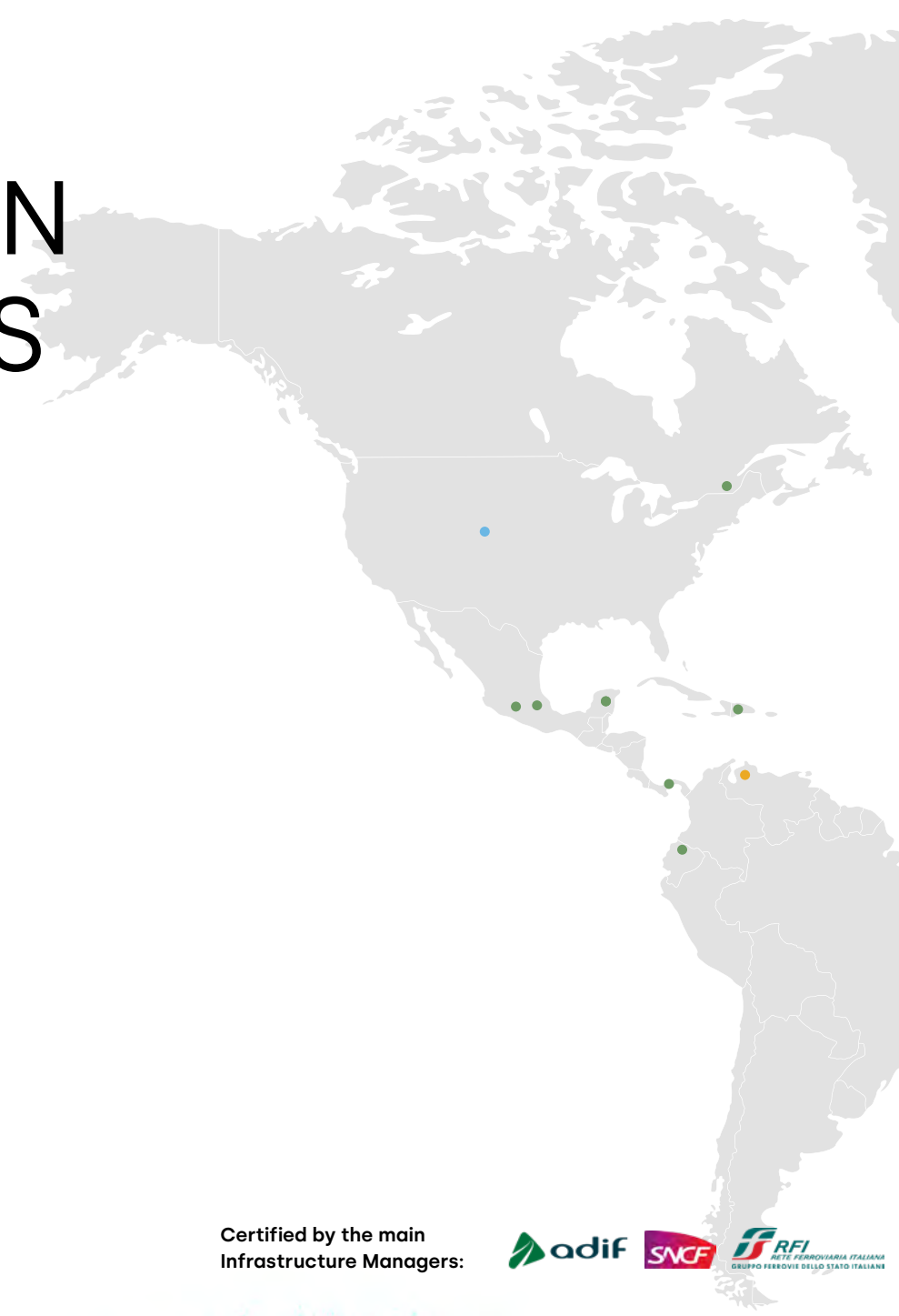
Acharnes - Tithorea Greece
 Athens - Tithorea Greece
 Bourg - Bellegarde France
 Casablanca - Kentira Morocco
 Casablanca - Rabat Morocco
 Cata - Apata Romania
 Mediterranean Corridor Spain
 Covilha - Guarda Portugal
 Crossrail England
 Dar es Salaam - Morogoro Tanzania
 Delhi - Ghaziabad - Meerut India
 Divača - Koper Slovenia
 Eastern EDFC India
 Railway electrification for mines United States
 Enlace - Manacor Spain
 Heerhugowaard The Netherlands
 Hernani - Irún Spain
 Kayas - Centikaya Turkey
 Kiato - Rododafni Greece
 Korail South Korea
 Kozzika - Cairo Egypt
 Minho Line: Porto - Valença Portugal
 Northern Line: Ovar-Gaia Portugal
 Follo Line
 Lisboa - Evora Portugal
 Lisboa - Oporto Portugal
 Official Supplier for NRIC Projects, Bulgaria
 Official Supplier for RFI Projects, Italy
 Official Supplier for SNCF Projects, France
 Marcilla - Alar del Rey Spain
 Marmaray Turkey
 Modernisation of Latvian lines Latvia
 Modernisation of Israeli lines Israel
 Morogoro - Makutupora Tanzania
 Mwanza - Isaka Tanzania

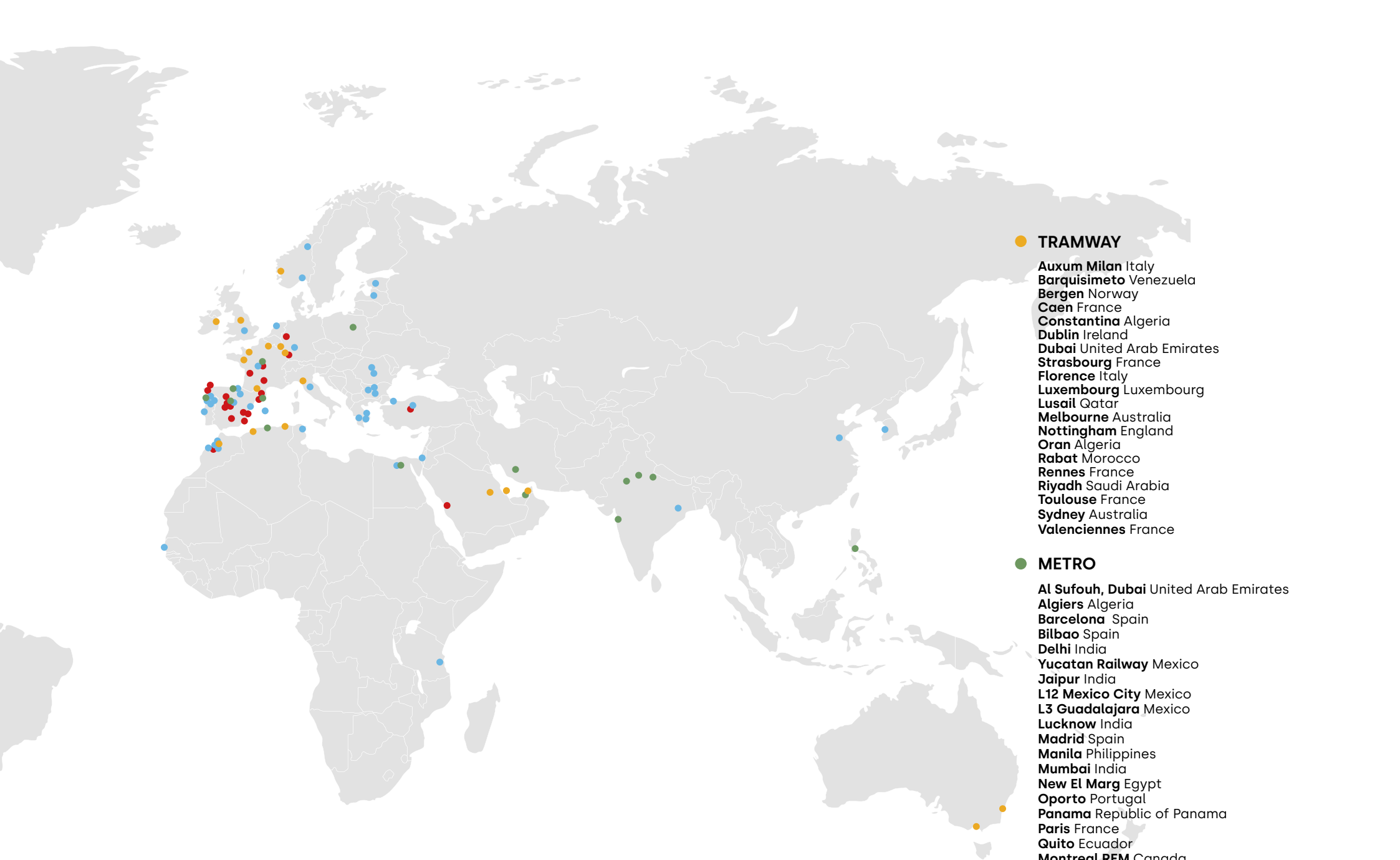
Plovdiv - Burgas Bulgaria
 Official Project Supplier for ADIF Spain
 Septemvri - Plovdiv Bulgaria
 Settat - Marrakesh Morocco
 Sighisoara - Brasov Romania
 Stuttgart S21 Germany
 Greater Casablanca Triangle Morocco
 Regional Express Train (TER) Dakar
 Tren Maya Mexico
 Transtu Tunisia
 Trønder - Meråker Norway
 Xianxiang - Rizhao China

