



CAVEL - a European product made in Italy

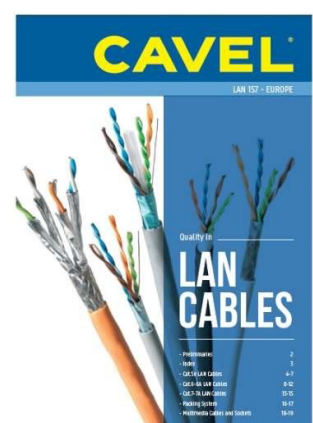
A telecommunications cable manufacturer in Italy, near Milan

Company Profile

As we know, globalization has brought most of the world's factories to East Asia, mainly China. Even so, there is still one factory of 15,000 m², spanning several buildings on a 5-hectare property in the Pavia countryside, surrounded by rice fields, near the banks of the Ticino River, employing 70 people to successfully produce coaxial and data transmission cables for the domestic market and a large number of European clients.

Italiana Conduttori Srl, which manufactures its own cables under the CAVEL brand name, is located in Gropello Cairoli, about 30 km south of Milan, along the A7 highway going towards Genoa. In 1968, cable production began in a rented industrial building in Pavia. But already in the early 1970s, the company moved to Gropello to start building its first industrial hub. This, thanks to the boost it received from an ever-growing recognition of the quality of its products, which were sought after by both domestic and foreign, mainly European, markets.

Year after year, buildings were added to constitute the current state of the company, which include: a 2-story building to house the administrative and sales offices; large premises used to handle raw materials; long warehouses dedicated to the various stages of cable production, their quality control and storage. In the "oldest" premises, which date back to the 1960s, today we find the copper wire drawing department and the production hub of cables for data transmission in structured buildings, i.e., the so-called LAN (Local Area Network) cables



CAVEL Products

The huge costs involved in first designing and then building TV and data transmission networks necessitate the use of products that have excellent technical characteristics and are long-lasting.

CAVEL's coaxial TV and data cables are designed to meet the growing technological demands of the sectors of application. Increasingly effective shielding techniques combined with size reduction but also improved mechanical strength and increased service life are the key features for the success of our products. All this has been made possible since the dielectric insulation of coaxial cables is made with physical nitrogen injected foam technology, instead of the previous one made with chemical foaming.

Service to installers has also been improved, with the introduction of the CABLEBOX dispenser, which not only makes work easier but also offers environmental and safety benefits, while the already wide range of connectors and tools is continuously being enriched to make professional installations in every specific niche of application.

In recent decades, continuous adaptation of our cable design, improvements in raw materials, and upgraded production means have enabled our company to apply a 15-year warranty to all coaxial cables supplied under the CAVEL brand. Both the Certificate and the Warranty Conditions can be independently downloaded from the respective links on this site.

The Quality of CAVEL Cables

Italiana Conduttori has been producing CAVEL coaxial cables for more than 40 years. The reliability of our products is guaranteed by:

- careful selection of suppliers of raw materials of proven reliability;
- the use of the best scientific instruments for analysis, development, monitoring and control of all stages of production;
- the achievement and maintenance of Quality Certification of company processes: initially UNI EN ISO 9002 in April 1996, issued by the Italian CSQ institute and internationally recognized by the IQNet network;
- subsequently updated with UNI EN ISO 9001-2008 Certification, obtained from 11/18/2010;
- the conformity of the products made according to the main international specifications, such as: IEC, CEI, UTE, BS, DIN and MIL.

In particular, nowadays in accordance with the following construction standards:

- CEI EN-50117 regarding coaxial cables;
- CEI EN-50173 regarding LAN cables for data transmission.



Manufacturing Excellence and Quality Characteristics

The renowned quality of our coaxial cables and long service life is rooted in three main construction features:

- Internal conductor wire drawing,
- Sophisticated physical extrusion of the dielectric using "skin-foam-skin" technology,
- PIB protection of the foam dielectric.

The implementation of these three specific construction skills is explained in detail in the following notes.

Copper Wire Drawing

At our plant, a bare copper wire drawing facility has been in place since 1988 and subsequently implemented. This activity was conceived solely with the intent of controlling and improving the quality of one of the most important components of all data transmission cables, whether coaxial or twisted-pair: the inner conductor.

Gradually, this activity continued to grow to its present capacity to make the entire supply of inner conductor wires needed for our production; something in excess of 500 tons of drawn copper wire per year. We can process wires in the diameter range from 0.31 to 3.40 mm. During the process, wires are checked according to: diameter, tensile strength, elongation, eccentricity, and surface cleanliness; all equally important parameters especially for making wires for data transmission cables, because of the "skin effect" of electromagnetic high frequency.



What are Gas-Injected Dielectrics

In 1996, CAVEL introduced the new technology of nitrogen gas injection for the physical foaming of the dielectric for coaxial cables. This technology was first introduced in Europe by the Pope company, whose plant in the Netherlands had come under the ownership of the US-based Belden in the mid-1990s. Our company was the second in Europe to use gas injection extrusion, but from the beginning we adopted the more sophisticated version of this technology, the so-called "skin-foam-skin" execution.

