

Down to the smallest detail...

A story of environmental awareness told through the development, production, use and disposal of a BeoCenter 6-26



BANG & OLUFSEN



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A modern glass-walled building with a curved facade, reflecting the sky and surrounding environment. In the foreground, a lush green field is visible, with several sheep grazing. The sheep are white with black faces and legs. The sky is a clear, bright blue.

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Foreword

The Bang & Olufsen logo is a guarantee of quality. We want our customers to be able to buy products from Bang & Olufsen safe in the knowledge that we have made intelligent decisions on behalf of our customers – in terms of working conditions for our employees and the environment as a whole.

The nature of the company's environmental work has shifted since the middle of the 1990s. Conventionally, the environmental focus was linked to the production of the company's products, including the working environment and impact on the immediate external environment from energy consumption, water consumption, emissions into the air, water and soil, and waste from the production processes. In time with this aspect of the environmental efforts is being met the environmental work today is viewed from a life cycle perspective, such that the environmental aspects of the products themselves have become a significant parameter.

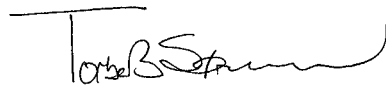
Bang & Olufsen prepares an annual environmental report that details the environmental conditions related to the

production carried out at our factories, as well as the working environment.

Similarly, we prepare product-related environmental reports – one of which you are reading right now: "Down to the Smallest Detail – a story of environmental awareness told through the development, production, use and disposal of a specific product." "Down to the Smallest Detail" reports have been prepared for the Automotive Business Area and for BeoCenter 1, BeoLab 1, BeoSound 3200 and BeoCenter 2. This time we have gone into detail about BeoCenter 6-26.

You can read "Down to the smallest detail" reports and our latest environmental report online at www.bang-olufsen.com.

On behalf of the Board of Management



Torben Ballegaard Sørensen
CEO





Environmental Policy

All human behavior influences the environment. This also applies to the production and use of our company's products. Bang & Olufsen works continuously on minimizing the effects on the environment. Equal weight is given to finding a balance between the needs of the environment and the consideration given to our products': practical qualities, economic value, aesthetic value and a long life span. In this way, Bang & Olufsen endeavors to be among the best in the business. We will openly discuss environmental issues related to the company and publish a yearly environmental report. We wish to be a part of sustainable global development and view our activities within a life cycle perspective. As a minimum Bang & Olufsen will comply with national and international environmental requirements.

Development (idea, design & construction)

A product's qualities regarding environmental impact are determined in the product generation process, and the necessary steps are taken to reduce this impact in subsequent phases of the product's life cycle.

Raw materials

We will attempt to avoid selecting environmentally problematic materials.

Production

We will give cleaner technology a high priority when choosing methods of production and equipment. We place emphasis on consideration of the local environment, as well as on creating a safe and healthy work environment for our employees. We focus here on improving the physical as well as the mental work environment. We will ensure that the suppliers we choose have adopted environmentally appropriate attitudes and policies. We will carry on a continuing dialogue with suppliers regarding the creation of sound environmental conditions in that phase of the product's life cycle that they are responsible for .

Transport

We will demand a great degree of efficiency of our carriers in their use of resources and application of technology in transport units.

Use

We will aim for problem-free product use in the customer's environment, long product life and a low level of energy consumption during the product's life span.

Disposal

We will endeavor to make product parts suitable for recycling. This entails making significant components easily identifiable during disassembly, and thereby making it possible to choose the best method of disposal or recycling.

Environmentally Friendly Design

We at Bang & Olufsen strive to design environmentally friendly products. As we see it, consideration for environmentally friendly qualities is a must – i.e. an aspect customers take for granted and expect to have been appropriately covered. At Bang & Olufsen, environmentally friendly design means that as early as in the development phase, we are already thinking in terms of the entire life cycle of the product. During the development phase, we make a range of environmental demands on our products – demands linked to aspects such as minimal stand-by consumption and a ban on unwanted substances.

We carry out tests that simulate the dismantling process at the disposal after 15–20 years of use so as to ensure that the product can actually be separated into the appropriate fractions. This process also generates suggestions for improvement that we can apply to subsequent development projects. All this work is intended to help us achieve environmental improvements in relation to previous products by including live cycle considerations during the development of new products.

