ECOfibra

PRODUCT CATALOG

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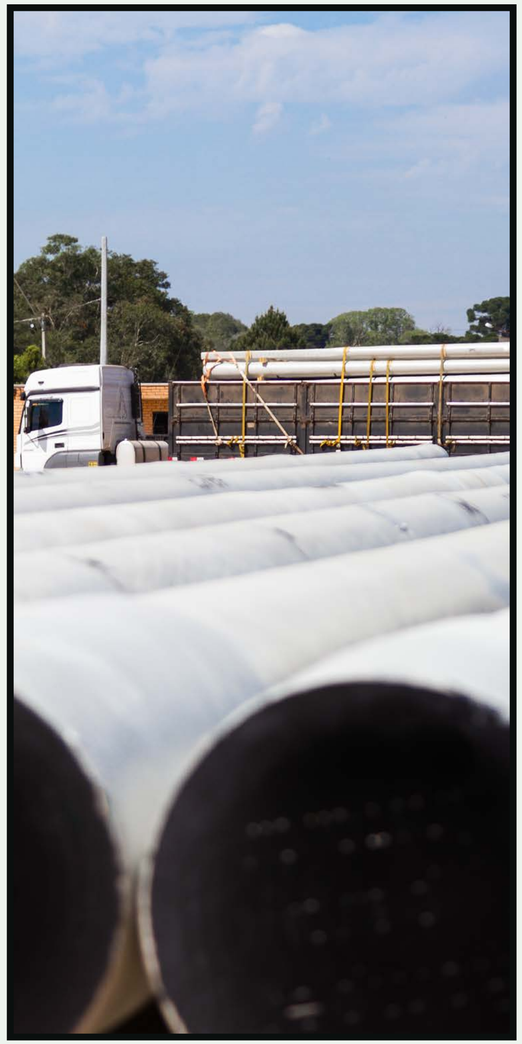
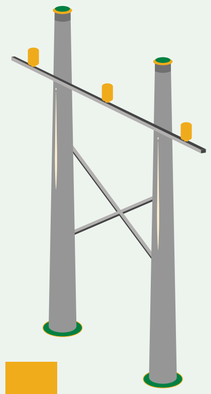




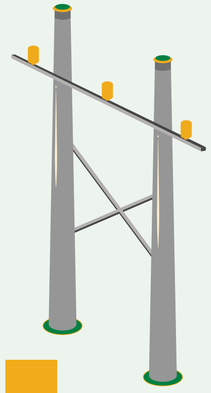
ECOFIBRA: Shaping the future with composite materials since 2009.

Founded in 2009, Ecofibra emerged to meet the demand for FRP (Fiberglass Reinforced Polyester) poles for the electrical and telecommunications sectors. We quickly gained leadership in the market, a position that we have strengthened year after year. We pride ourselves on producing environmentally friendly products with low atmospheric CO_2 emissions. Our solutions have been crucial in energy distribution and transmission works throughout Brazil, driven by our innovative technology in composites.

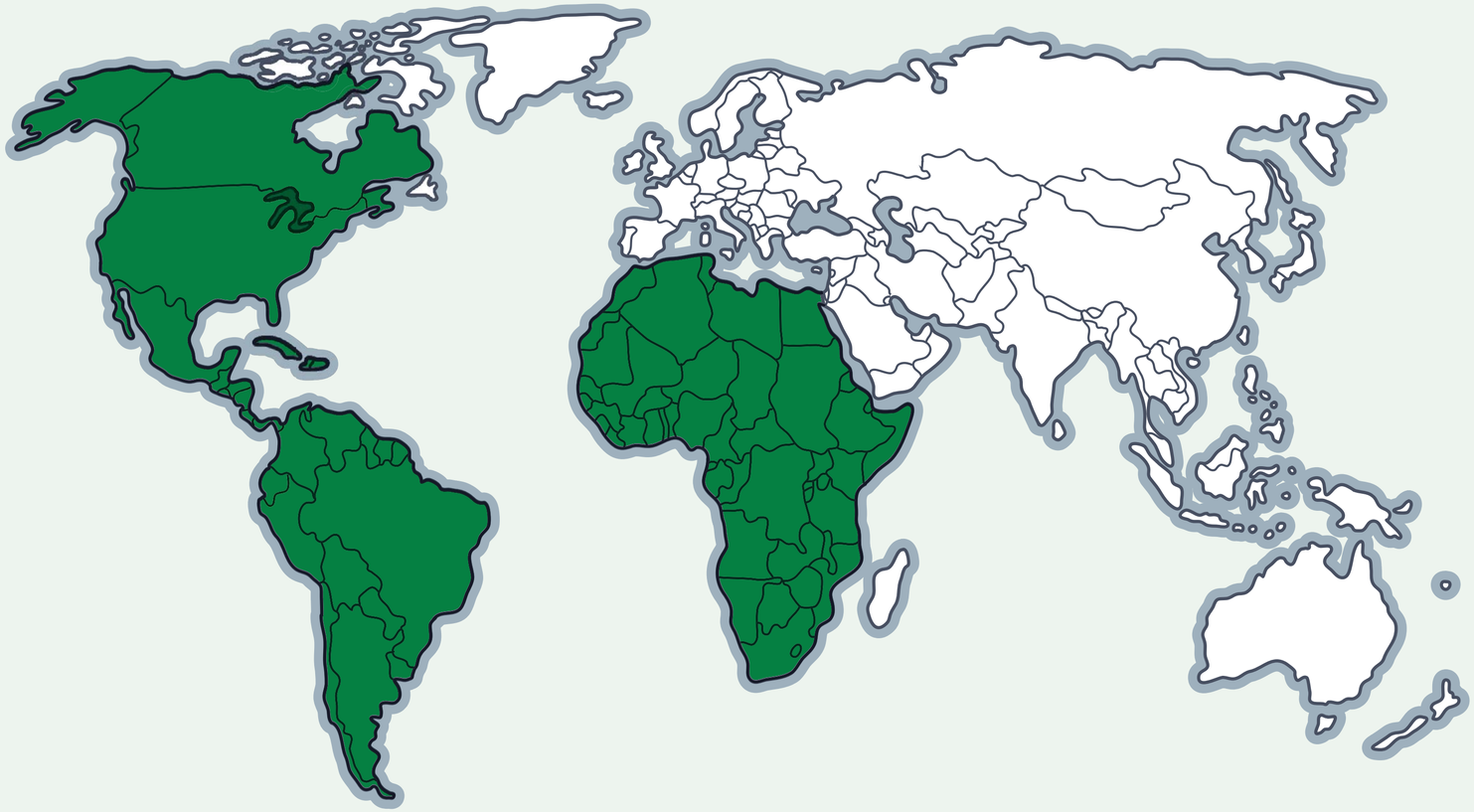
We are approved by all the power utility companies in Brazil and are present in most of Latin America, Africa and the USA. Whether for power distribution and transmission, telecommunications or special projects, Ecofibra offers high quality and value added products. Our goal is to reduce our customers' design costs, optimize installation and maintenance, and minimize accident risks.