● HIGH-SPEED LINES

Alcázar - Manzanares Spain
 Ankara - Istanbul Turkey
 Atocha - Chamartín Spain
 Barcelona - Figueres Spain
 Barcelona - French border Spain
 Mecca - Medina Saudi Arabia
 East Metz HSL - Strasbourg France
 Morocco HSL Morocco
 Madrid - Valencia Spain
 Medina del Campo - Salamanca Spain
 Monforte - Murcia Spain
 Rhine-Rhône France
 Santiago - Ourense Spain
 Sea Bourg - Bordeaux (Southern Europe Atlantic HSL) France
 Seville - Cadiz Spain
 Torrente - Xátiva Spain
 Valencia - Alicante Spain
 Vigo - A Coruña Spain
 Wendlingen - Ulm Germany

Certified by the main
Infrastructure Managers:









Conductors for railway electrification / **Solutions**

CATENARY SOLUTIONS



CATENARY SOLUTIONS

The complete range of copper solutions for the catenary system

Our solutions for railway electrification, developed through La Farga's innovation and technology, deliver enhanced performance and superior wear resistance compared to conventional catenary systems.

We offer a wide range of copper and copper alloy solutions with tin, silver, and magnesium, which are the best solutions for **passenger and freight lines, high-speed lines, metros, and tramways**.

In addition, we have a manual available with recommendations for installing and handling our solutions in railway applications. Our experienced technical team is also available to offer support and advice to our clients.

We manufacture the complete range of copper solutions required by the railway market:

- **Contact wire**
- **Rigid cables**
 - Messenger wire
 - Feeders
 - Connection cables
- **Flexible cables**
 - Droppers
 - Connection cables

Copper solutions for the catenary system

- 1 Contact wire

RIGID CABLES

- 2 Messenger wire
3 Feeders
5 Connection cables

FLEXIBLE CABLES

- 4 Droppers
5 Connection cables



Range of solutions available for brands:





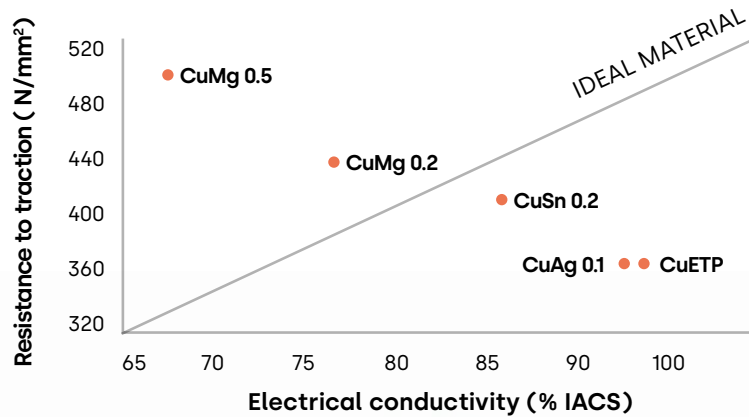
Copper alloys

In recent years, La Farga has developed cutting-edge copper alloy technology, which has allowed us to supply projects of different magnitudes worldwide.

CuAg

Silver is used as an alloying element to increase the base material's resistance to annealing. This helps the catenary acquire better thermal stability without sacrificing mechanical or electrical properties, and thus improving their durability.

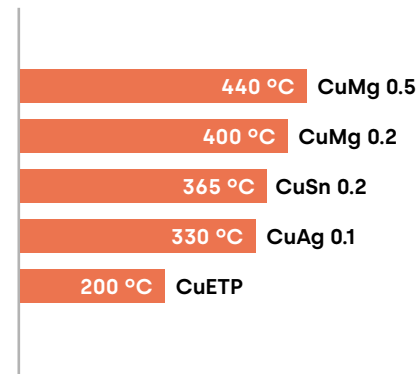
Contact wire's mechanical and electrical properties



CuSn & CuMg

Tin and magnesium are used as alloying elements due to their high strength, which allows suspension stresses to be effectively applied, resulting in higher wave propagation speeds in the catenary system. These alloys are needed on high-performance railway lines, especially on high-speed lines.

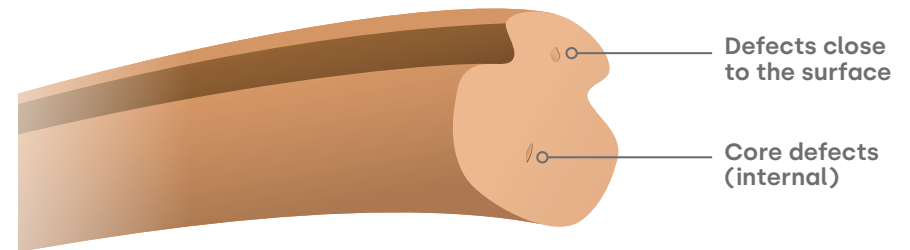
Contact wire's annealing temperature



Efficiency and quality are driven by La Farga's commitment to innovation and technological development

Our manufacturing process incorporates Dx3, an innovative technology for the comprehensive inspection of grooved contact wire. This proprietary technology, developed by La Farga, is designed to continuously **detect real-time defects both internally and on the surface of the wire during the manufacturing process.**

In response to a key market demand for internationally recognized quality assurance, the Dx3 (Deep Defect Detector) technology has been developed to deliver copper materials with maximum efficiency and quality. This innovation broadens the scope of analysis, enabling comprehensive inspection even in areas where other technologies on the market cannot reach. Dx3 is applicable to all materials with conductivity above 60% IACS.



The internal and external quality of the contact wire is essential for the reliability and efficiency of the catenary system.





Conductors for railway electrification / Solutions / **Contact wire**

CONTACT WIRE

Range of solutions available for brands:

La Farga



RAIL

Genius
by La Farga



RAIL



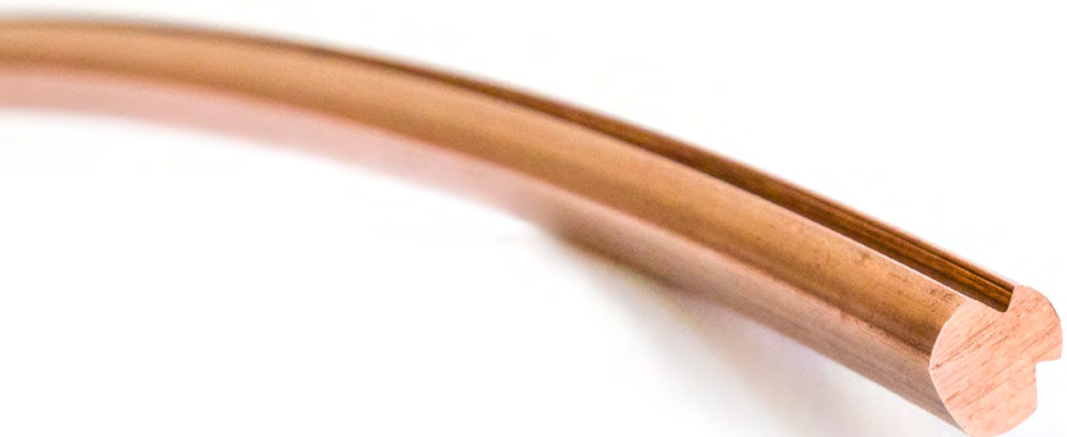


CONTACT WIRE

The grooved contact wire is part of the catenary electrification system, designed for contact lines.