The EU has adopted a directive that in the future will set environmental demands on new products that consume energy. As we have imposed environmental demands on our products for many years, we do not expect this new directive to have a major impact on our products.

In order to continue our environmental

work “along the chain” to our suppliers, we have introduced the concept of supplier assessment. This is not focused exclusively on environmental issues, it applies to just as great an extent to ethical and social issues. As a minimum, all

our suppliers are required to sign a Code of Conduct, and we carry out evaluations of every supplier.



Flame Retardants

In order to reduce the risk of fire in electrical units, authorities require plastic components and circuit boards (also called PCBs) to have a fire retardant effect. As a result, a flame retardant – i.e. a chemical substance that has a retardant effect on fire – is added to such components. For many years, brominated flame retardants have been used in televisions and computers. However, it now appears that some brominated flame retardants can actually evaporate from plastic when the temperature exceeds 30–40 °C, as these retardants are not chemically bound in the plastic. Moreover, flame retardants of this kind are suspected of having undesirable effects on people's health and on the environment.

On 1 July 2006, a new EU regulation came into effect, banning the use of two types of brominated flame retardants – PBB and PBDE. Many years before the regulation came into effect, Bang & Olufsen had already phased out the use of all brominated flame retardants and replaced them with phosphate-based flame retardants. As a result, our plastic components still live up to requirements from the authorities regarding fire retardant effect without being troubled by the issue of hazardous flame retardants. We actually made the change as early as the middle of the 1990s. For this reason, the BeoCenter 6 – just like all our other products – contains no plastic components that involve brominated flame retardants.

It must be said, however, that Bang & Olufsen does still use a brominated flame retardant in one component. In circuit boards, we use retardant type TBBPA, which is added reactively. This means that TBBPA is included in the chemical structure of the circuit board material, and is therefore not present in its original chemical compound. As a result, the TBBPA cannot evaporate. TBBPA is one of the brominated flame retardants which it is still permitted to use.

Naturally, we are monitoring the market for alternatives to brominated flame retardants for our circuit boards, and once we find a suitable replacement we will be able to phase out the last of our brominated flame retardants.

Energy Consumption

By far the greatest environmental impact from entertainment electronics stems from the energy consumption in the use phase, i.e. when the product is installed at the customer's home. This also applies to the BeoCenter 6.

For many years, we have been focusing on standby consumption as this is an aspect that many people consider a waste of energy. However, it is a necessity for users if they are to have the opportunity to use a remote control to switch on their equipment. Moreover, it is not possible to operate a BeoCenter 6 in a link setup if power has been disconnected at the mains.

The BeoCenter 6-26 consumes 0.8 W while on standby, and 116 W when switched on (on mode). Televisions are typically in "on mode" for six hours a day, which means they are in standby mode for 18 hours a day. This translates into

annual energy consumption of 260 kWh, of which only 5 kWh – or barely 2 per cent – are attributable to standby consumption. This equals consumption of three 60 W light bulbs that are switched on for four hours a day.

The on mode energy consumption of an LCD television depends on the audio volume level selected, but it is unaffected by colour and brightness levels. This is because the light source in an LCD screen – called a "backlight" – is illuminated constantly, irrespective of the picture. The energy consumption of televisions with picture tubes and plasma screens is, however, determined by the colour and brightness levels. From the perspective of energy consumption per area unit, an LCD television uses approximately the same amount of energy as a conventional or plasma television.

We always state the output of our units on a label that is affixed to the product. The same output values are printed in our main catalogue and published on our website.

Packaging



The purpose of packaging is to protect products during handling, storage and transport, but at the same time, packaging is considered a waste of resources and a waste problem. Bang & Olufsen uses the same packaging for BeoCenter 6, no matter where in the world they are to be shipped to. We choose materials that can be recycled when disposed.

The packaging for more-or-less all our products consists of a cardboard box in which the product is held securely in place by two shell sections of expanded polystyrene (EPS). EPS is shock-absorbent and consists of 2 per cent plastic and 98 per cent air. The plastic is expanded through the application of steam. In order to protect the product surfaces from scratches, they are packed in a thin layer of EPS film.

