

TREFINASA

innovation & experience



TREFINASA
TREFILADOS DE NAVARRA, S.A.

ALUMINIUM CLAD STEEL WIRE/STRAND
& ALUMINIUM TUBE FOR OPGW

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COMPANY

TREFINASA is a Spanish company established in 1998. The company's main objective has always been the manufacturing of Aluminium Clad Steel wires mainly dedicated to the energy industry, either for overhead conductors or OPGW conductors on distribution and transmission lines.

Based on the solid experience and service provided within last +20 years, TREFINASA has become the preferred supplier for the most important European OPGW and overhead conductor Manufacturers, and Transmission and Distribution Network Operators.

During these years a larger range of aluminium extrusion products has been added to the portfolio.

In the recent years TREFINASA started to produce conductor as well as fittings and accessories for overhead distribution and transmission lines.

The quality system implemented at TREFINASA is certified by ISO 9001 and IATF 16949. Products for overhead lines are accredited by AENOR certificates for domestic market.

Main factory and Head Quarters; UHAR-TE-ARAKIL (Spain) near to Pamplona. Subsidiary: Trefinasa de México SA de CV in QUERÉTARO (México).



DEFINITION

The clad aluminium steel wire, internationally known as **Aluminium Clad Steel (ACS)**, is a high resistance wire produced by extrusion process.

ACS wire presents **EXCELLENT** properties against **CORROSION** if compared to standard galvanized steel wire.

Additionally, if combined with aluminium wires in ACSR conductors or OPGW, ACS wire prevents from galvanic corrosion. ACS wire offers material compatibility (Al-Al) when in contact with aluminium wires avoiding galvanic corrosion.

Thanks to the aluminium cladding ACS wire provides much **HIGHER CONDUCTIVITY**, compared to galvanized steel, which is multiplied by three (x3).

HIGH RATIO RESISTANCE WEIGHT: compared to galvanized steel wire, ACS is lighter (15% less) maintaining the same mechanical properties.

