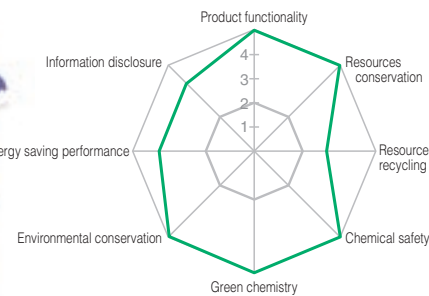
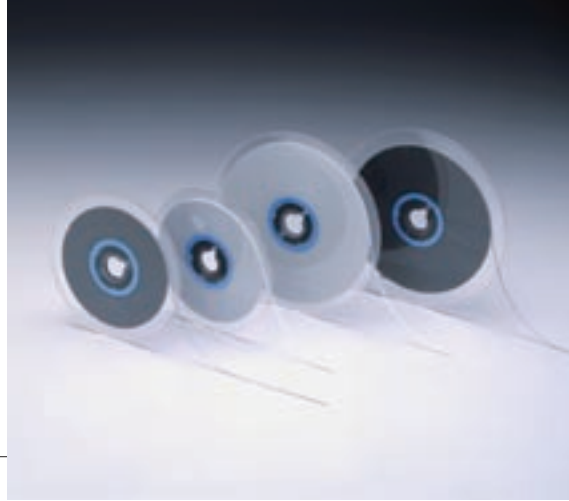


Examples of Green Products

Electronics-Related Products

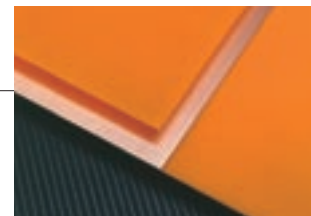
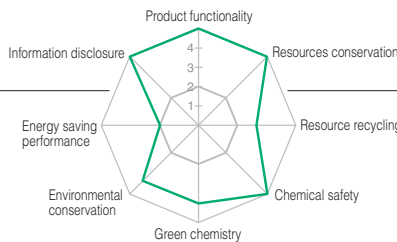
Anisotropic Conductive Film AC-9000 Series

Anisotropic conductive film (ACF) is an adhesive film featuring dispersed conductive particles. It is suitable for making collective connections between microcircuits, as the application of heat and pressure can secure the conductivity in the vertical direction while maintaining insulation across the in-plane direction. Based on these features, ACF has been used for connections in LCDs circuits as a substitute for soldering. It is an indispensable adhesive product for high-density circuits. The AC-9000 Series is a new series of ACF products, that allow lower temperatures and shorter times for connection than previous products. This series, therefore, contributes to a higher energy efficiency and shorter manufacturing processes.



Copper-Clad Laminates for Printed Wiring Boards MCL-BE-67G(H), MCL-E-679FG

Copper clad laminate (CCL) is a base material for printed wiring boards (PWB). To ensure safety, non-flammability is essential for CCL and other PWB materials. Conventional products were given this property by applying bromic flame retardant, which, like other halogen compounds, is known to generate dioxins when incinerated under certain conditions. Hitachi Chemical developed a new non-flammable system that does not use any bromic flame retardant and applied it to MCL-BE-67G(H) and MCL-E-679FG. These materials are also suitable for lead-free soldering processes.



Area	Characteristics	Product			
		MCL-E-679FG	MCL-BE-67(GH)	MCL-E-67(FR-4)	
Environment	Suitability for lead-free soldering processes	○	○	○	
	Halogen-free	○	○	○	
Reliability	High heat resistance (High Tg)	○	○	○	
	Low CTE	XY (horizontal direction)	○	○	○
		Z (vertical direction)	○	○	○
	Electric-corrosion resistibility	○	○	○	
	Heat conductivity	○	○	○	
	Stability of dielectric property	○	○	○	

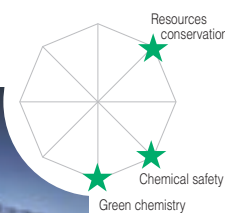
Halogen-free Printed Wiring Boards

Halogen-free printed wiring board is a high-density printed wiring board produced from materials without halogen-containing compounds. Heat resistance has been increased to accommodate lead-free soldering. Meeting a variety of needs, including those for printed wiring board materials, we can realize lighter, thinner, shorter and smaller components, as well as highly multilayered devices.



Epoxy Molding Compounds for Semiconductors CEL-HF Series

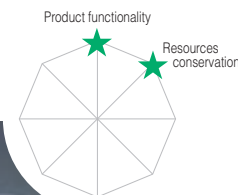
CEL-HF Series is an epoxy molding compounds for packaging semiconductor devices. Heat resistance has been increased to make it suitable for lead-free soldering processes. Non-halogen or antimony flame retardants are also available.



