

## Addressing Environmental Preservation through Our Products

### Reducing Packaging Materials and the Consumption of Energy in Physical Distribution

Since 1995, Murata has been working to reduce the environmental impacts accruing from distribution and from packaging materials as they relate to our business activities. We have addressed this issue from two sides: we have devised a packaging material strategy intended to conserve the resources consumed by packaging materials as well as a distribution strategy intended to conserve the energy consumed in distribution activities.

#### Promoting the Adoption of Bulk Case Packaging

The main initiative in our strategy to reduce packaging material at Murata involved switching over the chip component packaging method from tape to bulk cases. The principal advantage of bulk casing is that it eliminates the need for the paper tape used in tape packaging. Moreover, bulk case packaging offers the advantage of a more compact form, as the packaging shape allows for the storage of a larger number of chip components in a smaller space. Not only does this approach contribute to environmental preservation, it also enhances productivity and increases the available storage space.

However, the introduction of the bulk casing involved major challenges such as the remodeling of chip placement equipment, improvement of bulk feeder, and the increased dimensional accuracy of the components. Most notably, the need to supply the components in a continuous line resulted in increased structural complexity in the component supply section. In addition, technical and quality problems arose. However, we were able to overcome these technical problems through ongoing development and evaluation with the cooperation of the customers and equipment manufacturers. As well, in order to reduce the amount of used plastic, we collected used bulk cases for reuse.

We intend to continue implementing the switchover from tape to bulk cases.

#### Details of the bulk case



#### Promoting the Adoption of Bulk Cases

An industry standard specification for bulk cases was adopted in March 1992. Although Murata holds the industrial property rights for this type of bulk case, we are encouraging its widespread adoption by licensing it free of charge. We have declared our intention to extend this policy to companies in other countries as well.

Building on the "Bulk Summit" conference in the U.S.A. in 1999, Murata has taken part in planning "Bulk Summit Japan" in 2000 and 2001. Furthermore, we have aggressively promoted the spread of bulk casing from our position as a leader in the industry. We have also proposed a small bulk case that is more suited to accommodating orders of smaller quantities. It can accommodate chip components in sizes as small as 0.6 x 0.3 mm.

#### Promotion the Reduction and Reuse of Packaging Materials

Our green innovations include more than just the switchover to bulk cases. For example, since 1996 we have reduced the number of cardboard boxes consumed by introducing larger cardboard boxes for taped-packaged products. Additionally, we began reusing tape reels as well as the boxes for unit load used in the delivery to customers. By 2001 we had reduced the amount of packaging material used per unit of net sales by 11% compared with 1995 levels.

#### Reducing Energy Consumption during Transport

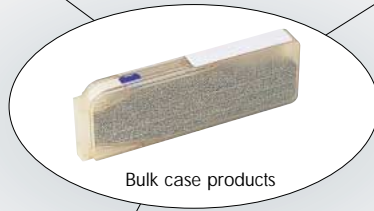
In 1996, we began to address the issue of energy conservation in distribution. To reduce the fuel consumption of the trucks transporting Murata's products, we have promoted energy-conserving driving practices (such as reducing the rpm at which transmission shifts occur and minimizing engine idling time), reduced the transportation distance (by reviewing transit routes), and promoted a modal shift from trucking to railroad. As a result, by 2001 we had improved fuel consumption per unit of mileage by 21% compared with 1995 levels.

By continuing with the policies we have adopted to date, such as promoting energy-conserving driving practices and reduced transportation distances, we will move closer to our goal of converting to the use of energy-conserving vehicles.

## Advantages of Bulk Cases

### Increased productivity

- Reduced stop time for chip placer
- Simplified replenishment of parts



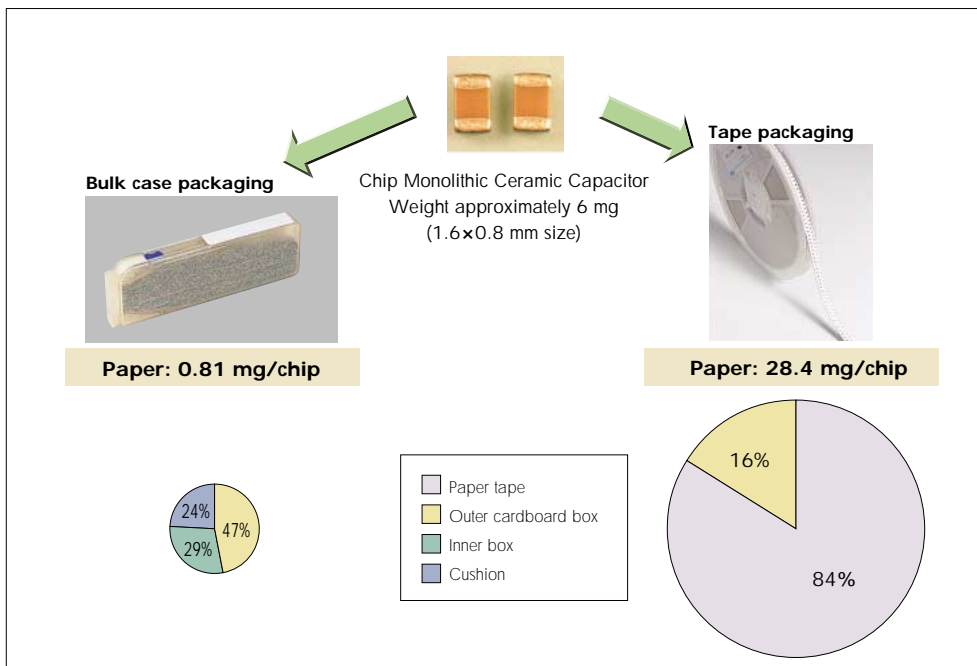
### Reduced storage space requirements



1/20 of tape packaging

### Environmental preservation

- Reduction in amount of paper consumed 1/30 of tape packaging



- Easily recyclable packaging material

- Reduced energy consumption during transportation 1/6 of tape packaging



Bulk-case-packaged products



Tape-packaged products

Note: Based on calculation using the data of 1.6×0.8 mm size.