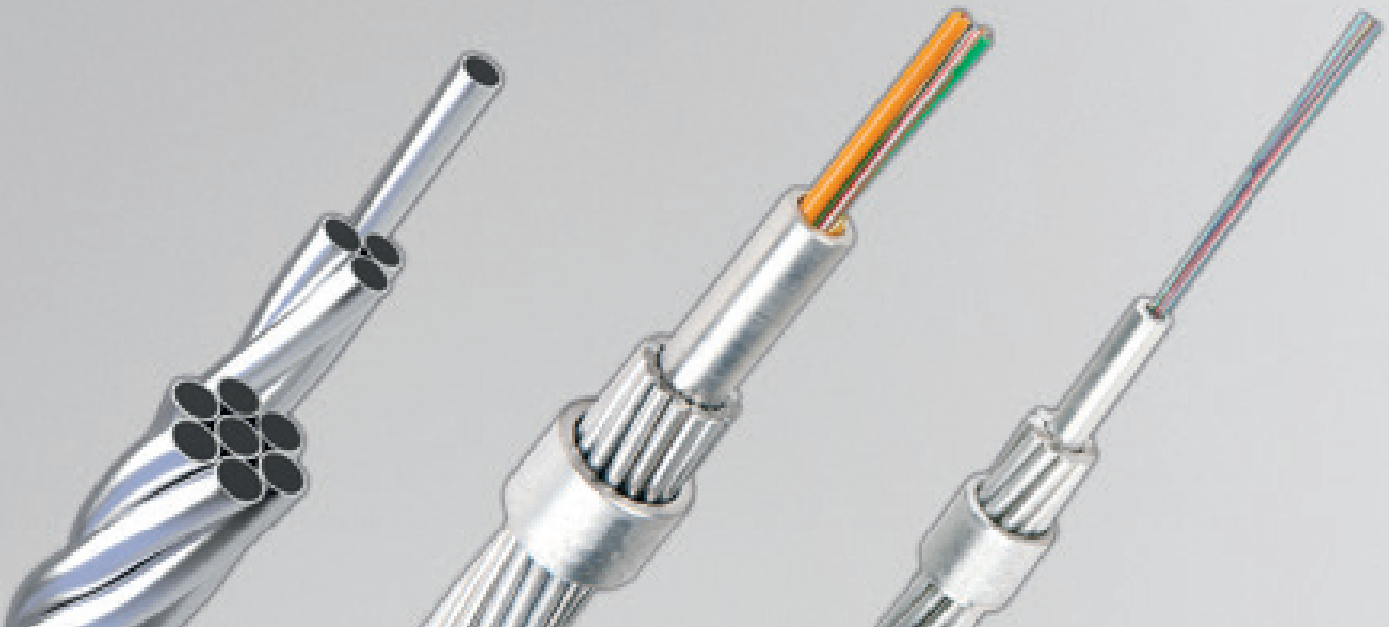


CLASS

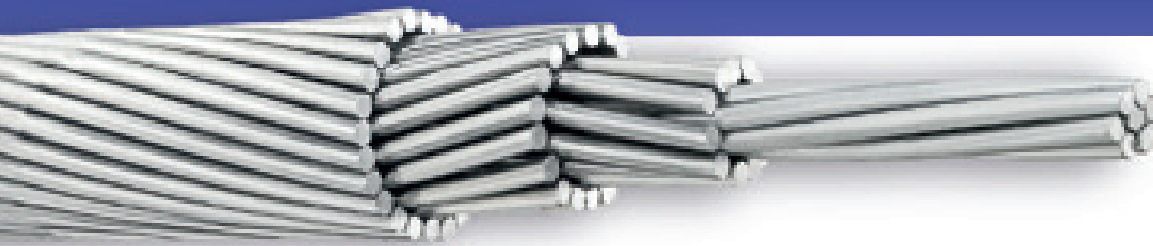
| | | | | | |
|--|----------|--------------|---------|---------|---------|
| IACS Conductivity % | 14 | 20.3 | 27 | 30 | 40 |
| Min. Thickness of aluminium (% of wire radius) | 4.6 | 10 | 14 | 15 | 25 |
| Density | 7.29 | 6.59 | 5.91 | 5.61 | 4.64 |
| Coefficient of linear expansion | 11.9 | 13 | 13.4 | 13.8 | 15.5 |
| Modulus of elasticity | 174 | 162 | 140 | 132 | 109 |
| Tensile strength grade | UHS, EHS | EHS, REGULAR | REGULAR | REGULAR | REGULAR |

UHS.- Ultra High Strength EHS.- Extra High Strength

Continuous quality controls are performed all along the manufacturing process to achieve the highest quality standards. TREFINASA manufactures aluminium tube for OPGW conductors applying the same quality standards as for ACS wire.

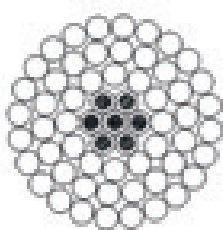


2 OVERHEAD CONDUCTORS

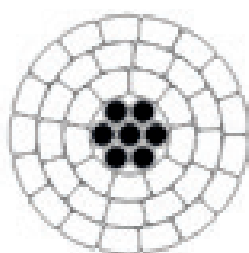


TREFINASA produces all the range of aluminium overhead conductors according to international standards or under customer specification.

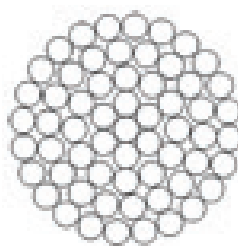
Standard conductors



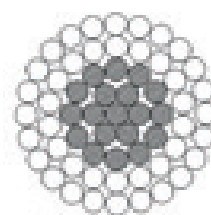
ACSR
ACSR/AW



ACSR/TW
ACSR/AW/TW



AAC
AAAC



ACAR

These products are certified by AENOR.

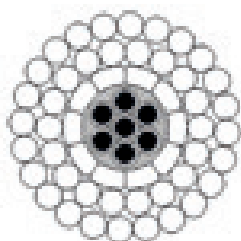


HTLS

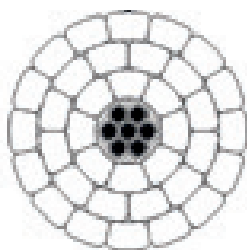
TREFINASA produces High Temperature Low Sag conductors under customer's demand (tailor made proposal).

We can adapt conductor size to the parameters of the line to be uprated. Our team of experts will analyse the limitations and requirements of the overhead line and will provide the most convenient solution for each individual case.

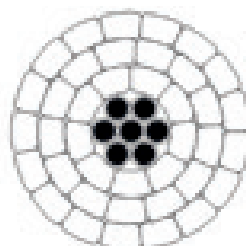
Please contact us for an individual study & quote.