This wire has grooves that provide unique characteristics and advantages over conventional wires. They allow for a more secure and stable connection.

La Farga supplies contact wire made of Copper (Cu), Copper Silver (CuAg), Copper Tin (CuSn) and Copper Magnesium (CuMg). The alloys offer superior properties by combining high tensile strength, high conductivity, and increased thermal and wear resistance.



1 Contact wire



Technical specifications

Standard:

ASTM B-9 | ASTM B47 | EN 50149 | JIS E2101 | UIC 870 and according to customer specifications.

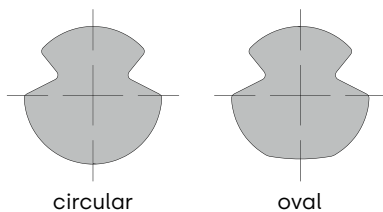
Range:

- Cu-ETP (CW004A)
- CuAg 0.1 (CW013A)
- CuSn 0.2 (CW129C)
- CuMg 0.2 / 0.5 (CW127C) / (CW128C)

Sections:

- Circular: 80, 100, 107, 120, 150 mm²
- Oval: 100, 107, 120, 150 mm²

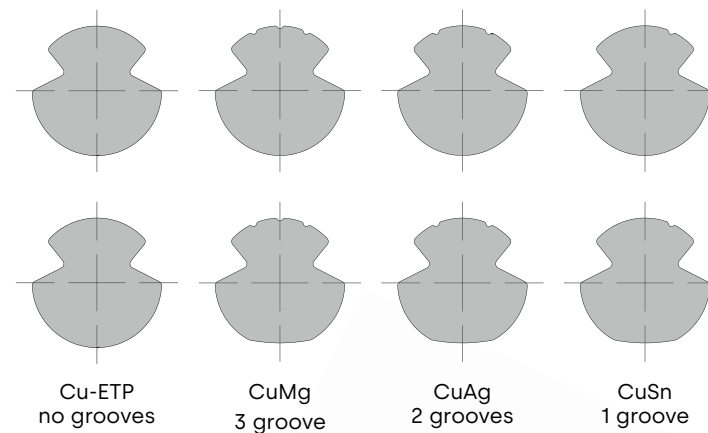
and according to customer specifications.



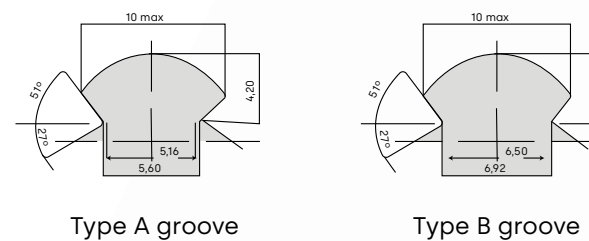
circular

oval

Identification grooves:



Attachment grooves:



Type A groove

Type B groove



Technical characteristics in accordance with standard EN 50149: 2012

Cu-ETP

Cross section (mm ²)	Diameter / Nominal Height (mm)			Nominal mass (kg/km)	Electrical resistance (Ω/km)	Tensile strength (N/mm ²)	Breaking load (kN)	Permanent Current Capacity (A)*			Elongation (%)
	Profile BC	Profile AC	Profile BF					Profile BC	Profile AC	Profile BF	
80	-	10.62	-	712	0.229	375	29.1	-	459	-	3 - 8
100	11.71	11.96	11.04	889	0.183	375	36.4	527	530	519	3 - 8
107	12.15	12.40	11.23	952	0.171	360	37.4	550	553	539	3 - 8
120	12.91	13.13	12.27	1067	0.153	360	41.9	591	594	583	3 - 8
150	14.42	14.69	13.42	1334	0.122	360	52.4	681	685	669	3 - 8

* Calculation based on IEEE 738-2006 method according $W_s = 1\text{m/s}$, $R_s = 1000\text{ W/m}^2$, $T_a = 35^\circ\text{C}$, T_c = depending on the alloy according to UNE-EN 50119 (80°C for Cu).

CuAg 0.1

Cross section (mm ²)	Diameter / Nominal Height (mm)			Nominal mass (kg/km)	Electrical resistance (Ω/km)	Tensile strength (N/mm ²)	Breaking load (kN)	Permanent Current Capacity (A)*			Elongation (%)
	Profile BC	Profile AC	Profile BF					Profile BC	Profile AC	Profile BF	
80	-	10.62	-	712	0.229	375	29.1	-	543	-	3 - 8
100	11.71	11.96	11.04	889	0.183	375	36.4	624	628	614	3 - 8
107	12.15	12.40	11.23	952	0.171	360	37.4	652	656	638	3 - 8
120	12.91	13.13	12.27	1067	0.153	360	41.9	701	704	691	3 - 8
150	14.42	14.69	13.42	1334	0.122	360	52.4	809	813	793	3 - 8

* Calculation based on IEEE 738-2006 method according $W_s = 1\text{m/s}$, $R_s = 1000\text{ W/m}^2$, $T_a = 35^\circ\text{C}$, T_c = depending on the alloy according to UNE-EN 50119 (100°C for CuAg).



CuSn 0.2

Cross section (mm ²)	Diameter / Nominal Height (mm)			Nominal mass (kg/km)	Electrical resistance (Ω/km)	Tensile strength (N/mm ²)	Breaking load (kN)	Permanent Current Capacity (A)*			Elongation (%)
	Profile BC	Profile AC	Profile BF					Profile BC	Profile AC	Profile BF	
80	-	10.62	-	714	0.309	460	35.7	-	477	-	2 - 8
100	11.71	11.96	11.04	892	0.247	450	43.7	584	551	539	2 - 8
107	12.15	12.40	11.23	955	0.231	430	44.6	572	575	560	2 - 8
120	12.91	13.13	12.27	1071	0.206	420	48.9	616	619	607	2 - 8
150	14.42	14.69	13.42	1338	0.165	420	61.1	709	713	695	2 - 8

* Calculation based on IEEE 738-2006 method according $W_s = 1\text{m/s}$, $R_s = 1000\text{ W/m}^2$, $T_a = 35^\circ\text{C}$, T_c = depending on the alloy according to UNE-EN 50119 (100°C for CuSn).

CuMg 0.5

Cross section (mm ²)	Diameter / Nominal Height (mm)			Nominal mass (kg/km)	Electrical resistance (Ω/km)	Tensile strength (N/mm ²)	Breaking load (kN)	Permanent Current Capacity (A)*			Elongation (%)
	Profile BC	Profile AC	Profile BF					Profile BC	Profile AC	Profile BF	
80	-	10.62	-	712	0.385	520	40.4	-	434	-	3 - 10
100	11.71	11.96	11.04	889	0.286	510	49.5	517	520	509	3 - 10
107	12.15	12.40	11.23	952	0.268	500	51.9	540	543	528	3 - 10
120	12.91	13.13	12.27	1067	0.239	490	57.0	581	584	573	3 - 10
150	14.42	14.69	13.42	1334	0.191	470	68.4	670	673	657	3 - 10

* Calculation based on IEEE 738-2006 method according $W_s = 1\text{m/s}$, $R_s = 1000\text{ W/m}^2$, $T_a = 35^\circ\text{C}$, T_c = depending on the alloy according to UNE-EN 50119 (100°C for CuMg).

