

Phenolic products contribute to the environment with weight saving for automotive application

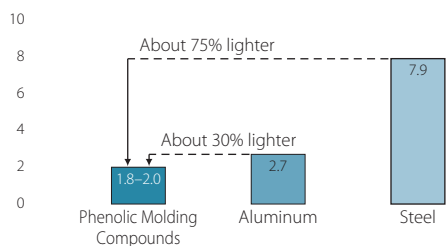
The total volume of carbon dioxide (CO₂), which is a part of greenhouse gas, emitted into the atmosphere in 2005 amounted to about 28 billion tonnes, but forecasts call for this figure to rise to approximately 43 billion tonnes in 2030. About 15% of the total CO₂ emissions in 2030 are expected to result from fuels of land transportation.

As a result, each country is asking the automobile industry to take the initiative in reducing CO₂ emissions and are setting high targets for fuel efficiency. The automobile industry is, therefore, significantly stepping up its activities to make vehicles lighter, which will make a major contribution to improving fuel economy.

Advantages of Phenolic Products

Sumitomo Bakelite develops, manufactures, and sells phenolic resins, molding compounds, and molded parts for automotive application. Although phenolic resin products have a lower specific gravity than metals,* they are superior to thermoplastics in terms of thermal resistance, chemical resistance, and dimensional stability because of their exceptionally strong network cross-linked structure. Phenolic products are, therefore, the most suited among various types of plastics as the materials for high-end applications.

■ Comparison of the Specific Gravity of Phenolic Molding Compounds and Metals



* This does not mean that they are lighter in proportion to their specific gravity. Differences in product shape and product thickness as well as other factors have an effect on weight.

Voices of the People in Charge

We at Sumitomo Bakelite have a long experience in manufacturing phenolic products. We work not only to provide customers with higher performance solutions but also to contribute to having automobiles lighter to improve their fuel economy. With further technological breakthroughs, we would like to contribute to the earth's environment; so, please continue to follow our activities.

Shigeru Oda, Dept. Manager, Solution Development Department, Market Development Division, High-Performance Plastic Products Business Unit



Phenolic Products Advance together with Automobiles

Phenolic resins, which were developed early in the 20th century by Dr. L.H. Baekeland, a U.S. citizen of Belgian descent, were the first plastic resins to be commercialized and have the longest history of any plastics. Sumitomo Bakelite was the first company in Japan to make these resins commercially available.

Phenolic resins are made by using an additive polymerization with phenols monomer and aldehyde. Sumitomo Bakelite has its own technology of polymerization, compounding, and molding, and, even today, is moving forward to contribute to the evolving automobile sector through the development of new technologies.

Recycling Activities

Since phenolic products cannot be melted by heating once they have been cured, they are reused as fuel (thermal recycling) or reused as filler after being crushed into fine particles (material recycling).

Sumitomo Bakelite is working on the chemical recycling process that will allow recovery of these higher-value-added chemical materials.

Phenolic Resins

Featuring superior thermal resistance and chemical resistance as well as adhesive properties, phenolic resins find application in disk brake pads, drum brake lining, clutch facings, tire binders, resins for shell moldings, and other areas.

Phenolic Molding Compounds and Molded Parts

Phenolic molding compounds with reinforcement, such as fillers, acquire additional properties like mechanical strength, modulus, and reliability in addition to superior thermal resistance and chemical resistance, thus making them high performance materials for automotive application. These uses include front end accessory pulleys, disk brake pistons, water pump covers, and a wide range of other applications.



Various types of FEAD pulleys



Disk brake pistons

Continuous Evolution of Phenolic Products

To respond to the increasing diversity of automotive applications and other needs, Sumitomo Bakelite is engaged in the development of new materials, including carbon fiber reinforced phenolic molding compounds that exhibit wearing resistance, long fiber reinforced molding compounds with high impact resistance, and other types of materials.

Phenol adhesives for plywood production contribute to biodiversity and global warming prevention

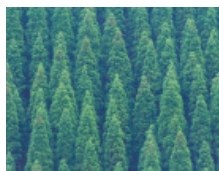
Kizukai (Wood Use) Activity

About 67% of Japan's land area is forestland. Forests are needed to perform an important function as absorbers of carbon dioxide, and to put forests into good condition to play this role, it will be necessary to increase demand for domestic wood fiber and return a portion of the funds obtained from such forest enterprises to pay for taking care of forestland. Accordingly, beginning in 2005, Japan's Forestry Agency has begun to promote the "Kizukai (Wood Use) Activity" to encourage the proactive use of domestic wood fiber.



Promoting the Use of Wood from Forest Thinning

To properly care for the forests, it is necessary to cut the undergrowth and conduct forest thinning. Active use of thinning wood obtained from these forest thinning activities in the manufacturing of plywood is expected to make an important contribution. However, there are a number of technical problems that have to be solved. Wood from forest thinning (primarily cedar) is difficult to dry and soft, and adhesives used in the production of plywood tend to release a relatively high level of formaldehyde. Overcoming these problems, however, is one way to promote the economic use of wood obtained from forest thinning.



Phenol Resin Adhesive: Yuroid PL-9000

PL-9000 was developed as a result of a basic review of resin reactions, and, compared with previously existing adhesives, the volume of formaldehyde released by the adhesive itself has been reduced. In addition, by developing adhesives that harden more rapidly at lower temperatures, even wood from forest thinning (cedar) can be bonded without puncture* problems. In addition, since PL-9000 excels in hardening quickly and at low temperatures, it is also effective in preventing reduction in the thickness of plywood sheets and results in plywood that has uniform thickness.



Phenol resin adhesive



Tank transport vehicle

Conventional Phenol Resin Adhesives

Since conventionally existing general-purpose phenol resin adhesives are applied at high temperatures, plywood made with wood having a high water content tends to puncture* more easily. In addition, compared to Russian larch and other types of woods that have been used thus far in the production of plywood, cedar has a higher formaldehyde content, and the amount of formaldehyde released by plywood products made from cedar tends to be higher. In addition, because sheets are glued together at high temperatures, the thickness of the plywood sheets tends to be reduced.

* Puncture occurs in the production of plywood when the moisture contained in the wood obtained from forest thinning and the adhesive is put under heat and pressure in the plywood manufacturing process, and, as a result, the high temperature vaporizes the moisture causing it to expand. When the energy of the vaporizing moisture overcomes the adhesive, the plywood punctures, and this destroys the adhesive layer.

Supporting the Care and Preservation of Forests through Thinning

Previously, imported lumber made from softwood (coniferous) trees was the principal wood fiber material used in Japan in the manufacturing of plywood, but, at present, there is an ongoing shift toward domestic wood fiber, with more than half accounted for by cedar. As previously mentioned, the importance of caring for and improving forest resources is increasing, and the value of Yuroid PL-9000 phenol resin adhesive in this area is becoming recognized more widely. Sumitomo Bakelite will continue to develop products that contribute to the prevention of global warming and to diversity with the aim of maintaining and expanding abundant forest resources and preserving the habitats of the diversity of life-forms that make their homes in the forests.

Voices of the People in Charge

We are aware that we are supporting, at least indirectly, the Kizukai (Wood Use) Activity through the supplying of phenol resin adhesives. We want to continue our efforts to make a contribution by supplying easy-to-use, high-quality adhesives.



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