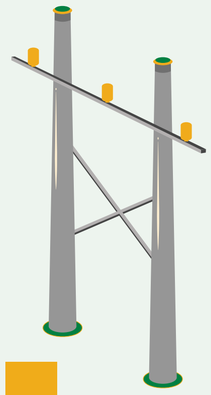
Our specialized team is always on hand to ensure safe and efficient installations. In our factory, located in the metropolitan region of Curitiba, we use state-of-the-art technology and automated processes to ensure consistent quality. Our commitment to sustainability is reflected in the prioritization of environmentally friendly materials and processes.

At Ecofibra, innovation and excellence guide our work on a daily basis. Our team is passionate about what they do and is always looking for new applications for FRP products. We invite you to join us and explore the advanced solutions we offer. Experience Ecofibra's vision, boldness and entrepreneurial spirit and discover the impact we can have on your business.



GEOGRAPHICAL SCOPE





CHARACTERISTICS OF FRP

FRP (Fiberglass Reinforced Polyester) products manufactured by Ecofibra are lightweight solutions with high mechanical properties, perfect for applications that require swiftness and little maintenance.

LIGHTWEIGHT

EASY TO TRANSPORT

EASY TO INSTALL

IMMUNE TO CORROSION

LOW ELECTRICAL CONDUCTIVITY

EXTENDED SERVICE LIFE

EASY TO MAINTAIN

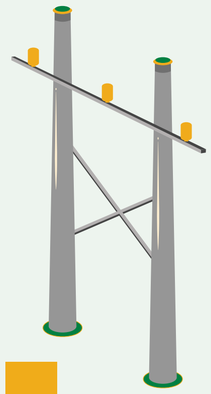
SELF-EXTINGUISHING

ECO-FRIENDLY PRODUCT*

UNIQUE SURFACE FINISH

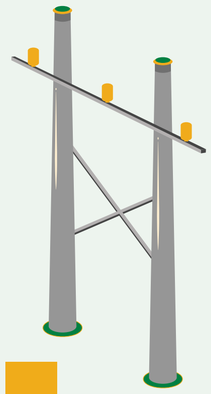
LOW OVERALL COSTS

* (CONTAINS RECYCLED PET IN ITS COMPOSITION - LOW CO_2 ATMOSPHERIC EMISSIONS)