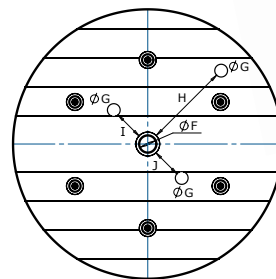
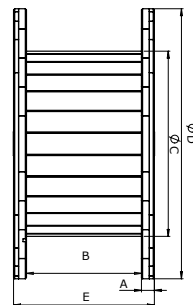


Packaging

1400 mm wooden reel

DIMENSIONS (mm)										
	A	B	C	D	E	F	G	H	I	J
1400	67	620	960	1400	750	82	65	518	250	250

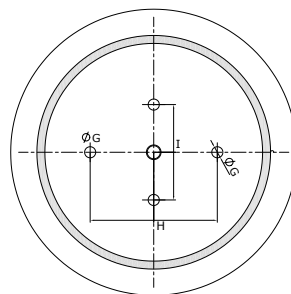
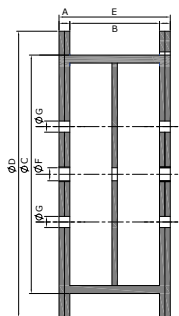
For Cu-ETP & CuAg contact wire
Maximum weight: 2200 kg/reel



1800 mm wooden reel

DIMENSIONS (mm)									
	A	B	C	D	E	F	G	H	I
1800	70	560	1500	1800	700	82	70	800	600

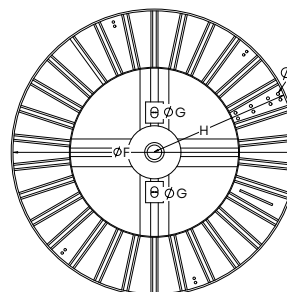
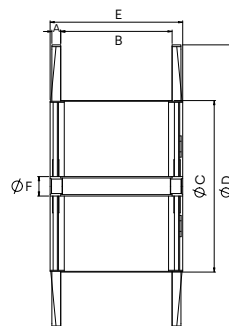
For CuMg & CuSn contact wire
Maximum weight: 2500 kg/reel



1650 mm metal reel

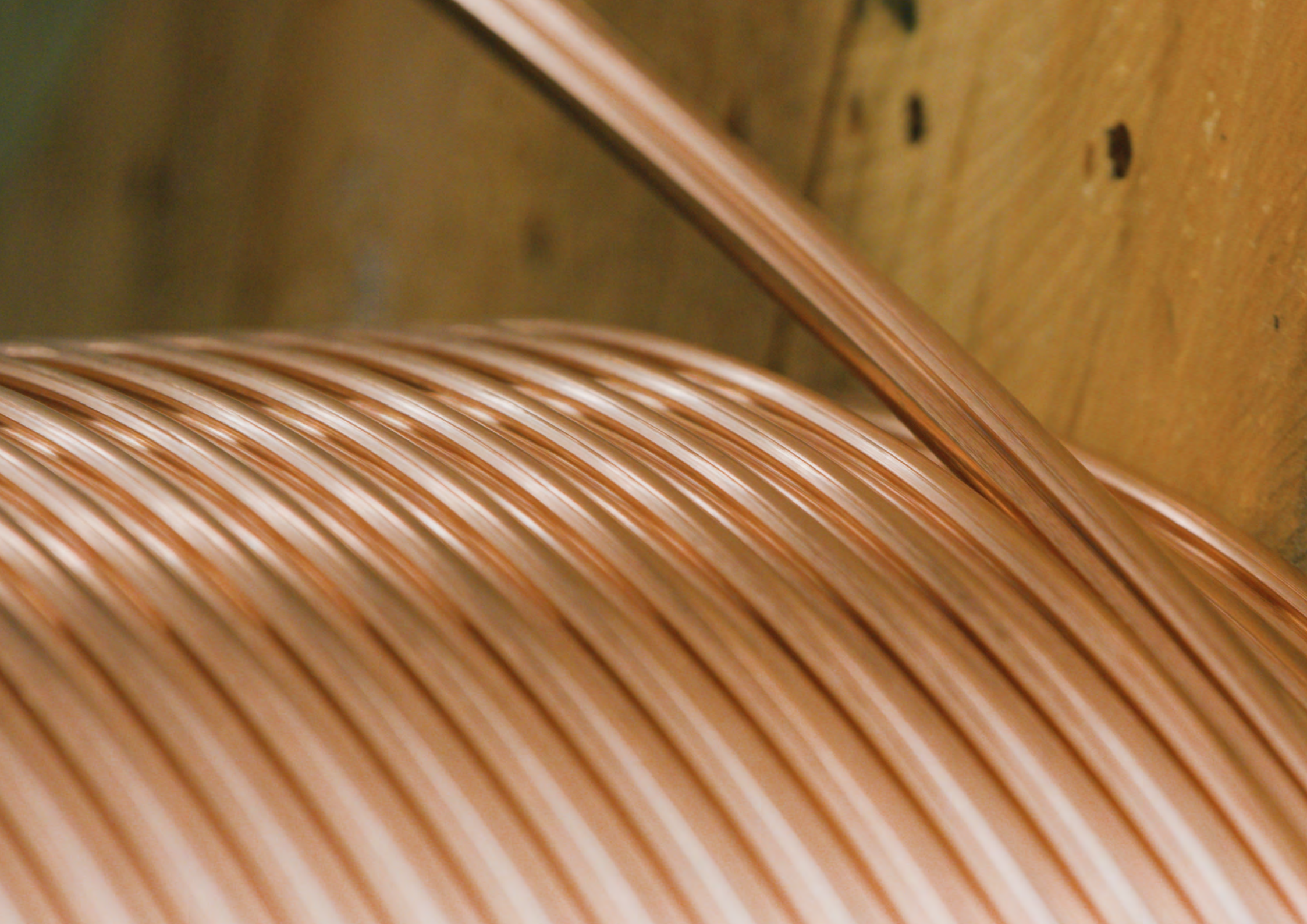
DIMENSIONS (mm)								
	A	B	C	D	E	F	G	I
1650	50	630	970	1650	750	82	60	225

For Cu-ETP contact wire and all its alloys
Maximum weight: 4000 kg/reel



Upon client request, reinforced reels can be offered to increase reel capacity.
Consequently, La Farga can also design and produce wooden or metallic drums
in different dimensions.

The wooden reels are phytosanitary compliant and come with staves and banding.







Conductors for railway electrification / Solutions / **Rigid cables**

RIGID CABLES

Range of solutions available for brands:

La Farga



RAIL

Genius
by La Farga



RAIL



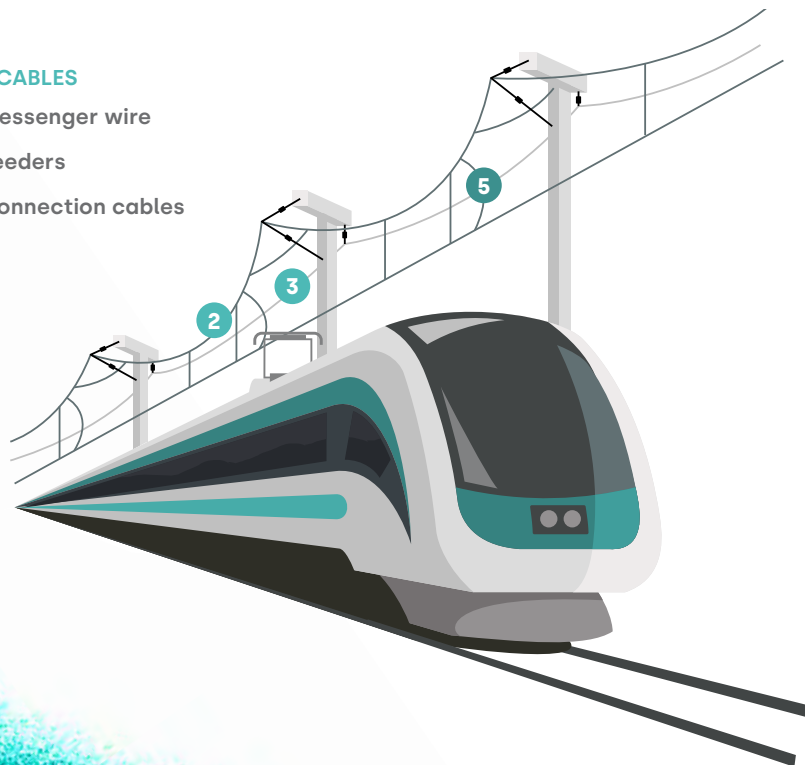
320

RIGID CABLES

The rigid copper cables and their Class 2 alloys support the weight of the system – composed of the contact wire and the droppers – and contribute to its electrical power supply. They are used in connection cables, messenger wires, and feeders for the catenary of passenger and freight lines, and high-speed lines.