Both cardboard and EPS can be either recycled or incinerated when disposed. When we designed the first packaging solution for the BeoCenter 6, we placed great emphasis on ensuring that the packaging could be moved with a fork-lift truck. For this reason, the first packaging solution was designed to stand on a pallet. However, this generated a number of practical problems for dealers and customers, as the packaged unit is unwieldy and too heavy to move manually. We therefore implemented a redesign process that resulted in our reducing the packaging volume by 50 per cent and its weight by 40 per cent, without compromising the

packaging properties. The new packaging solution provides the same protection as the old one, so we can be sure that it will protect the product all the way to the end user.

Similarly, we succeeded in reducing the packaging for two of the four stands that customers can choose for the product. The packaging for these two stands has been reduced by approximately 50 per cent.

The fact that we have reduced the weight and volume of these packaging solutions also provides an environmental benefit in relation to transport, as more units can now be transported on the same lorry. This naturally ensures more efficient use of the transport vehicle.



Working Environment in Assembly

We place great emphasis on the occupational health and safety of our employees. Our aim is to create a safe and healthy working environment – both physical and psychological – for our employees. We strive to adapt our workplaces to suit our employees, not the other way around. For this reason, occupational health and safety aspects are taken into consideration as early as in the design and development phase, because the choices of for instance materials, joining methods and surface treatment options made by our product developers often have a major impact on health and safety in the production phase.

At least once every three years, all our workplaces are subjected to what is known as a “workplace assessment” (WPA) that covers not only physical, chemical and ergonomic aspects, but also the psychological working environment.

We are committed to minimising the use of chemical substances that the authorities have classified as hazardous to eliminate the risk of our operators contracting workplace illnesses from the effects of such chemicals. We strive to replace the most hazardous substances with substances that serve the same purpose but are less hazardous to health and the environment. In the area of adhesives, we are working to introduce alternatives to the adhesive

we currently use and which contains hazardous substances. When setting up a new assembly line, we place great emphasis on ensuring that the workplaces feature an ergonomically correct design and that our employees can avoid heavy lifting. The Danish Working Environment Act states that a person may lift a maximum of 50 kg, on condition that there be no exacerbating factors. “Exacerbating factors” refers, for example, to lifts that are not close to the body, lifts below knee height or above shoulder height, lifting objects with sharp edges, or lifting objects with delicate surfaces. The BeoCenter 6 weighs 22 kg, but on account of exacerbating factors and the number of lifts required per day, lifting equipment is available at the beginning and end of the assembly line. Each assembly workplace has been designed to allow adjustment of the working height. In addition, the workplace design allows the units to be rotated if necessary to ensure a good working posture for each individual production employee. Previously, the assembly work involved a great deal of glass polishing, but optimising the internal transport packaging of the glass panels has made it possible to eliminate much of this polishing work for the benefit of the employees. In addition to the purely ergonomic conditions, we also work on other workplace factors such as indoor climate and noise levels.



Disposal

The BeoCenter 6 is designed to operate for many years. But when it is eventually time to dispose of the television, it must – just like all other electrical and electronic units – be collected and processed by an approved waste processor. This regulation applies throughout Europe and in a number of countries outside the EU. At the waste processor’s, the BeoCenter 6 is dismantled and the component materials are either recycled to make new materials, or incinerated so as to make use of the energy they contain. Only a very small part of the materials cannot be recycled or incinerated, and is deposited as landfill.

For many years, Bang & Olufsen has prepared its products to facilitate processing and recycling subsequent to disposal. For this reason, the company makes environmental demands on the design of new products – for example, plastic components have to be labelled – and always performs a dismantling test on every unit before it is released for production.

A number of materials in the BeoCenter 6 are bound, which means they can be recycled subsequent to disposal. The screen constitutes the largest part of the television. LCD screens are still relatively new components for waste

processors to deal with, and work is still being done on methods for dealing with these screens. At present, it is possible to recycle 60–75 per cent of the materials used in an LCD screen. Copper and other precious metals can be extracted from circuit boards. Plastic, metal and glass components are either granulated or melted down to produce “new” materials.

It is actually possible to recycle more than 90 per cent of the materials used in a BeoCenter 6. This is superior to the 75 per cent stated as a requirement in the EU directive concerning the disposal of electrical and electronic waste (the WEEE Directive).