



Oxygen Free Copper Wire Rod

Tamra Oxygen Free Wire Rod is directly cast oxygen-free copper wire rod, which can also be low alloyed depending on the customer's requirement. The total content of alloying elements can amount up to 5%.

Tamra Oxygen Free Wire Rod is produced in any diameters between 8 mm to 20 mm and has less than 5 ppm of oxygen content.



Typical copper alloy qualities

- » Cu-OFE
- » CuMg
- » CuAg
- » CuMgP
- » CuSn
- » CuTeP
- » CuFeP
- » CuP

We are pleased to develop Tamra Oxygen Free Wire Rod in other copper alloys in collaboration with our customers.

The advantages of Tamra Oxygen Free Wire Rod at a glance

- » Produced with high-quality LME Grade A Copper Cathode
- » Clean metallic surface
- » Excellent and homogenous product quality
- » Narrow tolerances for rod diameter
- » Resistant to hydrogen embrittlement



Packing

Pallet	Internal Diameter	Outer Diameter	Coil Weight
Wooden	800 +/- 100 mm	1200 +/- 100 mm	1 MT, 2 MT, 3 MT or Customer's requirement



The production process

- » State-of-the-art melting and casting furnaces (induction and resistance heated, depending on specific demands on product quality)
- » Continuous vertical upward casting of oxygen-free and low alloyed copper wire rod
- » Direct casting to the required final diameter
- » No rolling process
- » Flexible, cost-efficient and environmentally friendly production process
- » No additional surface treatment with pickling and conservation agents or lubricants
- » Consistent use of state-of-the-art technology ensures constantly high product quality

Tamra oxygen free copper of the highest quality is mainly used in electron technology, vacuum apparatus, cryogenics, super-conduction, cable technology (connecting elements, microwires, enamelled conductors, transmission conductors, conductors for applications in information technology, audio-video conductors).

Typical Analysis of Tamra (OFE)

Element	Cu	Ag	As	Bi	Fe	Ni	O ₂	Pb	S	Sb	Se	Sn	Te	Cd	P	Zn	Mn
C10100																	
ASTM B-49	99.99 %	25	5	1	10	10	5	5	15	4	2	2	2	1	3	1	0.5
Tamra OFE	>99.99%	<10	<1	<0.5	<2	<1	<3	<1	<5	<1	<0.5	<1	<0.5	<0.1	<1	<1	<1

Properties of Copper and Copper Alloys

CDA Alloy No.	Alloy Name	Chemical Composition (%)		Density (LB/UC IN)	Electrical Conductivity (% IACS@680F)	Resistivity (Ohms-Circ. Mil/ft)	Approximate Melting Point (OF)	Mechanical Properties					
								Tensile Strength (KPSI)		Yield Strength (KPSI)		Elongation (%)	
		Cu	Other					Hard	Soft	Hard	Soft	Hard	Soft
C10100	OFE Copper	99.99 Min.	-	.323	101	10.3	1981	55	34	50	11	6	36
C10200	OFHC Copper	99.95 Min.	-	.323	100	10.3	1981	55	34	50	11	6	36
C11000	ETP Copper	99.90 Min.	0.04	.323	100	10.3	1949	55	34	50	12	5	36