Tantalum Capacitor Micro type (TMCP, TMCJ)

Hitachi AIC Inc.

TMCP and TMCJ are micro-type tantalum chip capacitors that realize space-saving and resource-saving devices. When compared with TMCA, the conventional type, the volumes of TMCP and TMCJ have been reduced to approximately 1/3 and 1/8, respectively. They are also environmentally friendly products with lead-free electrode terminals.



* Among the eight items for assessment, only those that are rated at 5 (highest score) are shown with a star mark.

Examples of Green Products

Chemical-Related Products

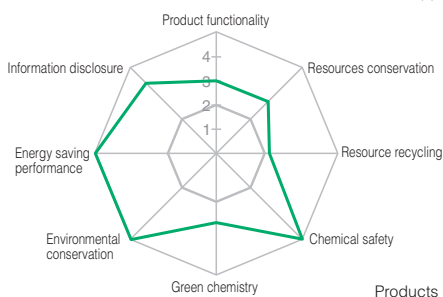


Application example of Ultraviolet Curable Resin
(Coating of flooring and panels)

Environmentally Friendly Advanced Performance Resins

Ultraviolet Curable Resin

Recent concerns for environmental protection and resource conservation urge a reduction in the use of organic solvents. Reduction in the use of formalin is also required as it is a possible cause of "sick-house syndrome." With its resin synthesizing technologies, the Hitachi Chemical Group developed and offered an ultraviolet curable resin made of acrylic oligomer that does not contain organic solvents or formalin. These products are also an energy-saving material, because unlike conventional products that require heat for curing, they are cured by ultraviolet light. To make the most use of its superior features, we are expanding the application possibilities of the products to printing inks and plastic film coatings.



Products (resin)

Molded Products for Automobile Exteriors

Molded Plastic Rear Hatch Door

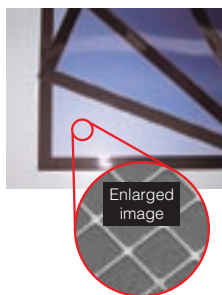
The molded plastic rear hatch door for automobiles is made from compounded materials that can supply superior strength, rigidity, shock resistance, creep features, and good external appearance utilizing the resin's moldability. When compared with conventional plated steel doors, the plastic doors are 10–20% lighter in weight, contributing to higher fuel efficiency and lower CO₂ emissions.



Electromagnetic Interference Shielding

Films for Plasma Display Panels

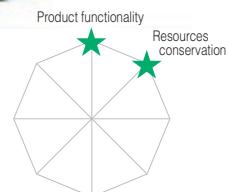
Recently, plasma display panels (PDPs) for large-sized, wall-mounted flat TVs have become commercially available. Hitachi Chemical has developed a clear film as a material to shield the electromagnetic waves emitted from PDPs. The high shielding effect and visible light transmittance are contributing to the rapid rise in popularity of flat-screen TVs.



Lithium Ion Battery for Hybrid Electric Vehicles

Shin-Kobe Electric Machinery Co., Ltd.

Automotive manufacturers are now developing the "next-generation" hybrid electric vehicles (HEVs) that contribute to an increased use of "clean energy." The long-lasting, light-weight and high-performance lithium ion batteries developed by Shin-Kobe Electric Machinery, a Hitachi Chemical Group member, are particularly suitable for HEVs.



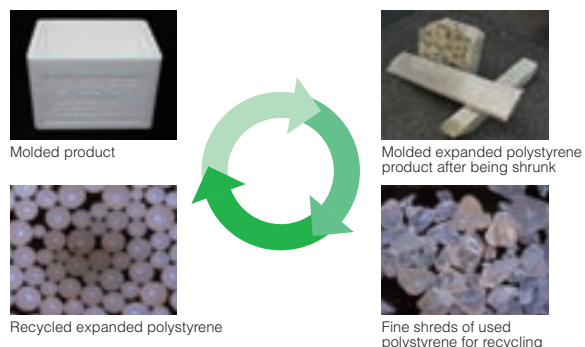
Developing More Recycling Technologies

Newly Developed Method to Recycle Expanded Polystyrene Beads

Since the Law for Promotion of Sorted Collection and Recycling of Containers and Packaging was implemented, many methods to recycle used molded expanded polystyrene (polystyrene foam or "Styrofoam") have been developed. In fiscal 2003, Hitachi Chemical further increased the performance of recycled polystyrene beads made using conventional methods and launched sales of a new type of recycled polystyrene bead. The product has the same mechanical properties as the virgin materials, as well as the superior appearance of molded products, and meets the Eco Mark standard by containing at least 50% recycled materials. Energy consumption and CO₂ emissions during the manufacturing processes were decreased to approximately 60% of the virgin materials. For some types of recycled expanded polystyrene beads, the content of VOCs,* a possible cause of "sick-house syndrome," has been reduced, and a self-extinguishing property was added so that they can be safely used as building materials.