RIGID CABLES

- 2 Messenger wire
- 3 Feeders
- 5 Connection cables



Technical specifications

Standard:

DIN 48201-1 | DIN 48201-2 | NF C34-110-3 | NF C34-110-2 | ADIF ET 03.364.158.0 | ADIF ET 03.364.159.8 and according to customer specifications.

Range:

- Cu-ETP (CW004A)
- CuMg 0.2 / 0.5 (CW127C) / (CW128C)

Cross-sections:

- Connection cables: cross-sections from 50 to 100 mm².
- Messenger wire: cross-sections from 70 to 300 mm².
- Feeders: cross-sections up to 500 mm²

Technical characteristics

Rigid Cu cables in accordance with standard DIN 48201-3

Denomination (mm ²)	Cross section (mm ²)	Composition (units x mm)	Nominal diameter (mm)	Nominal mass (kg/km)	Breaking load (kN)	Permanent Current Capacity (A)*
10	10.02	7 x 1.35	4.1	90	4.02	117
16	15.89	7 x 1.70	5.1	143	6.37	155
25	24.25	7 x 2.10	6.3	218	9.72	203
35	34.36	7 x 2.50	7.5	310	13.77	252
50	49.48	7 x 3.00	9.0	446	19.84	317
50	48.35	19 x 1.80	9.0	437	19.38	313
70	65.81	19 x 2.10	10.5	596	26.38	379
95	93.27	19 x 2.50	12.5	845	37.39	472
120	116.99	19 x 2.80	14.0	1060	46.90	545
150	147.11	37 x 2.25	15.8	1337	58.98	629
185	181.62	37 x 2.50	17.5	1649	72.81	718
240	242.54	61 x 2.25	20.3	2209	97.23	861
300	299.43	61 x 2.50	22.5	2725	120.04	983
400	400.14	61 x 2.89	26.0	3640	160.42	1180
500	499.83	61 x 3.23	29.1	4545	200.38	1358

* Calculation based on IEEE 738-2006 method according $W_s = 1\text{m/s}$, $R_s = 1000\text{ W/m}^2$, $T_a = 35^\circ\text{C}$, T_c = depending on the alloy according to UNE-EN 50119 (80°C for Cu).

Rigid Cu cables in accordance with ADIF ET03.364.158.0

Denomination (mm ²)	Cross section (mm ²)	Composition (units x mm)	Nominal diameter (mm)	Nominal mass (kg/km)	Breaking load (kN)	Permanent Current Capacity (A)*
50	50.0	19 x 1.83	9.15	455.4	1915	320
95	94.8	19 x 2.52	12.60	863.5	3427	478
150	147.1	37 x 2.25	15.75	1344.5	5450	631
153	153.0	37 x 2.30	16.10	1398.3	5695	647
185	184.5	37 x 2.52	17.64	1686.5	6526	728
225	224.6	37 x 2.78	19.46	2052.5	7942	822
240	236.0	37 x 2.85	19.95	2157.1	8347	848
300	304.2	61 x 2.52	22.68	2791.3	10392	996

* Calculation based on IEEE 738-2006 method according $W_s = 1\text{m/s}$, $R_s = 1000\text{ W/m}^2$, $T_a = 35^\circ\text{C}$, T_c = depending on the alloy according to UNE-EN 50119 (80°C for Cu).

Rigid Cu cables in accordance with standard NF C32-110-3

Denomination (mm ²)	Cross section (mm ²)	Composition (units x mm)	Nominal diameter (mm)	Nominal mass (kg/km)	Electrical resistance (Ω/km)	Breaking load (kN)	Permanent Current Capacity (A)*
5.5	5.5	7 x 1.00	3.0	48.2	3.34	231	79
10.8	10.8	7 x 1.40	4.2	94.2	1.70	434	121
12.4	12.4	7 x 1.54	4.5	108	1.47	499	132
14.1	14.1	7 x 1.60	4.8	123	1.30	552	143
17.8	17.8	7 x 1.80	5.4	156	1.03	699	166
22	22	7 x 2.00	6.0	193	0.83	862	190
24.2	24.2	7 x 2.10	6.3	212	0.76	924	201
25.2	25.2	7 x 2.14	6.4	221	0.73	960	206
27.6	27.6	7 x 2.24	6.7	242	0.67	1052	217
34.4	34.4	7 x 2.50	7.5	301	0.53	1310	251
29.2	29.2	19 x 1.40	7.0	258	0.63	1130	227
38	38.2	19 x 1.60	8.0	337	0.486	1436	267
48	48.3	19 x 1.80	9.0	426	0.384	1817	309
60	59.7	19 x 2.00	10.0	526	0.311	2244	353
75	74.9	19 x 2.24	11.2	660	0.248	2736	407
93	93.3	19 x 2.50	12.5	822	0.199	3408	468
100	100.88	19 x 2.60	13.0	-	-	-	-
116	116.2	37 x 2.00	14.0	1028	0.161	4274	536
146	145.8	37 x 2.24	15.7	1290	0.128	5212	619
182	181.6	37 x 2.50	17.5	1606	0.103	6493	710
200	199.5	37 x 2.62	18.3	1764	0.0935	6722	753
228	227.8	37 x 2.80	19.6	2015	0.0819	7677	820
262	261.5	37 x 3.00	21.0	2313	0.0713	8813	894
288	288.3	37 x 3.15	22.0	2550	0.0647	9452	950
240	240.4	61 x 2.24	20.2	2130	0.0779	8307	847
299	299.4	61 x 2.50	22.5	2653	0.0625	10347	973
376	375.6	61 x 2.80	25.2	3328	0.0498	12226	1122
522	521.7	61 x 3.30	29.7	4622	0.0359	16519	1380
631	631.3	61 x 3.63	32.7	5593	0.0297	19376	1556

* Calculation based on IEEE 738-2006 method according $W_s = 1\text{m/s}$, $R_s = 1000\text{ W/m}^2$, $T_a = 35^\circ\text{C}$, T_c = depending on the alloy according to UNE-EN 50119 (80°C for Cu).



Technical characteristics

Alloys

Rigid BzII cables in accordance with standard DIN 48201-2 (ADIF ET 03.364.159.8)

Denomination (mm ²)	Cross section (mm ²)	Composition (units x mm)	Nominal diameter (mm)	Nominal mass (kg/km)	Electrical resistance (Ω/km)	Breaking load (kN)	Permanent Current Capacity (A)*
10	10.02	7 x 1.35	4.1	90	2.803	5.88	115
16	15.89	7 x 1.70	5.1	143	1.768	9.33	153
25	24.25	7 x 2.10	6.3	218	1.158	14.24	200
35	34.36	7 x 2.50	7.5	310	0.817	20.17	249
50	49.48	7 x 3.00	9.0	446	0.568	28.58	314
50	48.35	19 x 1.80	9.0	437	0.584	28.39	309
70	65.81	19 x 2.10	10.5	596	0.429	38.64	376
95	93.27	19 x 2.50	12.5	845	0.303	54.76	469
120	116.99	19 x 2.80	14.0	1060	0.241	67.57	542
150	147.11	37 x 2.25	15.8	1337	0.192	86.37	628
185	181.62	37 x 2.50	17.5	1649	0.156	106.63	716
240	242.54	61 x 2.25	20.3	2209	0.117	142.40	861
300	299.43	61 x 2.50	22.5	2725	0.0947	175.80	985
400	400.14	61 x 2.89	26.0	3640	0.0755	231.12	1148
500	499.83	61 x 3.23	29.1	4545	0.0567	288.70	1367

* Calculation based on IEEE 738-2006 method according $W_s = 1\text{m/s}$, $R_s = 1000\text{ W/m}^2$, $T_a = 35^\circ\text{C}$, $T_c =$ depending on the alloy according to UNE-EN 50119 (100°C for BzII).

