

Application Status and Development Trend of Plastics in China's Electric Wire & Cable Industry

Electric wire & cable industry is the second largest industry in China next to auto industry, with the main business income up to 1/4 of electric industry in China. On the global context, the gross output of China's electric wire and cable has surpassed the U.S. and become the biggest manufacturer of electric wire and cable. However, most of high-profile products are not manufactured by China, primarily owing to inferior quality of materials, especially the insulated materials--plastics.

In 2008, the sales value of China's electric wire & cable industry amounted to about RMB669.5 billion, and major raw materials include: copper, aluminum and plastics, of which it's estimated that millions of tons of plastics were consumed last year, and over 500 plastic granulating mills provided plastics for the electric wire & cable industry. Polyvinyl chloride (PVC), polyethylene (PE) and crosslinked polyethylene (XLPE) rank among top three for the consumption of plastics. The consumption of polypropylene(PP) and thermoplastic elastomer (TPE) register less than 1~2% of the gross amount, and fluorine plastic is only applied to special cables.

Despite of Asia financial crisis in 1998, the development of INTERNET drove the technical R&D of China's electric wire& cable enterprises, so optical fibers and digital cables, etc, developed quickly with an overwhelming market share in China. "New Energy Resources, Intelligent Grid and Low-Carbon Economy" are frequently covered by various medium this year, indicating that new energy resources and intelligent grid are already discussed as a national strategy, and implying that they will play a crucial role of getting out of the financial crisis, recovering the engine of economy and even improving China's international status.

The construction of China's intelligent grid is closely related to its electric wire& cable industry, which covers the supportive cables of wind power, solar energy and nuclear energy in addition to traditional telephone lines, TV coaxial cables, electric wires and signal control cables. Preferably, the power grid, telecom network and wired TV network are fully combined to build up an "integrated optical cable& power grid". This will open a door for R&D of new products while accelerating the adjustment of product mix in our electric wire & cable industry.

As a key technology of intelligent grid, superconducting cable will play a key role in the development of intelligent power grid since it provides a driving force to the

revolution of power industry. Thus, particular attentions shall be paid to the superconducting cable by the electric wire & cable enterprises and plastic industry in China.

A revolutionary reform in electric wire& cable industry will surely occur with the rapid development of intelligent grid and superconducting cable as well as demanding requirements of environmental protection. Meanwhile, this will give an impetus to the technical development of plastic industry for providing more high-end products, for instance: crosslinked polyethylene insulation materials of 110kv and above, PTFE materials for big airplanes, waterproofing cable materials and high elastomers for the cables of nuclear stations, wind power and solar energy stations, as well as frost-resisting, rodent-resisting flexible plastics of strong resistance to UV rays, coloring and grease; environmental-friendly, fire-retardant, low-smoke and zero-halogen sheathing plastics, highly flexible insulating materials, as well as insulating and sheathing materials for irradiated crosslinked cables. Besides, it's required to develop or improve the energy-saving and control systems for high-speed extruders and extruding machines.

The currently available plastics for electric wires & cables include:

1. Flexible polyvinyl chloride plastics for electric wire & cable ;
2. Insulating materials for crosslinked polyethylene power cable;
3. Semi-conducting shields for crosslinked polyethylene cable;
4. Black crosslinked polyethylene insulating materials for overhead insulated cable;
5. Silane crosslinked polyethylene insulating materials of rated voltage 1kV and below;
6. Black weatherproofing polyethylene insulating materials of rated voltage 10kV and below;
7. Thermoplastic, low-smoke, zero-halogen and fire-retardant polyolefine cable materials;
8. Black polyethylene plastics for electric wires & cables;
9. Polyvinyl chloride plastics for overhead cables.

Two up-to-date products will be developed recently:

1. Cable materials exclusively used for wind power generation:

With the growing price of conventional energy resources and increasing awareness of environmental protection, China made great efforts to develop new energy resources, of which the fastest-growing and most mature wind energy/wind power

generation has put demands on the special cables. In addition to the performance required for common cables, the special cables for wind power generation must meet the basic requirements of small bending radius and frequent twisting, while presenting excellent resistance to lower temperature and abrasion, strong fatigue durability, weather proofing, aging-resistance as well as perfect resistance to micro-organism, oils and chemicals. Conversely, common cables lack of resistance to abrasion and corrosion.

2. 1E Cat. K1 cables for nuclear station

The cables used on or around the nuclear islands must meet the requirements for fire retardance, low-smoke and zero-halogen without corrosive gas. Polyethylene, polyoefine, ethylene-propylene rubber and silicone rubbers can be selected depending on the characteristic requirements of 1E cables of various categories.

Source : Cable-wire Industries Association of Shanghai