SUSTAINABLE MATERIALS DESIGN FUNNEL

Sustainable Material Funnel and Incorporating Life Cycle Assessments (LCA)

We take the need for safe, sustainable materials seriously – we've adjusted our processes, created new design and development tools, and implemented new life cycle and cost models that represent alternate materials. With these resources at their fingertips, Mattel product teams are empowered to choose sustainable new materials for their new designs and advance our company toward our sustainable product and packaging goals. Key to this is the Mattel Sustainable Material Funnel.

The 4 Phases of the Sustainable Material Funnel

- *Material Scouting*: This involves finding new materials through vendor contacts, trade shows or desktop research.
- *Technical Review*: Once a material is found, we review the specifications, perform a regulatory screen, assess the material's sustainability and review the commercial aspects like cost, capacity and lead-times.
- *Manufacturing Trial*: We mold parts using the material and put them through evaluations of their ability to be processed, assembled and decorated. We also perform extensive safety and reliability testing to ensure we are meeting our expectations for quality and durability.
- *Available for Use*: The material has made it through the funnel and is ready to use. Once selected for a specific product, the material will be subjected to additional product-specific safety and reliability requirements.

What the Sustainable Material Funnel Helps Us Accomplish

Per our 2030 sustainable product and packaging goal, we are actively improving the recyclability of the products that we use – we want them to be easy to disassemble, separate and recycle wherever the appropriate recycling facilities are available. We're also working to continually increase the amount of recycled and bio-based content in our products. Our Sustainable Material Funnel helps us accomplish this in two primary ways:

1. It helps us choose raw materials with a preferable environmental footprint. In line with our 2030 goal, we have already qualified and approved six materials for new products in development, including three bio-based materials, two post-consumer recycled materials and one bio-based/post-consumer combination. LCA, technical requirements and design principles help our teams to select the best material for each product and package application.

2. It confirms that we have not introduced unintended environmental impacts by choosing the alternate materials. The sustainability assessment included in the funnel enables us to consider environmental impacts all along the product's lifecycle, including impacts from the sourced raw materials and during manufacturing, transportation and end of life.

Incorporating Life Cycle Assessments

Mattel's Sustainable Material Funnel considers environmental impacts along the product lifecycle from cradle to grave. We have invested in a custom LCA tool to help us optimize product design choices and are training our product design and development and engineering teams to integrate the modeling into all new product development. LCA modeling was used for the Fisher-Price Rock-a-Stack to ensure that the bio-based materials selected were better for the environment than conventional plastics. Our LCAs are aligned with ISO14040/ISO14044 and measure five environmental impact categories: greenhouse gas emissions, primary energy demand, eutrophication, acidification and photochemical oxidation potential.

Our custom-built LCA tool helps us objectively evaluate the environmental impact of conventional and potential alternative materials. Data for standard resins and the alternate materials that have passed through our Sustainable Materials Funnel are included in the tool, which will help guide subsequent material and design decisions. As an example, data from our bio-based plastic resin demonstrates that bioplastics have an environmentally preferable LCA compared to fossil fuel-based plastics, Bioplastics are even CO_2 negative. The negative comes from the plants, which absorb more CO_2 than needed for the production of the plastic.