Rigid Bz cables in accordance with standard NF C34-110-2

Conductivity (%IACS)	Denomination (mm ²)	Cross section (mm ²)	Composition (units x mm)	Nominal diameter (mm)	Nominal mass (kg/km)	Electrical resistance (Ω/km)	Breaking load (kN)	Permanent Current Capacity (A)*
72	12 B	12.37	7 x 0.65	5	110	2.12	727	139
72	22	21.99	7 x 2.00	6.0	196	1.120	1301	201
72	34	33.58	19 x 1.50	7.5	303	0.744	14.24	261
72	48	48.35	19 x 1.80	9.0	434	0.518	2935	328
72	93	93.27	19 x 2.50	12.5	840	0.268	5358	499
72	116	116.24	37 x 2.00	14.0	1050	0.216	6850	573
72	148	148.07	19 x 3.15	15.8	1330	0.169	8028	669
72	182	181.61	37 x 2.50	17.5	1646	0.138	10400	761
60	22	21.99	7 x 2.00	6.0	196	1.350	1397	183
60	35	35.16	37 x 1.10	7.7	317	0.857	2385	245
60	48	48.35	37 x 2.50	9.0	434	0.620	3097	300
60	65	65.38	37 x 1.50	10.5	590	0.462	4323	362
60	93	94.15	37 x 1.80	12.6	850	0.320	6042	457
60	116	116.24	37 x 2.00	14.0	1050	0.26	7344	522
60	182	181.62	37 x 2.50	17.5	1646	0.167	10650	692
37	116	116.24	37 x 2.00	14.0	1050	0.451	8398	396

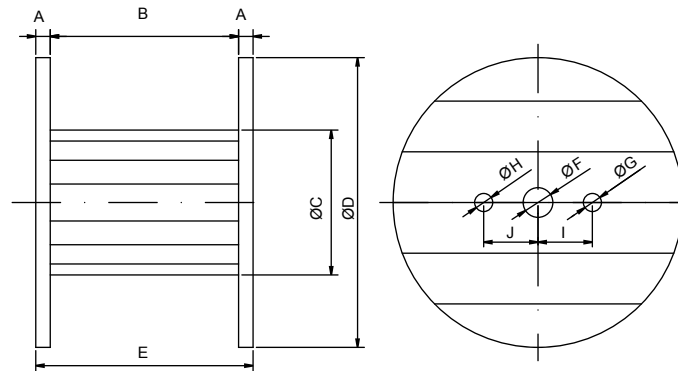
* Calculation based on IEEE 738-2006 method according $W_s = 1\text{m/s}$, $R_s = 1000\text{ W/m}^2$, $T_a = 35^\circ\text{C}$, $T_c =$ depending on the alloy according to UNE-EN 50119 (100°C for Bz).

Packaging

1250 mm wooden reel

DIMENSIONS (mm)										
	A	B	C	D	E	F	G	H	I	J
1250	67	620	630	1250	750	82	65	65	160	160

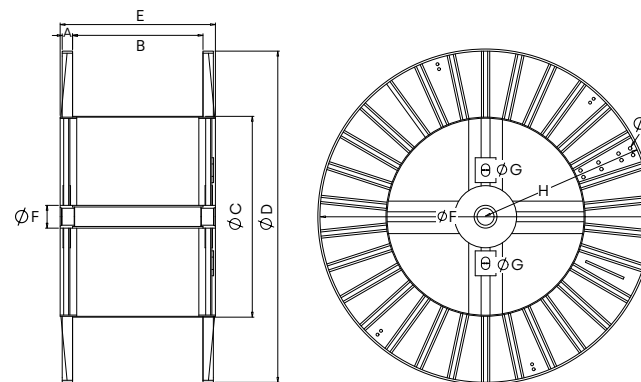
Maximum weight: 2000 kg/reel



1650 mm metal reel

DIMENSIONS (mm)									
	A	B	C	D	E	F	G	H	I
1650	50	630	970	1650	750	82	60	225	17

Maximum weight: 4000 kg/reel



Upon client request, reinforced reels can be offered to increase reel capacity. Consequently, La Farga can also design and produce wooden or metallic drums in different dimensions.

The wooden reels are phytosanitary compliant and come with staves and banding.





Conductors for railway electrification / Solutions / **Flexible cables**

FLEXIBLE CABLES

Range of solutions available for brands:



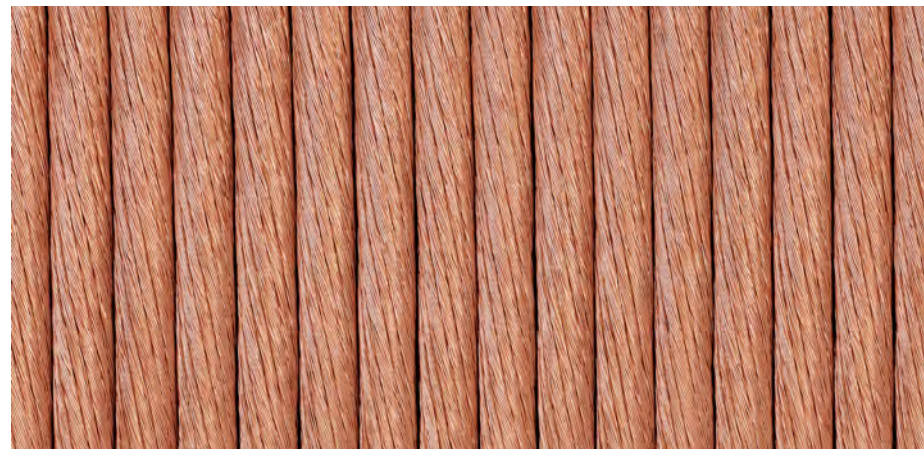
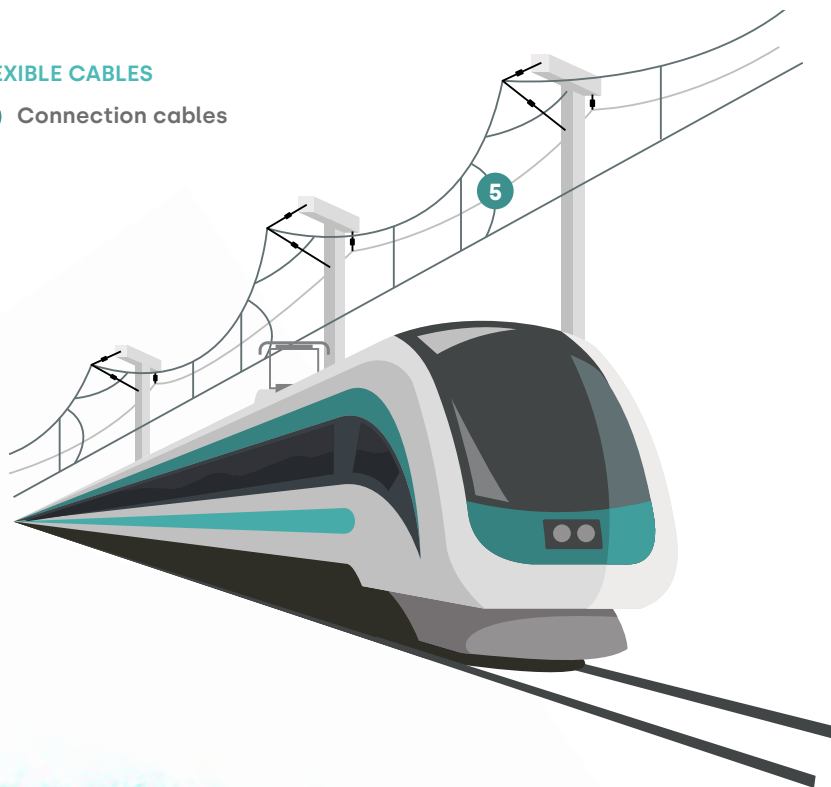


FLEXIBLE CABLES

Flexible copper cables and their Class 5 and Class 6 alloys are used as connection cables.

FLEXIBLE CABLES

5 Connection cables



Technical specifications

Standard:

DIN 43138 | NF F 55-681 | ADIF ET 03.364.158.0 and according to customer specifications.

