

Special Issue Featuring Thermal Solutions

— Moving Heat toward the Future —

Junji Sotani *

This issue of the Furukawa Electric Review has a special focus on thermal solutions.

The recent trend for electronic equipment to combine higher performance with slimmer, more compact configurations, has lent new urgency to finding solutions to heat problems. Furukawa Electric has adopted the slogan “moving heat toward the future” to epitomize its efforts in the business of finding thermal solutions. The Company has itself developed wires and cables to move electricity, pipes and conduits to move water, and optical fiber cables to move information, thereby opening up the future and the dream of moving business into the next generation. Now we have well and truly embarked on the path of moving heat toward the future.

Furukawa Electric offers a broad line of thermal products, and in this special issue we focus on industry-leading heat-conductive pipes, heatsink elements and heatsinks, together with the analytical techniques and intellectual property that support them.

(1) Heat-Conductive Pipes

Furukawa Electric’s heat-conductive pipes are widely used in air-conditioning for fixed installations and automotive systems. Those for fixed installations are manufactured by the floating die method, while those for automotive systems are made by conform extrusion. Both make it possible to fabricate high-performance grooved heat conductive pipes in a way that conventional technology cannot match, thereby contributing to making the equipment more compact.

(2) Heatsink Elements

Among those products categorized as heatsink elements we find heatpipes, thermal sheets and Peltier devices.

Furukawa Electric’s heatpipes use fine grooves for the inner surface structure and environment-friendly pure water as the working fluid, so that there is very little deviation among heatpipes, and thermal resistance is low.

We have also developed a patented manufacturing method that delivers such long-term reliability that it is even used for equipment where service life is required to exceed 20 years.

Following on the commercialization of the world’s thinnest heatpipes, with a thickness of only 1 mm, we have recently succeeded in developing peraflex[®], which is only

0.55 mm thick. We also have a program for the development and commercialization of thermal sheets and EMI sheets to cope with electromagnetic interference. These sheets also feature outstanding environmental properties.

Recently there has been gradual progress in the commercialization of equipment using Peltier devices for temperature control, but because they are vulnerable to heat cycling, they are of limited applicability in equipment requiring long-term reliability. Currently we are working to develop Peltier devices that combine long-term reliability with a slim profile.

(3) Heatsinks

Commercially available heatsinks include not only those with extruded aluminum fins, but also those with brazed and crimped fins, as well as the heatpipe style.

Extruded aluminum fins are widely used in a broad range of equipment, but with the rapid increase in exothermic value or exothermic density, the more equipment there is for which they are inadequate. The solution to this problem is provided by brazed fins and crimped fins, which offer a larger surface area per unit of volume. Because of their outstanding thermal performance they make possible small size and light weight unmatched by conventional technology, even without the use copper, with its higher thermal conductivity.

The heatpipe style heatsink makes for heatsinks that are smaller, lighter and slimmer, and are widely used in digital home appliances. Furukawa Electric’s heatsinks, making wide use of high-performance heatpipes and techniques for joining the block and the fins that competitors cannot match, are particularly in demand where there is a requirement that the equipment be smaller, lighter and slimmer.

(4) Analytical Techniques

These are the materials, and the thermal and fluid analysis technologies that support thermal solutions. At Furukawa Electric we mobilize these analytical techniques to shorten the time needed to develop new products and new technologies. It is no exaggeration to say that our most recent products could not have been developed without this analysis.

Furukawa Electric carries forward its program of development and commercialization, with major emphasis on the environment described above (smaller, lighter and slimmer equipment; saving of raw materials by eliminating

* Manager of Thermal and Antenna Solutions Dept., Electronic Components Div., Electronics and Automotive Systems Co.

fins; and energy saving).

These include cooling devices for automotive use using halogen-free heatpipes, systems for cooling electrical substations without the use of fans, heatsinks for lap-top computers, heatsinks for desk-top computers, heatsinks for TV sets, and heatsinks for video cameras. They are specific examples of environmentally friendly thermal solutions that Furukawa Electric has been the first to develop and commercialize.

We propose to continue our contribution to society through the development and commercialization of environmentally conscious products.