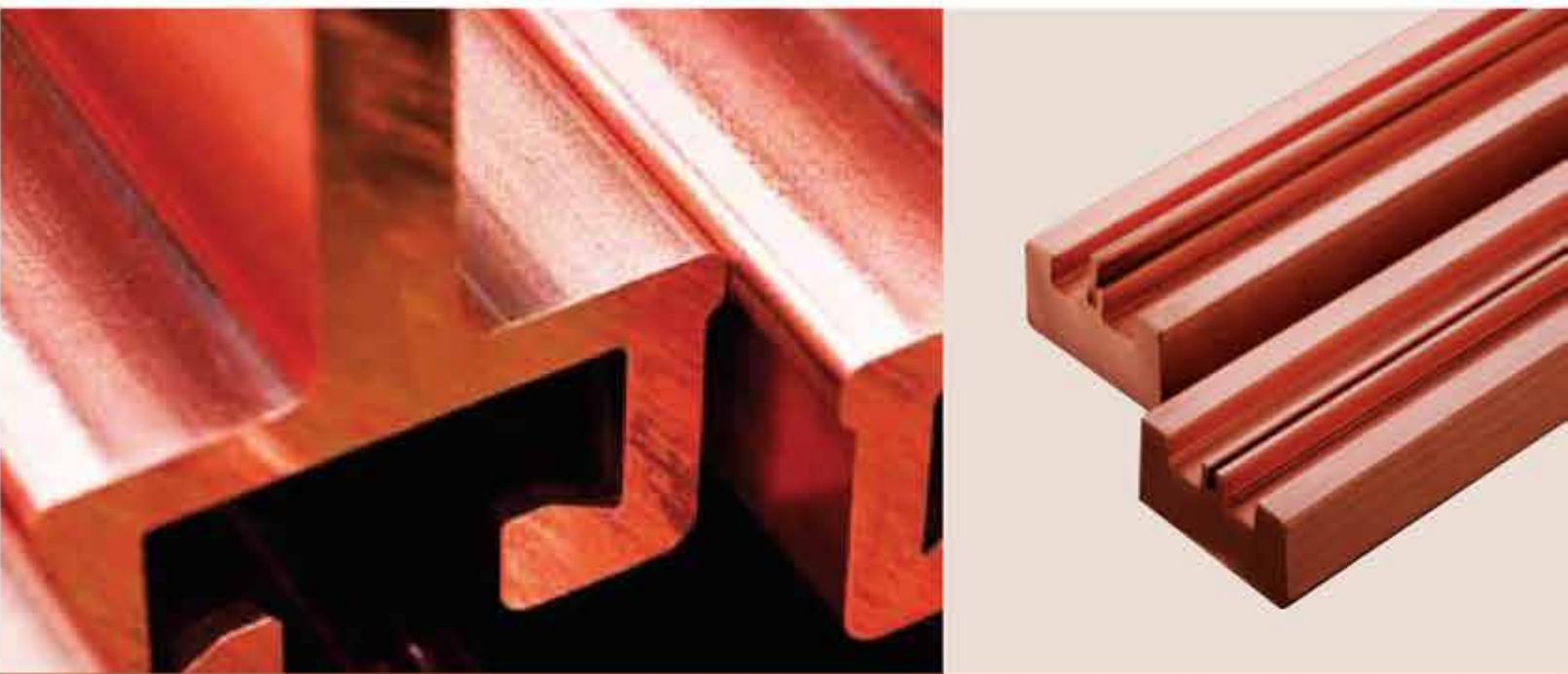
Bars & Profiles

Copper product of highest purity

Tamra Bars & Profiles production facility is located in India. Manufactured from outstandingly pure Oxygen-Free Copper Wire Rod produced on site, Tamra is equipped with most advanced equipment in India, enabling us to deliver top quality product to the customers around the globe.

We take care of developing close partnerships to fully meet our customers requirements. The constant quality of our products, the respect of our lead times and the expertise of our team shows our willingness to develop sustainable partnerships on a daily basis.