Range:

- Cu-ETP (CW004A)
- CuMg 0.2 / 0.5 (CW127C) / (CW128C)

Cross-sections:

- Connection cables: cross-sections of 50, 95, 125, 150, 240 & 500 mm²



Technical characteristics

Flexible Cu cables in accordance with standard DIN 43138

Denomination (mm ²)	Cross section (mm ²)	Composition (units x mm)	Nominal diameter (mm)	Nominal mass (kg/km)	Electrical resistance (Ω /km)	Permanent Current Capacity (A)*
16	16.3	49 x 0.65	5.9	152	1.1654	159
25	26.1	133 x 0.50	7.5	246	0.7472	212
35	37.6	133 x 0.60	9.0	353	0.5080	269
50	51.2	133 x 0.70	10.5	482	0.3677	329
70	72.7	189 x 0.70	13.0	685	0.2587	414
95	99.7	259 x 0.70	14.7	935	0.1888	501
120	118.5	336 x 0.67	16.4	1120	0.1595	561
150	150.9	392 x 0.70	18.3	1420	0.1247	652
185	185.1	525 x 0.67	20.4	1745	0.0857	809
210	209.8	595 x 0.67	21.5	1980	0.0901	800
240	245.2	637 x 0.70	23.1	2320	0.0768	883
300	296.6	637 x 0.77	25.4	2800	0.0629	1000

* Calculation based on IEEE 738-2006 method according $W_s = 1\text{m/s}$, $R_s = 1000\text{ W/m}^2$,
 $T_a = 35^\circ\text{C}$, T_c = depending on the alloy according to UNE-EN 50119 (80°C for Cu).



Flexible Cu cables in accordance with standard NF F55-681

Denomina- tion (mm ²)	Cross section (mm ²)	Composition (units x units x mm)	Nominal diameter (mm)	Nominal mass (kg/km)	Electrical resistance (Ω/km)	Permanent Current Capacity (A)*
26	26	19 x 7 x 0.50	7.50	237	0.735	213
50	50	37 x 7 x 0.50	10.50	452	0.378	324
75	75	37 x 7 x 0.61	12.70	665	0.263	409
95	95	37 x 7 x 0.68	14.30	870	0.204	478
104.5	104.5	19 x 7 x 1.00	15.00	970	0.184	510
147	147	37 x 7 x 0.85	17.90	1323	0.131	633
164	164	37 x 7 x 0.90	18.35	1537	0.122	660

* Calculation based on IEEE 738-2006 method according $W_s = 1\text{m/s}$, $R_s = 1000\text{ W/m}^2$,
 $T_a = 35^\circ\text{C}$, $T_c =$ depending on the alloy according to UNE-EN 50119 (80°C for Cu).

Flexible Cu cables in accordance with ADIF ET 03.364.158.0

Denomina- tion (mm ²)	Cross section (mm ²)	Composition (units x units x mm)	Nominal diameter (mm)	Nominal mass (kg/km)	Electrical resistance (Ω/km)	Permanent Current Capacity (A)*
95	89.54	19 x 24 x 0.50	13.10	816	0.210	461
120	111.92	37 x 30 x 0.50	14.80	1020	0.165	537
150	141.76	37 x 38 x 0.50	16.40	1292	0.134	612
240	232.47	37 x 32 x 0.50	20.50	2125	0.084	819

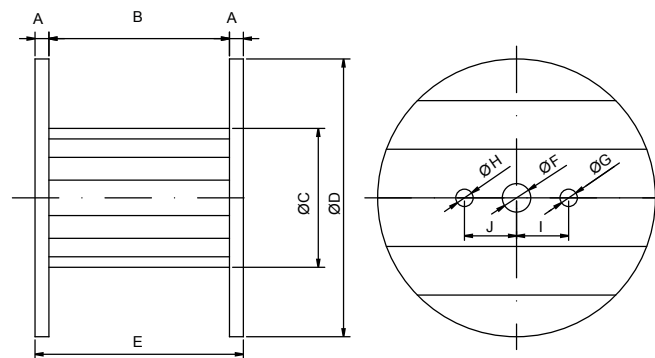
* Calculation based on IEEE 738-2006 method according $W_s = 1\text{m/s}$, $R_s = 1000\text{ W/m}^2$,
 $T_a = 35^\circ\text{C}$, $T_c =$ depending on the alloy according to UNE-EN 50119 (80°C for Cu).

Packaging

1250 mm wooden reel

DIMENSIONS (mm)										
	A	B	C	D	E	F	G	H	I	J
1250	67	620	630	1250	750	82	65	65	160	160

Maximum weight: 2000 kg/reel



Upon client request, reinforced reels can be offered to increase reel capacity. Consequently, La Farga can also design and produce wooden or metallic drums in different dimensions.

The wooden reels are phytosanitary compliant and come with staves and banding.



DROPPERS

Range of solutions available for brands:



DROPPERS

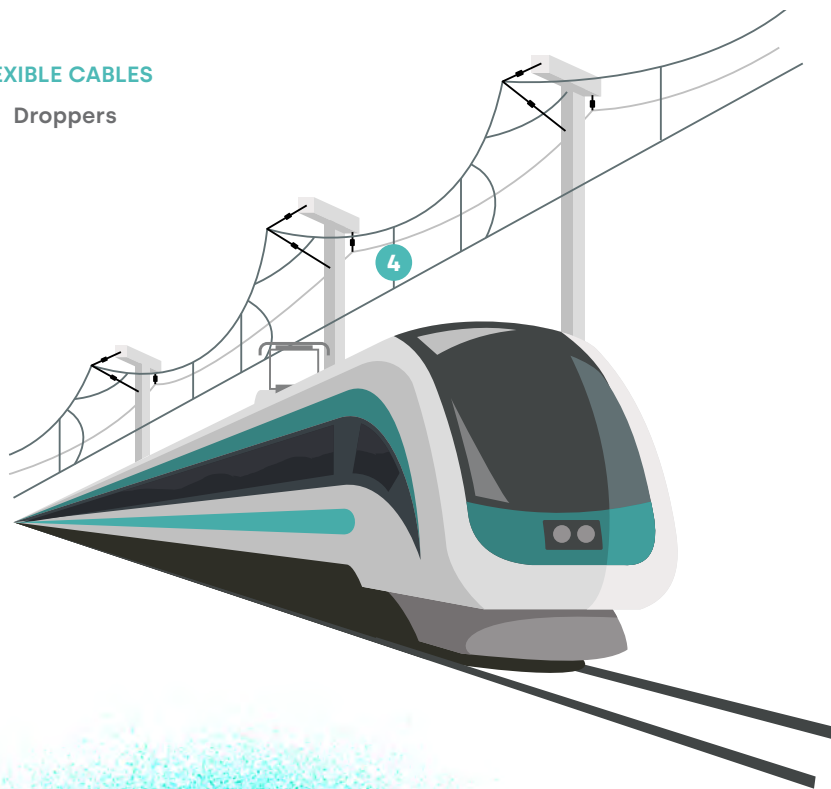
The droppers support the contact wire and ensure the correct distance between the contact wire and the locomotive's horizontal plane.

La Farga manufactures two types of droppers:

- Equipotential droppers
- Droppers rod

FLEXIBLE CABLES

4 Droppers



Technical specifications

Standard:

DIN 48138 | NF C34-110-2 | ADIF ET 03.364.158.0 and according to customer specifications.

Range:

- Cu-ETP (CW004A)
- CuSn 0.2 (CW129C)
- CuMg 0.2 / 0.5 (CW127C) / (CW128C)

Cross-sections:

Suspension wire from 3 mm Ø to 6 mm Ø

- Cu-ETP: cross-sections of 25 mm²
- CuSn: cross-sections of 12 mm²
- CuMg: cross-sections of 10, 16, 25 & 35 mm²

Technical characteristics

Bzll Droppers in accordance with standard DIN 43138

Conductivity (% IACS)	Denomina- tion (mm ²)	Cross section (mm ²)	Composi- tion (units x mm)	Nominal diameter (mm)	Nominal mass (kg/km)	Breaking load (N)
62	10	9.6	49 x 0.50	4.5	89	116
62	16	16.3	49 x 0.65	5.9	152	195
62	16	16.3	84 x 0.50	6.2	152	116
62	25	26.1	133 x 0.50	7.5	346	116
62	35	37.6	133 x 0.60	9.0	353	167

* Calculation based on IEEE 738-2006 method according $W_s = 1\text{m/s}$, $R_s = 1000\text{ W/m}^2$,
 $T_a = 35^\circ\text{C}$, T_c = depending on the alloy according to UNE-EN 50119 (100°C for Bzll).