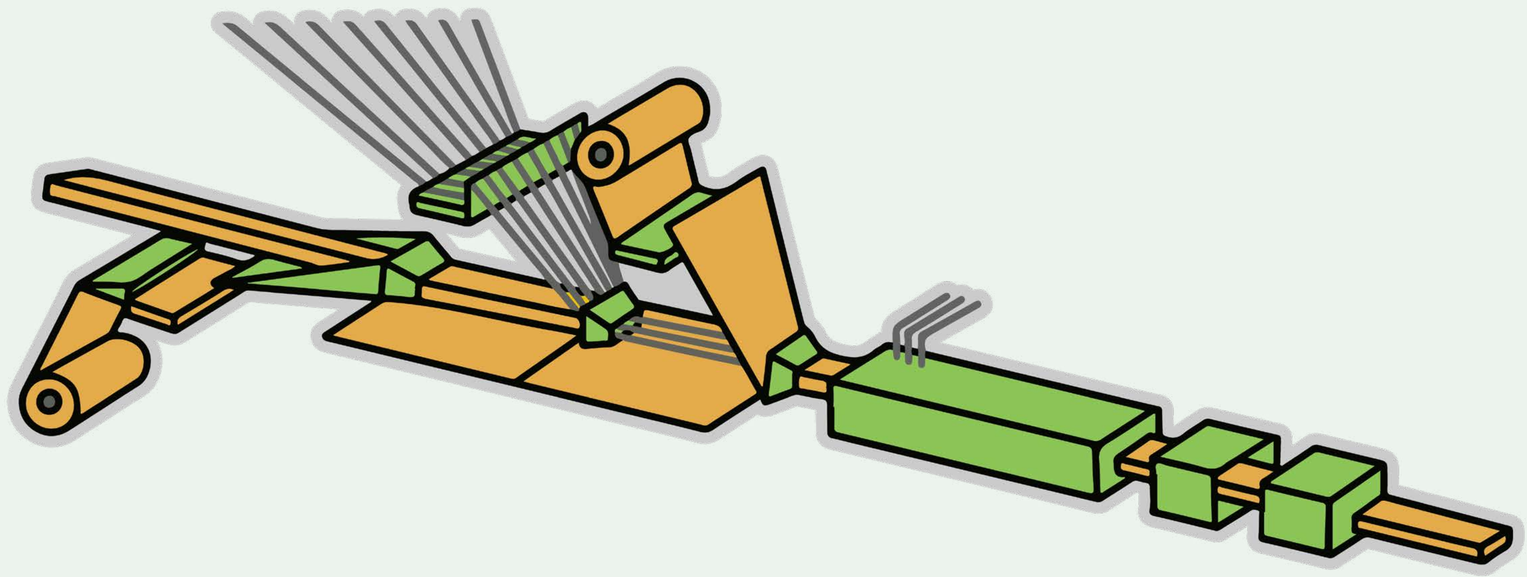
ADVANTAGES OF FRP

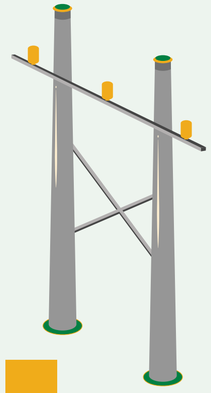
	WEIGHT	TRANSPORTATION	UNLOADING	INSTALLATION	CORROSION	ELECTRIC SHOCK HAZARD	SERVICE LIFE	MAINTENANCE
FRP								
STEEL								
CONCRETE								



PULTRUSION PROCESS

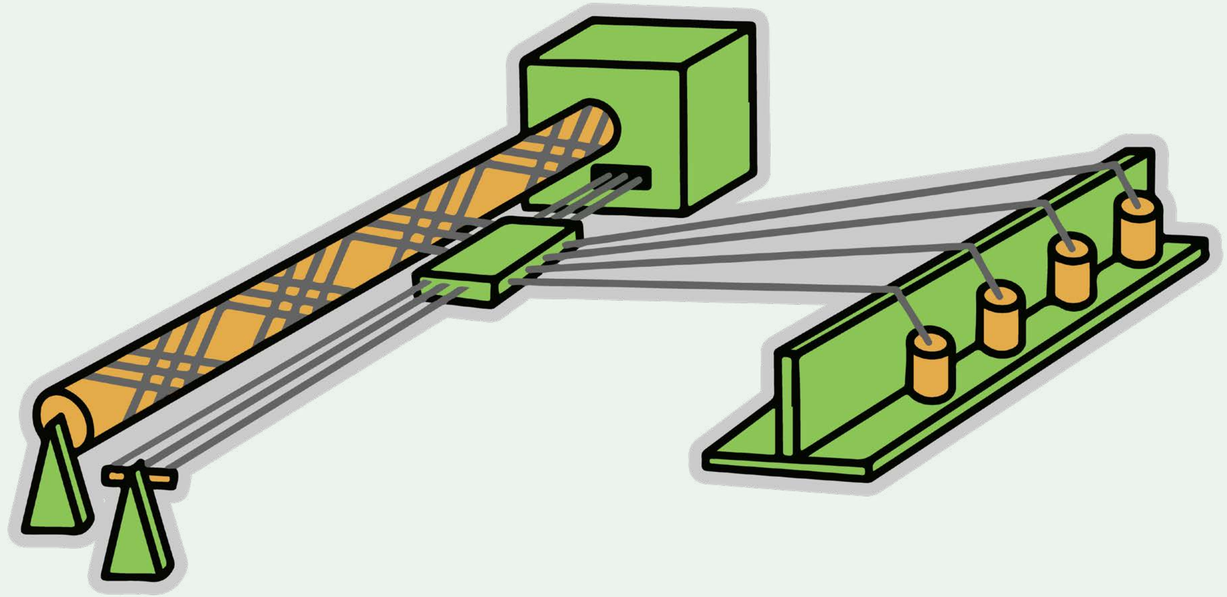
The pultrusion process is a highly effective manufacturing technique consisting of impregnating fiberglass with resin. Subsequently, this combination is pulled through a heated mold, resulting in a robust, long-lasting and lightweight profile. This composite material has high strength and durability when compared to conventional materials such as steel and concrete, but with a remarkable advantage in terms of lightness. We offer profiles that can be adapted in various shapes, dimensions and colors, making them perfect for a wide range of applications in various industries.

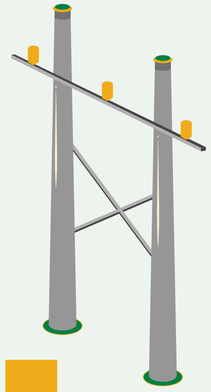




FILAMENT WINDING PROCESS

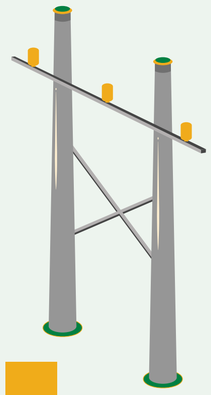
Filament winding is a highly effective technique used to produce FRP (Fiberglass Reinforced Polyester) items. This method consists of winding glass fibers, previously impregnated with polyester resin, on a rotating mandrel. It is especially efficient for creating hollow parts such as pipes or poles. The resulting products have an excellent strength to weight ratio, providing notable advantages with regard to transportation, assembly, and installation.