Previously, dielectric foaming was achieved with the use of chemical agents. These were mixed with the low-density polyethylene (LDPE) granules which, due to the heat of the extrusion process, decomposed into gas. This method provides less mechanical strength to the dielectric and also compromises the maintenance of the attenuation characteristics of a coaxial cable over time, because it does not guarantee the absence of a certain degree of moisture within the cells of the foam dielectric.

In contrast, foam dielectric insulation with physical injection of nitrogen gas is first made from high-density polyethylene (HDPE), which immediately imparts a higher mechanical strength to the item, similarly to a solid polyethylene dielectric.



This ensures less aging of the physical characteristics of the cable, which results in prolonged reliability and durability of the electrical characteristics over time. Simply put, a coaxial cable with a gas-foamed dielectric is more resistant to shocks, crushing, stretching and bending, all of which the cable typically experiences during installation. It also ensures that electrical attenuations remain unchanged for a long period of time after the distribution system is put in place.

According to standard EN-50117-par.5.3.5, this special feature can be measured by subjecting the cable to 3 thermal cycles of 24 hours at -40°C and 24 hours at 70°C (to this last cycle, we add a degree of humidity of 95%) and measuring that the attenuation deviation does not exceed 5% of the initial attenuation.

"Skin-Foam-Skin" extrusion

As mentioned, the dielectric of all CAVEL coaxial cables is extruded by physical gas injection with the purpose of reducing their degree of aging, mainly caused by the infiltration of moisture. In addition, the best method is the "skin-foam-skin" system, which consists of simultaneous triple extrusion, as follows:

- a first layer of a few μm of solid PE covers the inner conductor like a "skin";
- the second and more substantial section is the extrusion of the gas-foamed PE dielectric;
- a third layer, again a few μm of solid PE, covers the underlying gas-foamed dielectric.

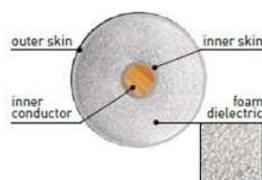
Thanks to this sophisticated foaming:

- the first PE skin protects the inner conductor from longitudinal moisture infiltration, as a result of which it will be immune from the possible formation of oxidation;
- this skin, which adheres well to the next layer of high-density PE dielectric constitutes a mechanically robust unit capable of giving a stable and deformation-free geometry to the dielectric, especially at the bends that the cable undergoes during laying;
- finally, the outer skin, which equally adheres to the underlying foam dielectric, also contributes to ensuring the perfect eccentricity of the inner conductor with respect to the outer at the bends, as well as still contributing to insulating the dielectric from moisture.

PIB protection

To protect against the infiltration of moisture into the cable, we have also adopted an additional measure, namely the exclusive presence of a layer of Poly-Iso-Butylene between the outer skin of the dielectric and the overlying shielding foil; this in case the latter is not glued to the dielectric itself.

This layer, in fact, acts as a barrier to moisture infiltration and buildup and helps to ensure excellent attenuation stability during the service life of the cable.



A company that respects Nature

Raw Materials

CAVEL has always stood for a company that respects nature. All raw materials used, comply with the European RoHS Directive, which bans the use of certain chemicals considered harmful to health. In the past, for example, the cable industry used PVC compounds with lead, a useful component for thermal stabilization of sheath extrusion. In accordance with the RoHS Directive, since 2005 we have stopped using PVC with lead. In addition, since June 1, 2007, REACH Regulation 1907/2006, on the evaluation, authorization and restriction of certain chemicals, has been in force. In compliance with this regulation, Italiana Conduttori qualifies as a downstream user, and in particular as a "user of substances" and "producer of articles".



For more information, we invite you to download our respective RoHS and REACH Declarations of Conformity from the website.

CAVEL respects the environment

Until not so long ago, boxed rolls and disposable reels, made of plastic or wood, constituted the traditional packaging for TV coaxial cables. Despite a few drawbacks, these packages were seen as the norm. Nowadays, due to changes in environmental awareness, the concept of recycling is increasingly being considered as a value to be pursued. For this reason, CAVEL has developed a comprehensive solution with the goal of improving in **efficiency**, **price** and the **environment**. In this spirit, we created an innovative product, the **CABLEBOX** unwinder, designed with the concepts of **reduction** and **reuse** in mind.

Since 1997, the **CABLEBOX** has been designed and launched on the market with the purpose of making the installer's work easier. This item did effectively hit the mark but also introduced a new environmental awareness: the **reduction** of packaging material. This is the case, in fact, with the great success represented by the 100 or 250m rolls of cable, wrapped in heat-shrink plastic and usable as refills for the respective **CABLEBOX** DS100 and DS250 unwinders.

THE PRESENT new smart pack solution



Ethical Products

Six decades have passed since the beginning of World War II. In that time humanity has consumed more resources than in the entire span of history before then. This waste of resources should be regarded as a kind of crime against future generations. We think that technological knowledge should guide the preservation of resources despite achieving the necessary characteristics.

In this regard, as mentioned above for the reduction of packaging materials, we pursue the goal of designing and producing cables capable of providing the best characteristics with the right use of raw materials, this as a contribution in curbing the era of compulsive consumption.

Lionello Loris Bronzo General
Manager

CAVEL- Italiana Conduttori Srl Gropello Cairoli, 02/01/2023