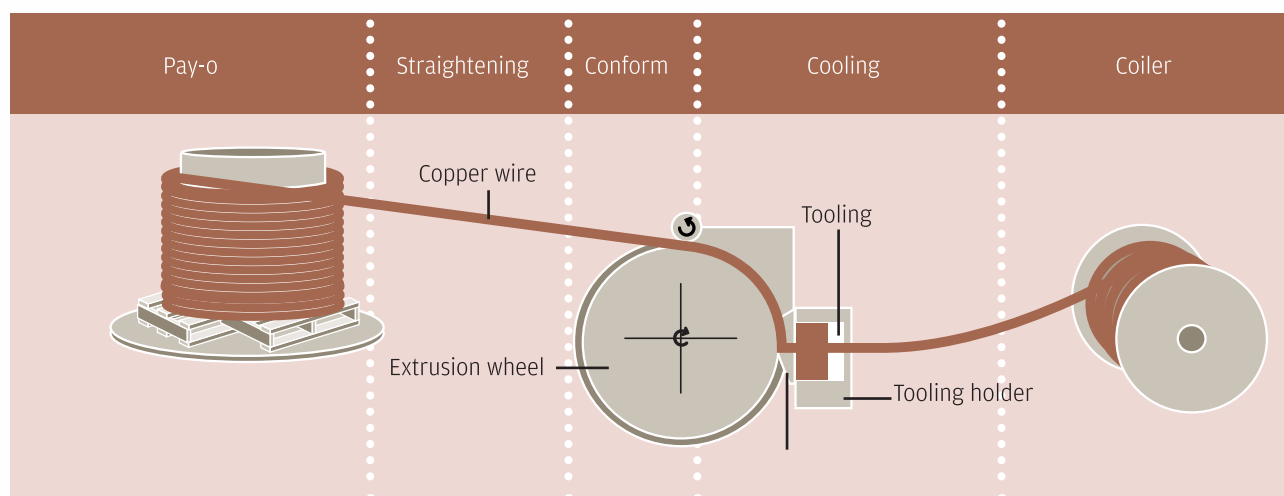




Process technology

5000 Tonnes of Tamra Bars & Profiles capacity are installed in India. Tamra started producing bars and profiles using one of the most advanced technologies - the continuous extrusion process. Three state-of-the-art production lines produce excellent and high-quality profiles, strategically placed in Bhiwadi. The production lines have been developed and modified to improve efficiency.

Tamra is continually developing the process to push the boundaries and improve product quality. Regardless of their complexity or size, all profiles undergo a thorough risk analysis to ensure that our customers' expectations are entirely satisfied. We undertake joint development projects for the electrical engineering industry, ensuring that our customers stay one-step ahead of their competitors.





Product Range

Profiles

Tamra has designed and manufactured number of profiles for renowned switchgears OEMs. Tamra provide profiles from simple to more complex forms according to customer specifications.

Cross-sections:

from 10 mm² to 3,000 mm²
(90 g/m to 27 kg/m)

Conditioning:

Our profiles can be delivered in various finished conditions.

- » Straight lengths up to 6 m
- » Coiled on drums up to 2,000 kg
- » Loose coils up to 200 kg

Alloys:

Cu-ETP, Cu-OFE, CuAg

Flat Bars

Tamra provide a wide range of flat copper bars for many applications in the electrical engineering industry.

Conditioning:

Our flat bars up to 6 m can be delivered in various finished conditions according to our customers requirement.

Alloys:

Tamra produces wide range of Flat Bars as below

	Max	Min
Width	170 MM	12 MM
Thickness	1 MM	25 MM
W/T Ratio	8:1	1.4:1

Tamra manufactures alloys like Cu-ETP, Cu-OFE, CuAg, CuAg0.1 OF

Round & Square Bars

Tamra provide a wide range of Round & Square Bars to the OEMs in India and Overseas.

Dimension range:

4 mm to 70 mm in diameter,
lengths up to 6 m

Conditioning:

We offer several packaging solutions for round & square bars in order to fulfill all of our customers requirement precisely.

Alloys:

Cu-ETP, Cu-OFE, CuAg

Tamra Bars & Profile Application :

Tamra Bars and Profiles made of vairous alloys of copper are also used for trunking systems. The combination of high conductivity and durability make Tamra Copper the preferred choice where there are size restrictions and high current demands.

Added benefits due to the superior conductivity and reduced energy losses, which lead to a reduced lifecycle cost of the installation.



Switchgear

Tamra Bars and Profiles are used in low, medium and high voltage applications globally.