CERTIFIED TESTS

APPLICATION	TEST	REGULATORY STANDARD	REFERENCE RESULT
POLES AND CROSSARMS	ELASTICITY AND RUPTURE	ABNT NBR 16989 ABNT NBR 16946	ACCORDING TO THE DESIGN
POLES AND CROSSARMS	TORSIONAL RESISTANCE	ABNT NBR 16989 ABNT NBR 16946	NO RUPTURE AFTER APPLICATION OF 1.4 X RATED LOAD
POLES	BENDING MOMENT	ABNT NBR 16989	ACCORDING TO THE DESIGN
POLES	BENDING FATIGUE	ASTMD 4923	NO LOSS OF MECHANICAL PROPERTIES AFTER 1,000,000 CYCLES
CROSSARMS	LATERAL TENSILE STRENGTH	ABNT NBR 16946	≥ 160 DAN
CROSSARMS	LONG-TERM MECHANICAL TEST	ABNT NBR 16946	ACCORDING TO DESIGN AFTER 216 HRS
POLES AND CROSSARMS	TORQUE RESISTANCE	ABNT NBR 16989	≥ 8 DAN.M
POLES AND CROSSARMS	BARCOL HARDNESS	ASTM D 2583	≥ 30 BARCOL
POLES AND CROSSARMS	WATER ABSORPTION	ABNT NBR 5310 ASTM D 570	≤ 3%
POLES AND CROSSARMS	ELECTRICAL TRACKING RESISTANCE	ABNT NBR 10296	2A 1,75 KV
POLES AND CROSSARMS	DIELECTRIC STRENGTH	ASTM D 149	≥ 10 KV/MM
POLES AND CROSSARMS	FLAMMABILITY	UL 94	CATEGORY V-0
POLES AND CROSSARMS	FLAME PROPAGATION	ABNT NBR 16989 ABNT NBR 16946	FLAME EXTINCTION WITHIN 30 SECONDS
POLES AND CROSSARMS	ACCELERATED AGING	ASTM G 154	VARIATION OF MECHANICAL PROPERTIES < 25% AFTER 5,000 HRS OF AGING
CROSSARMS	INDUSTRIAL FREQUENCY TO WITHSTAND VOLTAGE IN THE RAIN	ABNT NBR 16946	NO DISRUPTIVE DISCHARGES



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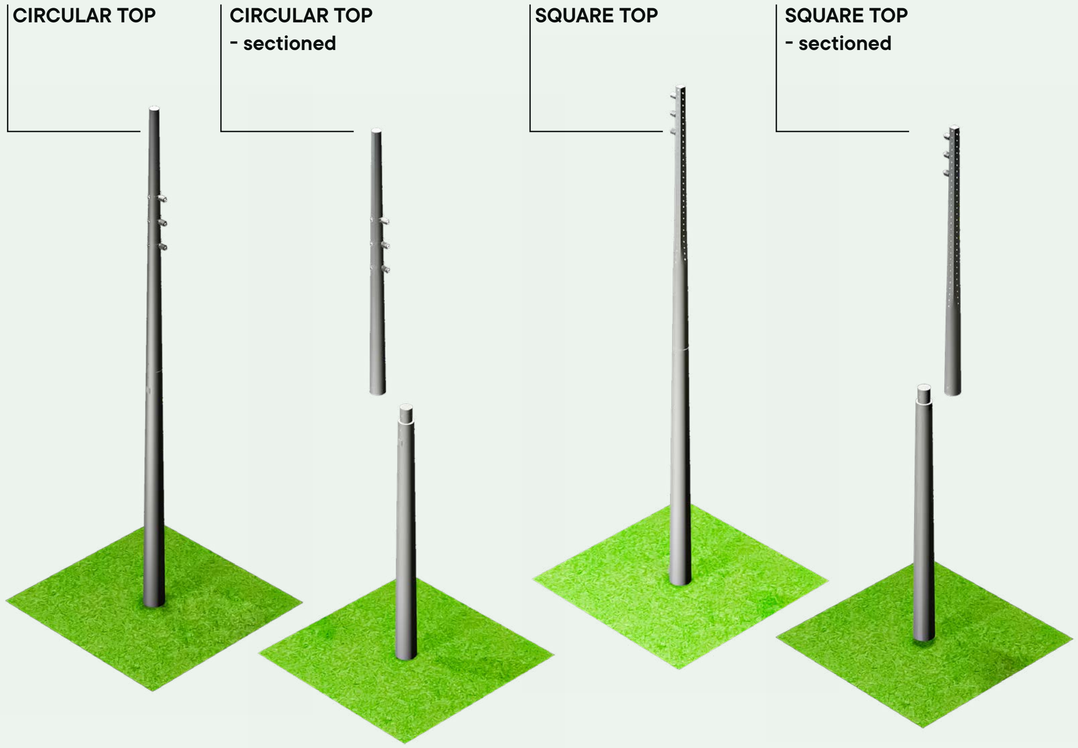
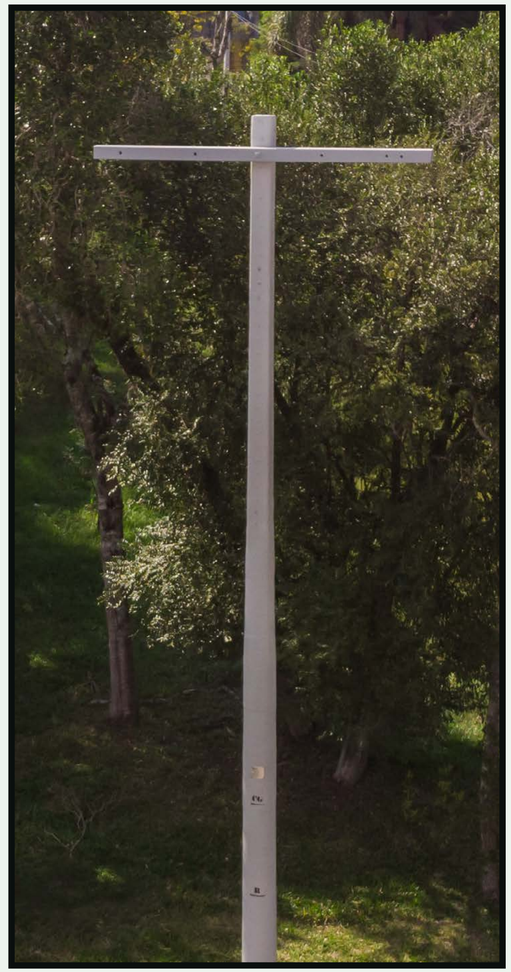
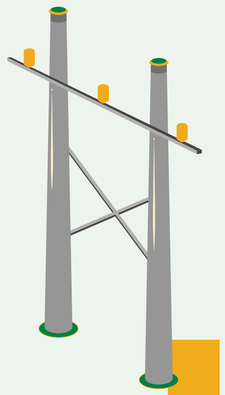
PRODUCTS