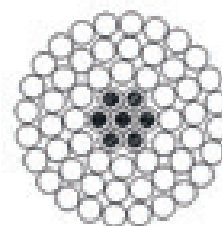
Gap G(Z)TACSR



Gap
G(Z)TACSR/TW



ACSS/TW



Invar (ZTACIR)
ACSS

OVERHEAD LINE FITTINGS AND ACCESSORIES

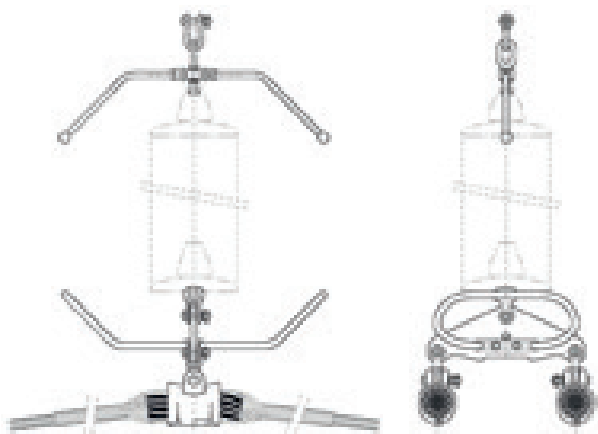
In 2018 TREFINASA acquires the rights of MADE HERRAJES brand along with the technical designs and product engineering.

The new brand TREFINASA-MADE continues the same product line that MADE developed during more than 50 years with remarkable success and quality.

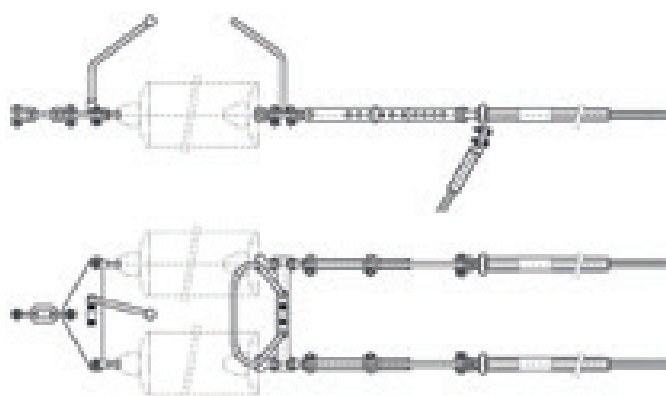
The offered products are designed for overhead lines up to 500 kV.

Production range includes fittings for insulator string, bolted and compression clamps and accessories.

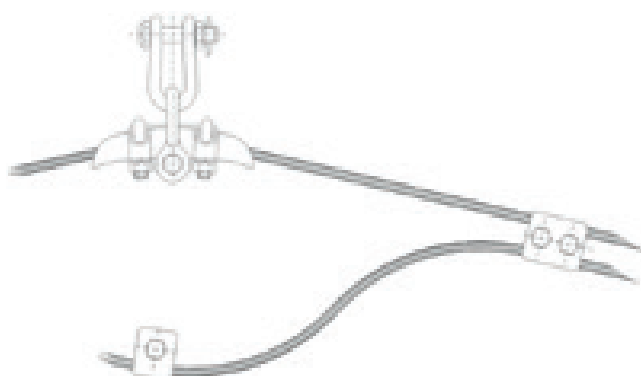
SINGLE SUSPENSION STRING FOR TWIN BUNDLE



DOUBLE TENSION STRING FOR TWIN BUNDLE



EARTHWIRE SUSPENSION STRING



EARTHWIRE TENSION STRING



Extruded aluminium products are manufactured by continuous extrusion of different aluminium alloys.

| ALLOYS | 1050 / 1070 / 1370 3003 / 3103 6101 / 6060/ 6063 |
|--------|--|
|--------|--|

| PRODUCT | DIMENSION | | TEMPER |
|---------------------------------|---------------------------------------|------------------------|--------|
| TUBE | Wall Thickness ≥ 0.40 mm | Ø Outer 2 <-> 30 mm | O,H,T |
| FLAT WIRE | Thickness ≥ 1 mm | Width < 70 mm | O |
| SOLID ROUND PROFILE AND WIRE | Ø 2.5 <-> 40 mm | | O |
| OTHER SHAPE | Cross Section > 10 mm ² | | O |

O.- Annealed

H.- Strain Hardened

T.- Thermally Treated

*Table with general values. Possibility to analyze other inquiries.

Continuous quality controls are performed all along the manufacturing process to achieve the highest quality standards. Additionally, for the aluminium tubes the pressure tightness is guaranteed by nitrogen pressurization.

This process is certified by IATF 16949.





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