A Switchgear enclosures becomes more complicated by using profiles, the electrical properties changes, resistance increases and energy losses increase. Due to the high conductivity of Tamra copper, the losses are partially compensated.

Circuit Breakers

Profiles from Tamra copper are used in many different types of circuit breakers. There is little or no standardization, generally a short lifetime and high demands for compactness of the unit results in a dynamic market.

Rotating Machines

Tamra copper profile are used in AC and DC motors. Various applications includes automobiles, railways, industrial motors and white goods.

Due to the high running demands at elevated temperatures, our range of copper silver alloys is perfectly suited to these applications. The components used demand very tight and repeatable dimensional tolerances. This is only made possible with our superior-knowledge of the tooling and manufacturing process.

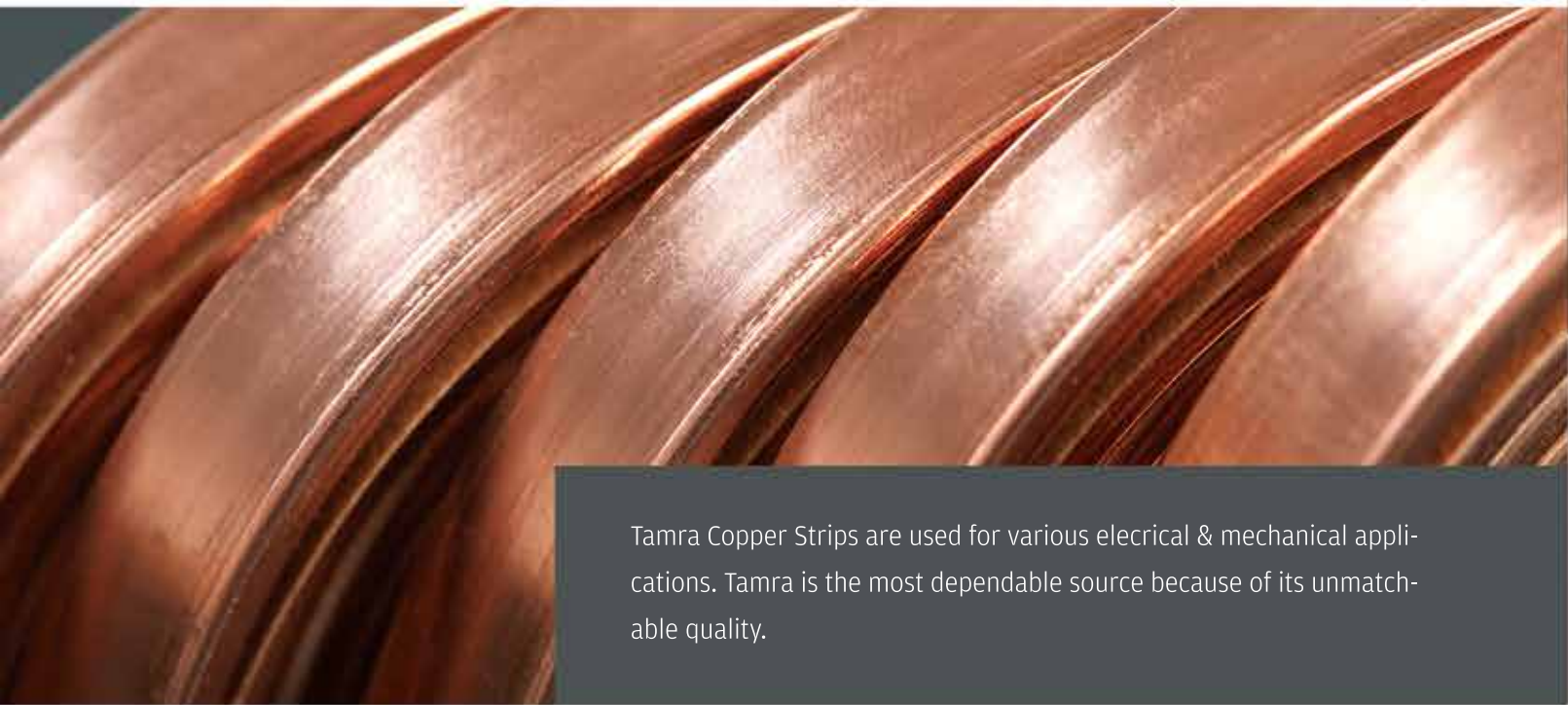
Highlights

- Tamra Copper
- » High conductivity
- » Copper content >99.99 %
- » Flat, smooth surfaces, superior conductivity
- » Improved thermal distribution
- » Easy to bend and coat

Packing

Pallet / Drum	Length	Coil
Wooden / Steel	Max 6 Mtr/ Customized	Max 2 MT in drum/ customized

Copper Strips



Tamra Copper Strips are used for various electrical & mechanical applications. Tamra is the most dependable source because of its unmatched quality.

Tamra Transformer Conductor

Tamra Transformer Conductor are soft annealed copper strips with clean, smooth surfaces and round edges for transformer windings. Its most important feature is the carefully deburred edges and high conductivity, making it the best choice for transformer windings with any cross-sectional area. Tamra well understands the complex nature of transformer where current loss is inversely proportional to the conductivity of Copper. Tamra Transformer Conductor increases the life cycle of the transformer and is one of the preferred choice for most of the transformer manufacturer in India and Overseas.

Tamra Transformer strip are made in following Copper grade

- » C10100 (OFE grade)
- » C11000 (ETP grade)

Manufacturing Range

Tamra Transformer Conductor covers most of the range used in Transformer industries. Produced by the state-of-the-art machine, Tamra Transformer Conductor are available in range from 5 sq. mm to 100 sq. mm.