ENERGY DISTRIBUTION POLES

• UP TO 55 FT (16.0 M) HIGH • UP TO 6,750 LBF (3,000 DAN) RATED LOAD
• CIRCULAR OR SQUARE TOP • 1, 2 OR 3 SECTIONS







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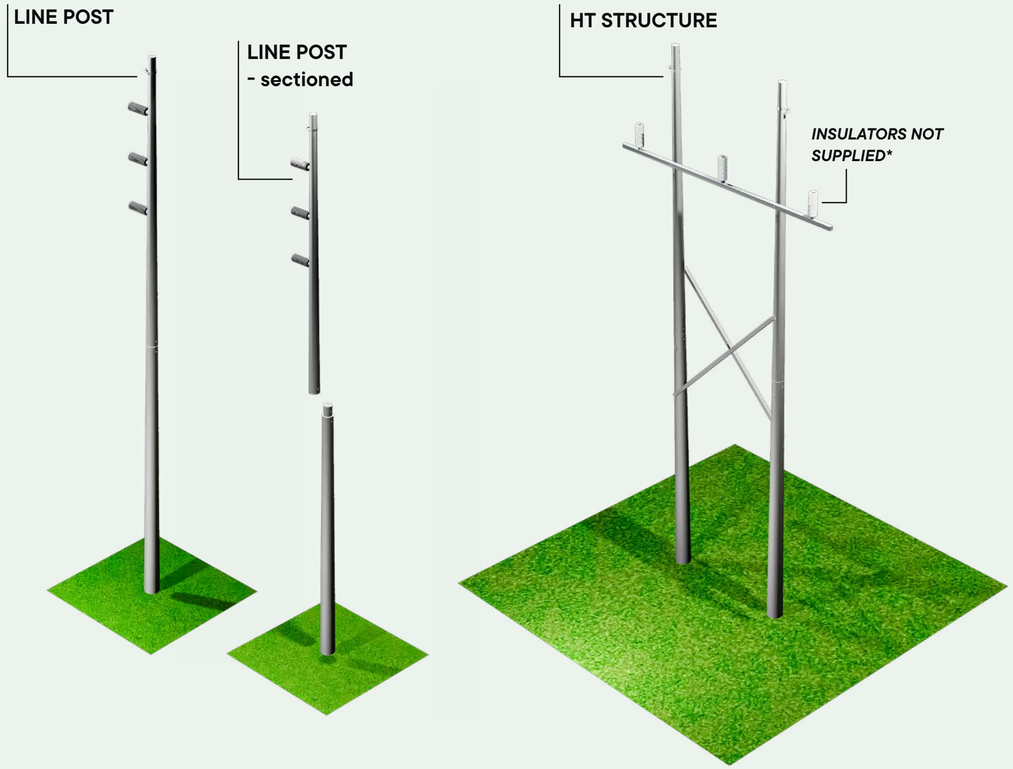
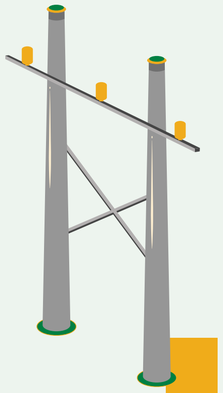
ENERGY TRANSMISSION POLES

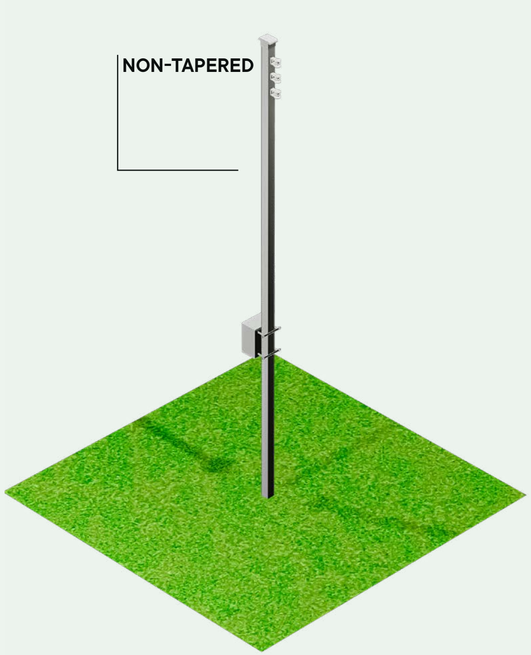
• UP TO 145 FT (44.0 M) HIGH • UP TO 6,750 LBF (3,000 DAN) RATED LOAD
• CIRCULAR OR SQUARE TOP • 2 OR 3 SECTIONS • LINE POST OR HT STRUCTURE