Bz Droppers in accordance with standard NF C34-110-2

Conductivity (% IACS)	Denomina- tion (mm ²)	Cross section (mm ²)	Composition (units x mm)	Nominal diameter (mm)	Nominal mass (kg/km)	Electrical resistance (Ω/km)	Breaking load (N)
80	12 B	11.94	7 x 0.65 + 42 x 0.54	5.0	110	2.05	728
72	12 B	11.94	7 x 0.65 + 42 x 0.54	5.0	110	2.12	727

* Calculation based on IEEE 738-2006 method according $W_s = 1\text{m/s}$, $R_s = 1000\text{ W/m}^2$,
 $T_a = 35^\circ\text{C}$, T_c = depending on the alloy according to UNE-EN 50119 (100°C for Bz).

Cu Droppers in accordance with ADIF ET 03.364.158.0

Denomina- tion (mm ²)	Cross section (mm ²)	Composi- tion (units x mm)	Nominal diameter (mm)	Nominal mass (kg/km)	Electrical resistance (Ω/km)	Breaking load (kg)
25	25	8 x 64 x 0.25	7.7	234	0.738	500

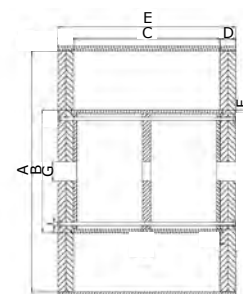
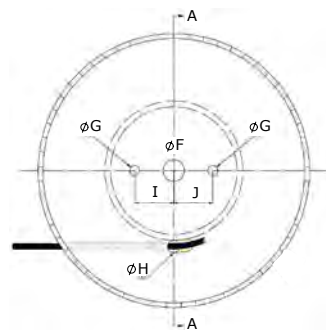
* Calculation based on IEEE 738-2006 method according $W_s = 1\text{m/s}$, $R_s = 1000\text{ W/m}^2$,
 $T_a = 35^\circ\text{C}$, T_c = depending on the alloy according to UNE-EN 50119 (80°C for Cu).

Packaging

800 mm wooden reel

DIMENSIONS (mm)										
	A	B	C	D	E	F	G	H	I	J
800	66	400	400	800	532	82	40	40	100	150

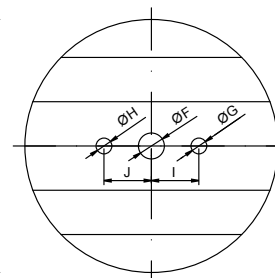
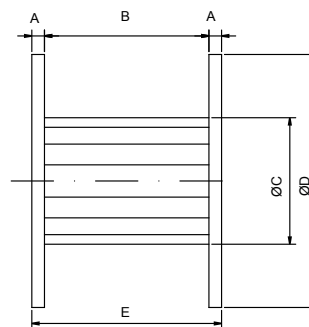
Maximum weight: 500 kg/reel



1250 mm wooden reel

DIMENSIONS (mm)										
	A	B	C	D	E	F	G	H	I	J
1250	67	620	630	1250	750	82	65	65	160	160

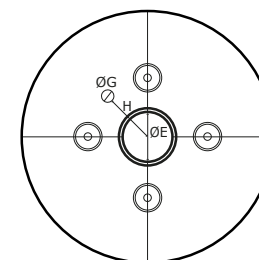
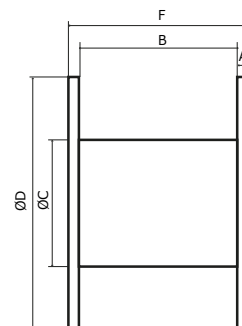
Maximum weight: 2000 kg/reel



620 mm plywood reel

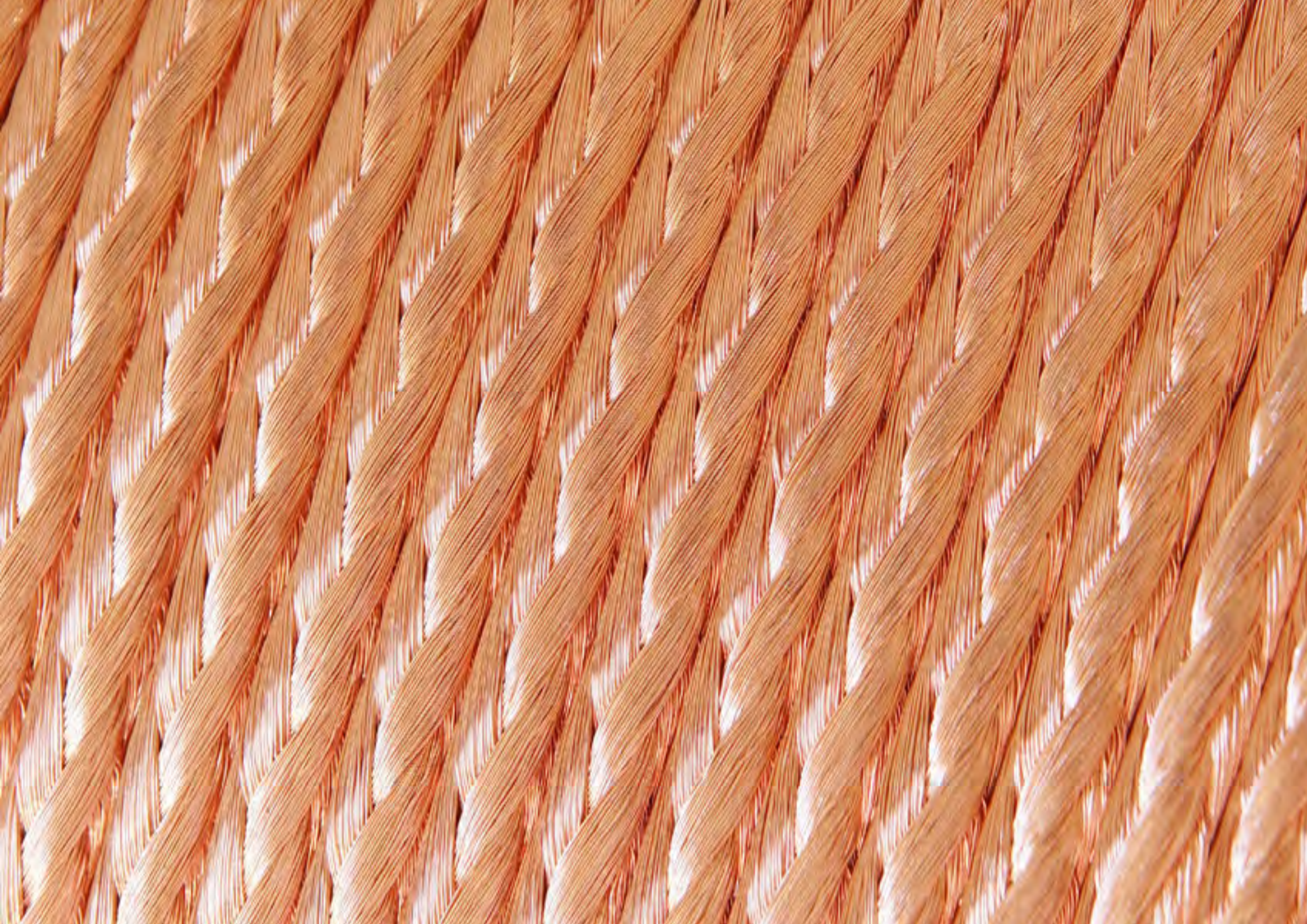
DIMENSIONS (mm)								
	A	B	C	D	E	F	G	H
620	15	385	315	620	127	415	28	140

For equipotential droppers
Maximum weight: 90 kg/reel



Upon client request, reinforced reels can be offered to increase reel capacity. Consequently, La Farga can also design and produce wooden or metallic drums in different dimensions.

The wooden reels are phytosanitary compliant and come with staves and banding.













LA FARGA yourcoppersolutions, S.A.

Colònia Lacambra, s/n

08508, Les Masies de Voltregà, Barcelona, Spain

+34 938 504 100 | lafarga@lafarga.es | www.lafarga.es |  Follow Us