Tamra Transformer Conductor come with following insulation

- » Paper Insulated Copper Conductor
- » Nomex Insulated Copper Conductor
- » Mica Insulated Copper Conductor



SI No.	Spool Code	Flange Dia d1	Barrel Dia. d2	Bore Dia. d3	Traverse Length L2	Overall Length L1	Possible Material
1	310 mm	310	200	36	160	200	ABS/PP/Wooden Drum
2	355 mm	355	224	36	160	200	ABS/PP/Wooden Drum
3	400 mm	400	250/300	40/56/127	230	280	ABS/PP/Wooden Drum

Commutators

Commutators are electrical components for which the advantages of Tamra-oxygen-free copper can be fully exploited.

Tamra-Oxygen-free copper is the purest form of the metal and offers unparalleled thermal and electrical conductivity as well as superior weldability. As a conductor, it generates much less internal heat than other copper grades and it suffers a much lower decrease in conductivity at high temperatures. A small amount of silver alloyed in copper increases the softening temperature of pure copper without any major sacrifice in electrical conductivity.

Our commutator strips, profiles and wires are also manufactured in the full range of oxygen-free silver bearing copper grades.

Earthing

From Transformer to Towers from IT-Building to Engineering Colleges, from Hotel to Hospitals, earthing is very important for safety of human life, equipment and functioning of an electrical system.

Tamra offers strip in OFC grade and DHP grade suitable for various earthing applications.



Motor Winding

Tamra Copper Strips is a trusted name amongst various pumps and motors manufacturing companies. Tamra Oxygen-free Copper Strips is best choice for edge winding. Tamra is a reliable name among various traction motor winding companies.



Copper Solid Wire

Drawn Round Tamra Copper Wire - For Redraw and Electrical Application

Tamra Copper Solid wire is manufactured from Tandem Rod Break Down Machine with in-line Annealer and is a preferred choice because of its smooth finishing, superior mechanical and electrical properties with various packing options.



Applications of Tamra Copper Wire

Redrawing

Tamra Copper Wire is used for redrawing purposes. Manufactured from ETP/OFE grade Copper, Tamra wire is suitable for super fine drawing used in electronics / winding wire / wire and cable industries.