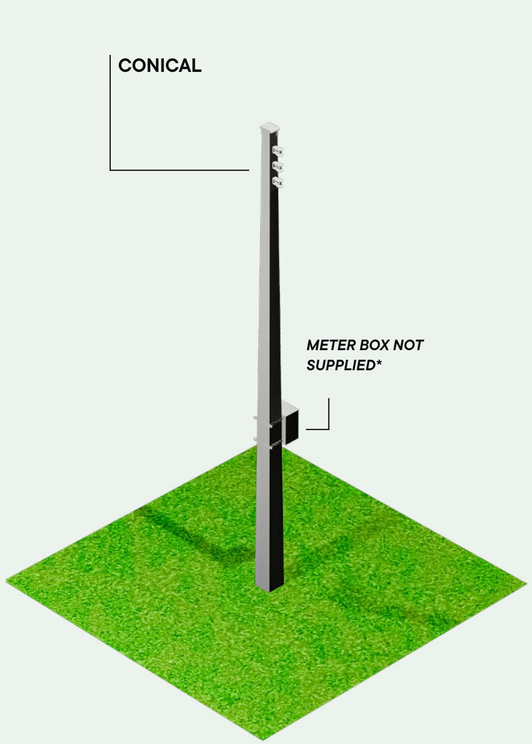


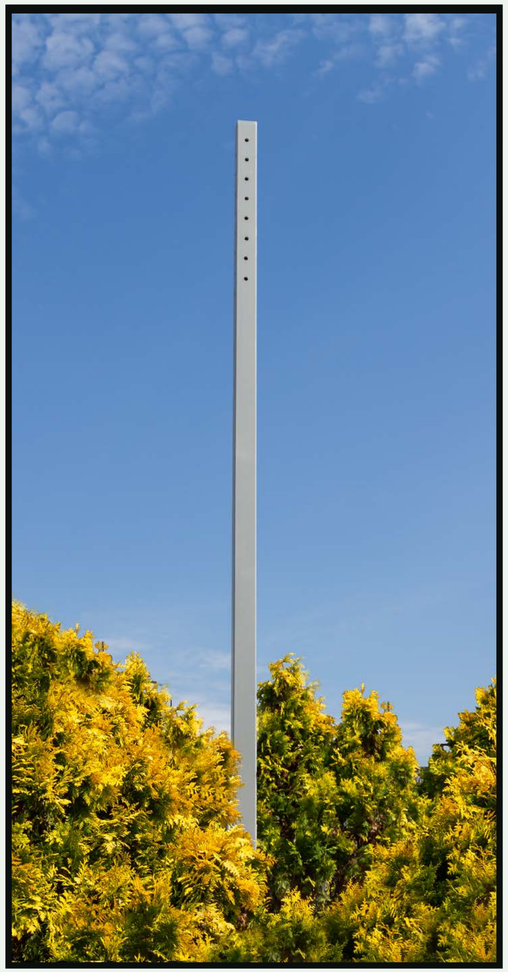


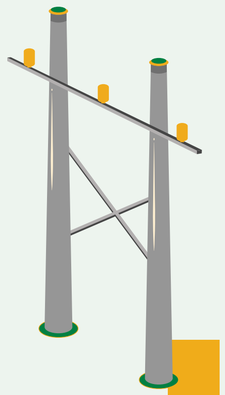
SERVICE ENTRY POLES

- UP TO 25 FT (7.5 M) HIGH • UP TO 340 LBF (150 DAN) RATED LOAD
- CONICAL OR CONTINUOUS SQUARE SECTION









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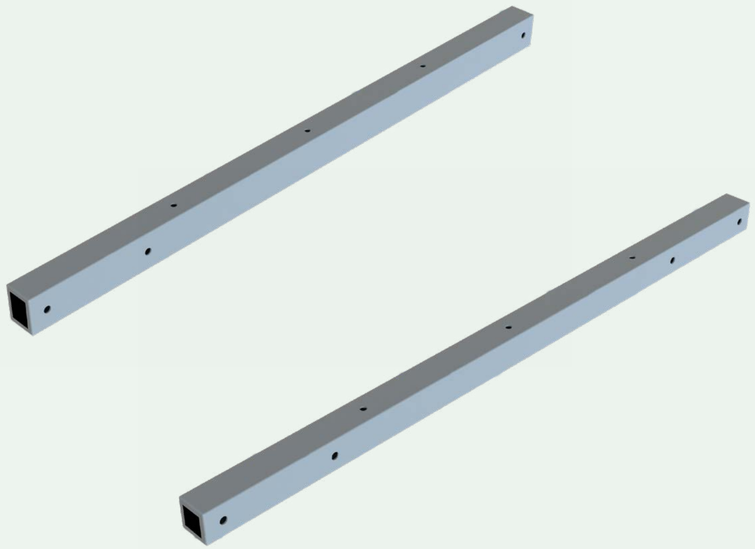
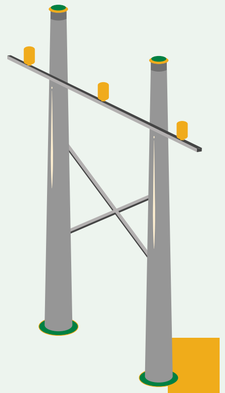
CROSSARMS

- CONTINUOUS SECTION PROFILE • UP TO 23 FT (7.0 M) IN LENGTH
- 565 OR 900 LBF (250 OR 400 DAN) OF RATED LOAD
- AVAILABLE GEOMETRIES: 2 X 2 IN (50 X 50 MM), 3.5 X 2 IN (80 X 50 MM), 3.55 X 3.55 IN (90 X 90 MM), 3.55 X 4.5 IN (90 X 112 MM)