* VOC: Volatile organic compound.

Hitachi Chemical's recycling system of expanded polystyrene



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Examples of Green Products

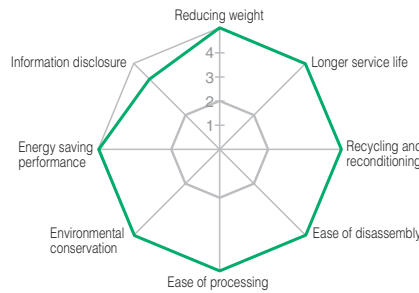
Housing Equipment and Environmental Facilities

Compact Combined Wastewater Treatment Systems

KGR2 Series Hitachi Hometec Co., Ltd.



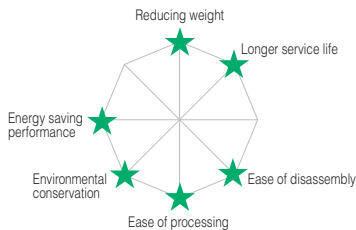
Compact combined wastewater treatment system KGR2 Series can treat domestic wastewater—from toilet, kitchen, and bathroom—to almost the same level of cleanliness as the wastewater treated by a public treatment plant. Our original biological filtering technologies substantially increased the purifying performance and greatly reduced the size of the tanks, allowing them to be installed in smaller spaces. Less energy is used during the manufacturing processes of the main body. The major material of the body is a special type of resin that has a longer product life and higher strength. In addition, the body does not generate environmental pollutants at the time of disposal.



System Bathroom

VLP-1616 Hitachi Hometec Co., Ltd.

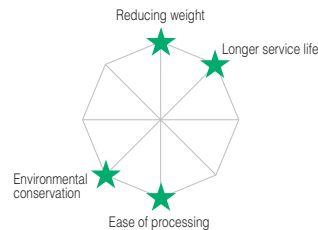
System bathroom VLP-1616 is a bath system with a washbowl shelf that allows a large floor space and smooth flow of water on the floor. As a further energy-saving feature, a fog-free mirror that requires no electricity was selected. The new materials realize a smaller and lighter form, and reduce energy and resource consumption and use of specific chemical substances. With these features, the product's overall environmental impact has been reduced.



Vanity Tables

BV Series Hitachi Hometec Co., Ltd.

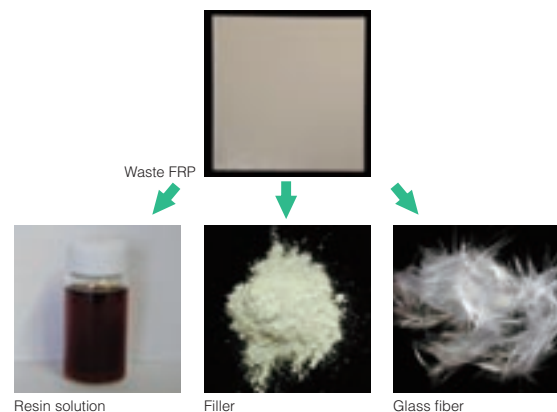
Vanity tables BV series are washstands with a large basin for a wide range of uses, including face washing and shampooing. A functional mirror for makeup, shower faucet, and cabinet are also installed. The hinges are located inside the doors for improved appearance and durability. The amount of vinyl chloride use has also been reduced. The packaging for shipping is made from recyclable materials.



Developing More Recycling Technologies

Waste Treatment of Fiber-Reinforced Plastics (Unsaturated Polyester Resins)

Fiber-reinforced plastic (FRP) is a hard and strong type of plastic that contains glass fiber and fillers. Because of its strength and high resistance to water and heat, FRPs are used in a wide range of products, including home equipment, automobile parts, and railway car parts. When recycling these products, they need to be sorted according to the different component materials. Sorting, however, has been almost impossible due to the high durability of the unsaturated polyester resins themselves. Hitachi Chemical developed an original technology that enables separated collection of different materials, making recycling of waste FRPs possible. In addition, with this new method the recycling process can be conducted under normal pressure and does not require preliminary treatment, such as crushing or grinding. These properties allow lower costs for waste treatment and recycling, a wider range of uses for the collected materials, and a lower impact in terms of safety and health.



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