Soudronic Wire

Tarma Copper wire with wide range of packing and high mechanical properties is a preferred choice among manufacturers of Tin Cans. In a short time Tamra wire is well used by Indian and Overseas Tin Can manufacturer.

Power Cable

With ability to manufacture wire from 4.0 mm to 1.2 mm and with the state-of-the-art manufacturing facilities Tamra copper wire is used by most of the power cable manufacturers in India and abroad.



Production Process

Tamra Copper Wire is made from continuous cast copper wire rod of ETP or OFE Grade. Tamra machines has been tailor-made by Neihoff - world leading brand for wire drawing machines. We offer various packing options to cater the needs of our customer in Domestic and International market.

Product Range and Packing

Size	Temper	Packing
4.0 mm - 1.20 mm	Hard / Annealed	630 DIN MS / Spoolless / Steel Basket / Card Board Basket

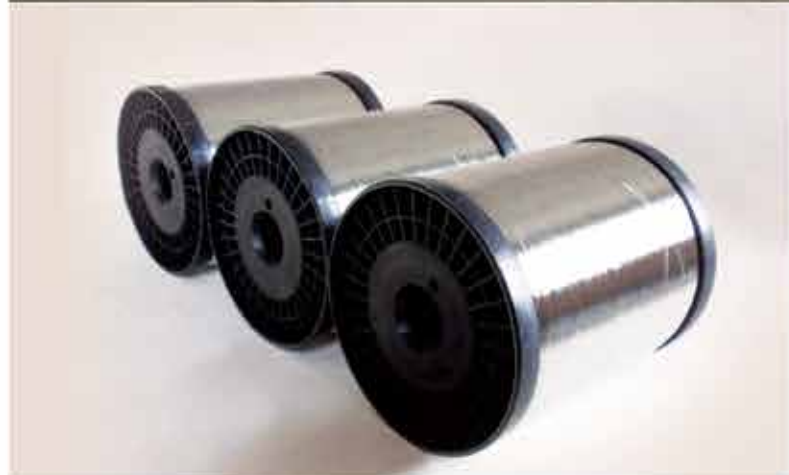


Tinned Coated Copper Wire

Tamra Tinned Coated Copper Wire is made from latest electrolysis plating technology using ETP/OFE Copper Wire as input.

Tamra Tinned Coated Copper Wire made from proven process and technology, produces wire that consistently exceeds all standards for conductivity, tin concentricity and surface quality to ensure consistent drawing capability, corrosion resistance and ease of soldering based on our customer applications.

Tamra Tinned Coated Copper Wire is recommended for Cable manufacturers requiring higher corrosion protection, mining cable, marine & offshore cable application, instrument cable, specialized bare conductors, electrical cable for soldering application, fuse wire and many others.





Manufacturing process

Tamra Tinned Coated Copper Wire is produced from electrolysis process where copper wire acts like cathode and 99.95% Tin Ingot is used as anode. Plating thickness with close tolerance is delivered through PLC control operation system which adjust the parameter like ampere and speed, as per programme designed specifically for Tamra. With state-of-the-art production line sourced from renowned manufacturer from Europe. Our efficiency allows us to produce concentric and homogeneous coating.



Product Range and Packing

Size	Temper	Packing
4.0 mm - 1.2 mm	Annealed / Hard	Coil Basket / spoolless pack
1.6 mm - 0.16 mm	Annealed	630 DIN / 400 DIN / 250 DIN MS / ABS

High Conductivity Annealed Copper Conductor

Bunched/Stranded Bare/Tinned

Tamra High Conductivity Annealed Copper Conductor are available in various shapes and sizes both in bare and tinned form. Tamra can design almost all kind of Conductor Bunched / Stranded upto 400 Sq.mm. Tamra conductors are available both in ETP and OFE grade.