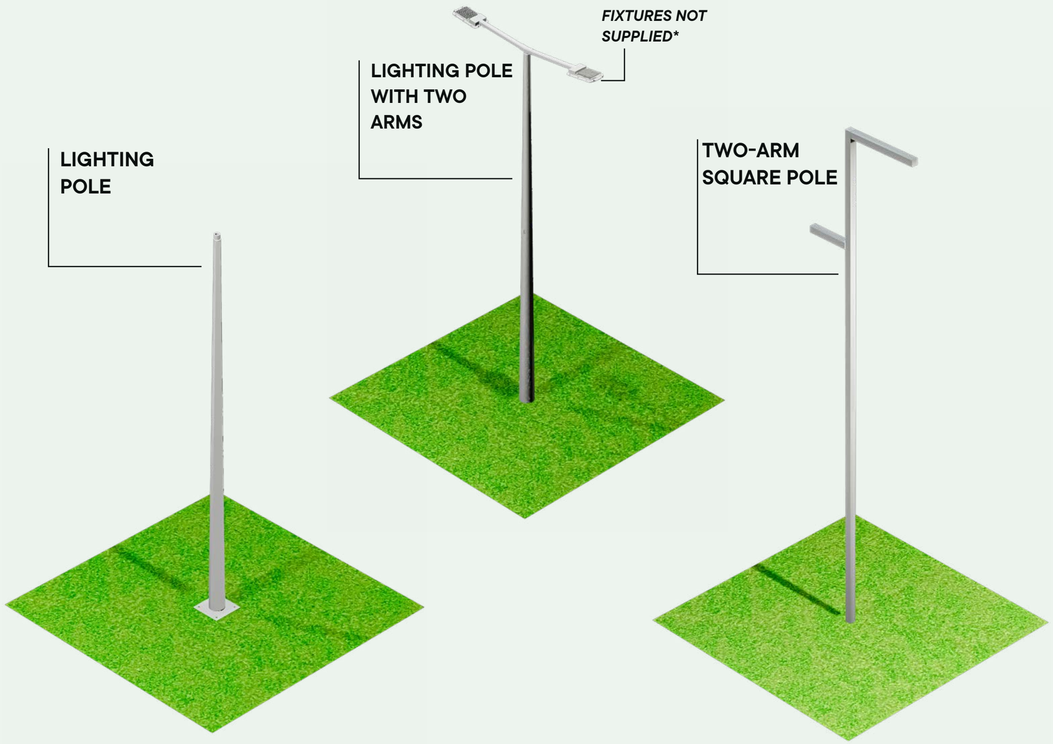
• Other sizes and load upon request

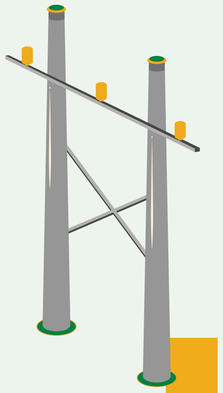


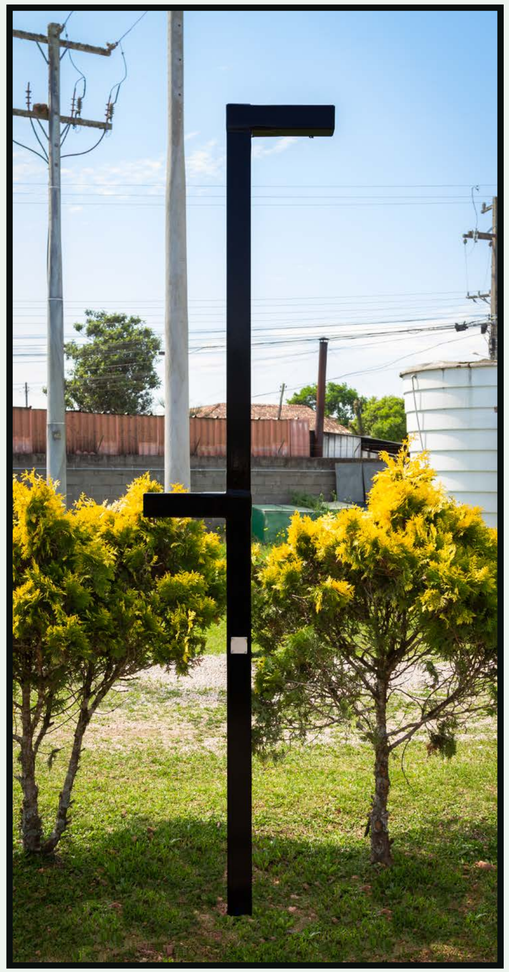


LIGHTING POLES

- UP TO 145 FT (44.0 M) HIGH • SMOOTH FINISH WITH PU PAINT
- SECTIONED IN UP TO 3 PARTS • DIRECT EMBEDDED OR ANCHOR-BASED
- ADAPTABLE TO FIT TIPS AND CORES FOR LIGHTING ARMS AND FIXTURES