Tamra High Conductivity Annealed Copper Conductor which is being produced from 101% Conductivity Wire rod available in Rigid /Flexible Bare/ Tinned and is used in various types of Cables / Overhead Distribution / Ground applications.



Applications of Tamra Copper Conductor

Cables

Several cable manufacturers in India and Overseas are using Tamra Conductor for various critical applications. Power Cable, Control Cable, Instrumentation Cable, Rubber Cable, Building Wire, Panel Wire manufacturers rely on Tamra Conductor.

Good electrical, smooth surface, better flexibility, longer run with no joints make Tamra Conductor unmatched and a dependable source for any critical cable design.

Overhead Distribution

Tamra High Conductivity Annealed Copper Conductor is best suited for application of overhead distribution. Available in size up to 400 sq.mm. Tamra covers almost all the range required for distribution of electricity. Available in various packing sizes and facility to give longer runs provides the customer to design network with lesser joints.

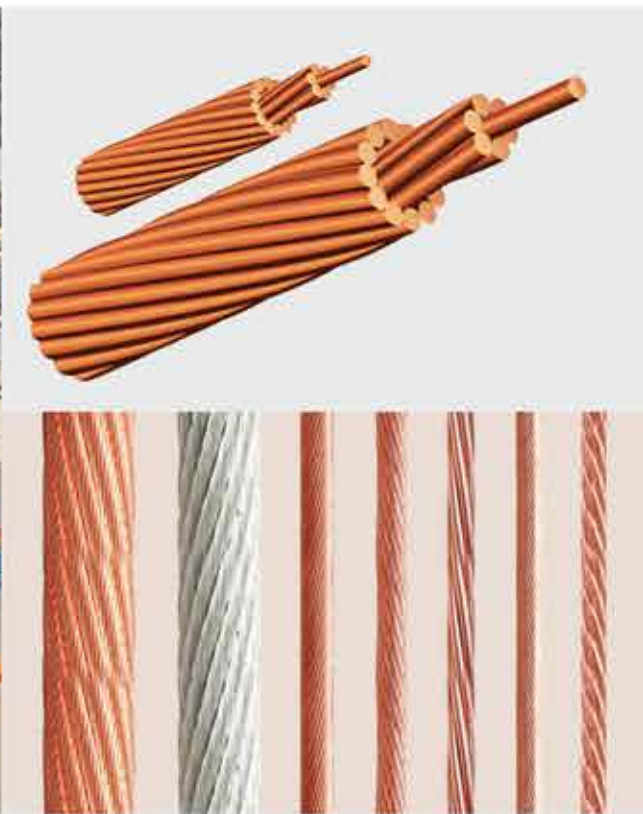
Automotive

Tamra High Conductivity Annealed Copper Conductor is extensively used in Battery cable, Auto cable design as per DIN / JASO / ISO / ISI.

With our ability to provide flexible conductors from its state-of-the-art manufacturing facility, Auto industry has acknowledged our quality and just in time deliveries.

State-of-the-art-production

We have an installed capacity of 10000 MT to produce copper conductors in India. Tamra Conductors are manufactured from the most advance technology like Multi Wire, High Speed Bunchers, Planetary type stranding machines tailor made to the requirement of Tamra from world leading machine manufacturer M/s Neihoff from Germany. A thorough risk analysis is conducted on all our products irrespective of complexity in shapes and sizes at our planning stage.



Product Range and Packing

Size	Flexible	Stranded
0.35 sq.mm - 6 Sq.mm	S / Z Type Bunched / Unilay Conductors are available in 630 DIN Steel / ABS	
6 Sq.mm - 16 Sq. mm	S / Z Type Bunched / Unilay Conductors are available in 800 / 630 DIN Steel / ABS	
10 Sq.mm - 400 Sq. mm	Concentric / Unilay available in packing of 630 / 800 / 1000 /1200 / 1600 MM Steel / Wooden	Concentric / Shape Conductor / Unilay available in packing of 630 / 800 / 1000 /1200 / 1600 MM Steel / Wooden



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