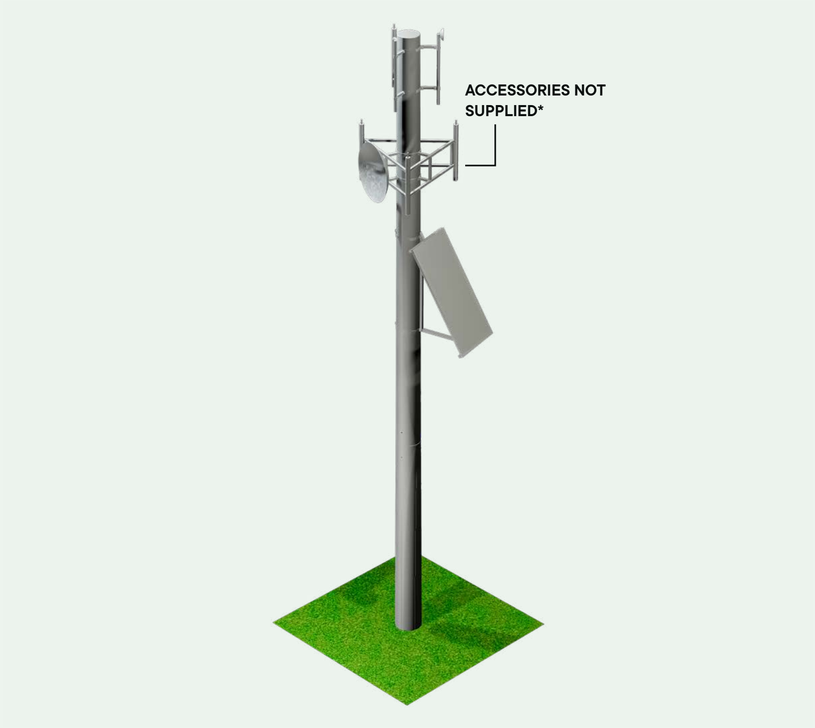


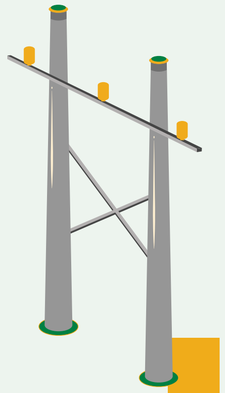


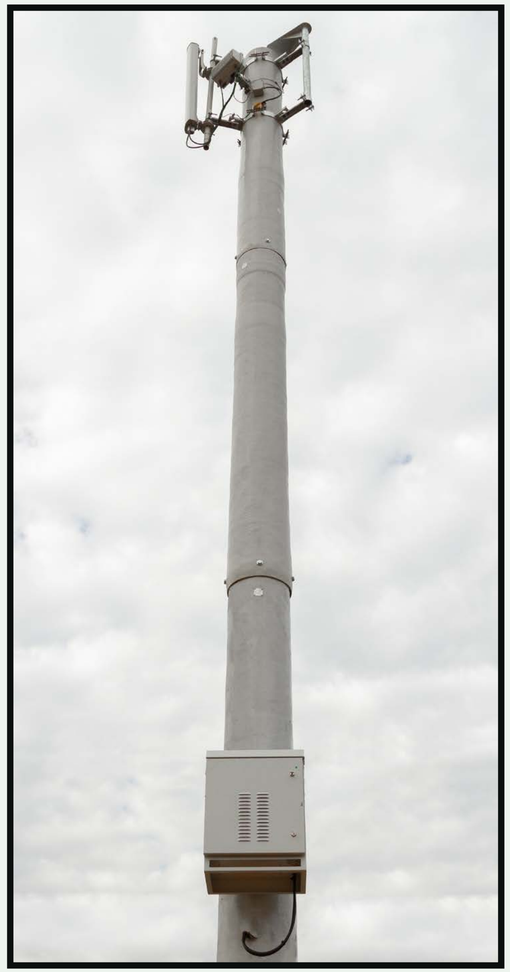


TELECOMMUNICATIONS POLES

• UP TO 145 FT (44.0 M) HIGH • RATED LOAD CALCULATED ACCORDING TO WIND EXPOSURE SURFACE AND CUSTOMER SPECIFIED CHARACTERISTICS
• CIRCULAR OR SQUARE TOP • UP TO 4 SECTIONS • DIRECT EMBEDDED OR ANCHOR-BASED

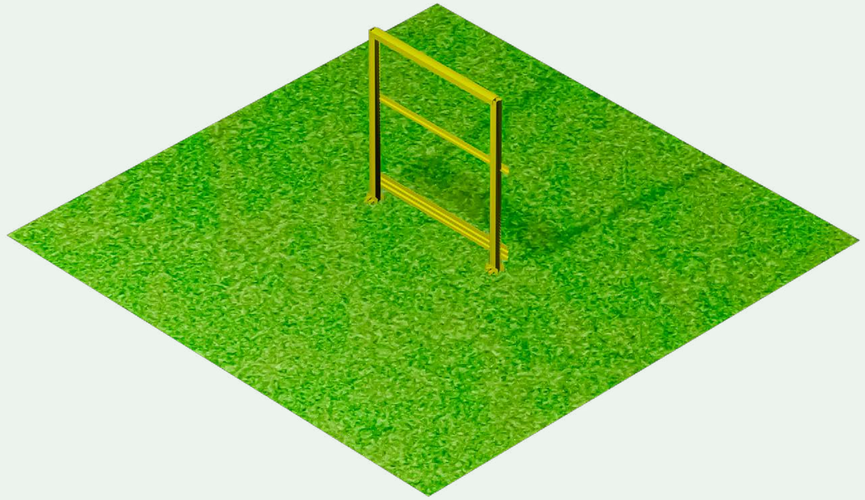


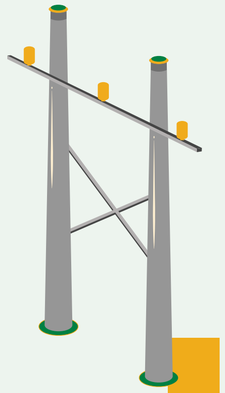




RAILINGS

- NR 12 STANDARD • ABNT NBR 15708 STANDARD
- ISOPHTHALIC POLYESTER RESIN OR VINYL ESTER
- OTHER STANDARDS UPON REQUEST





SPECIAL PROJECTS

Ecofibra's engineering team can calculate the perfect solution for your design. Based on the accessories that will be installed and/or loading schemes, engineering calculates the best structure configuration for your application.

Examples:
- Structures for transition from overhead line to underground line
- Temporary structures for installing cables at crossings
- Structures to contain falling cables
- Off-Grid Structures

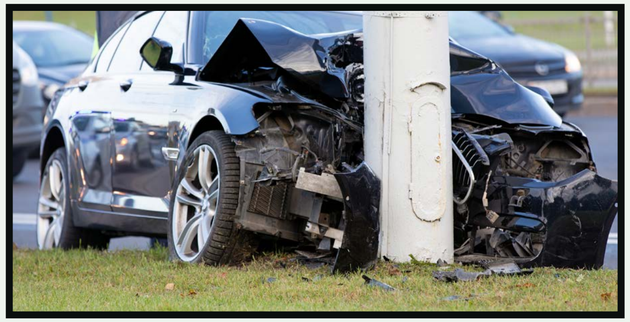
•OFF-GRID STRUCTURES

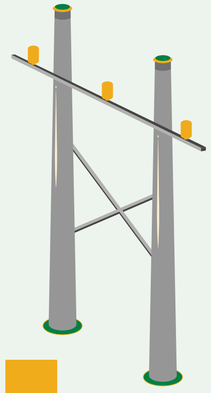
We also design collapsible poles. These are poles with a special structural design and manufacture, designed to collapse at the base when hit by a vehicle, reducing damage to the vehicle and increasing the safety of its occupants. In addition, when connected to the network, the collapsible pole hangs from the wires, which guarantees the integrity of the network and nullifies the risk of other poles falling due to the "domino effect".

•COLLAPSIBLE POLES

X

•NORMAL POLES





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