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izzy+ End of Life Recovery Strategies

When a product or material reaches its end-of-life, there are several options for recovering some or all of its initial value. Through various recovery strategies, additional value can be found in a product's original form, its material content, or its embodied energy.

There are three primary methods of end of life recovery. In general terms these strategies are *material reuse*, *material recycling*, and *energy recovery* arranged in the typical order of decreasing recovery value. However, which method of recovery is appropriate may ultimately dependent upon many additional factors including the condition of the product, the nature of its materials, and the recovery infrastructure available. The best recovery opportunity for any particular product will likely involve a combination of the above strategies.

While end of life recovery strategies are typically considered in context to the recovery of products at the end of their useful life, the strategies presented in this document are equally applicable to material waste streams which arise during the manufacturing of our products.

izzy+ End of Life Recommendations

It is part of izzy+'s commitment to its Sustainability Policy and Environmental Stewardship Principals to reduce the environmental impact at our product's end of life. Through the *izzy+ Design for Environment* (DfE) process, izzy+ products are designed to maximize product life and to optimize material recovery and reuse at the end of the useful life of the product.

izzy+ recognizes the inherent value in order, and therefore promotes strategies which extend the useful life or our products or recovery of the materials which comprise them. As such, izzy+ recommends that our customers pursue *material reuse* and *material recycling* strategies as detailed below when selecting end of life strategies. While identified as a potential recovery option, *energy recovery* should only be considered as a final option for recovery when other options are not appropriate. izzy+ is developing the *izzy+ Disassembly Instructions* for its products to enable the optimal recovery of materials for reuse or recycling.

Material Reuse

Material reuse is the first option for retaining the highest value from your aging izzy+ product. This recovery strategy seeks to recover value by reusing the product or material in its original form. In this manner, the functional application of the components, its materials, and its embodied energy are preserved. Additional use or value can usually be obtained with little or no processing involved. This recovery option encompasses strategies often termed as reuse, repurposing, or refurbishing.

izzy+ products are designed to serve a long and useful life, however, normal wear and tear is inevitable. Material reuse seeks to preserve and extend the useful life of the overall product by reusing as much of the furniture in its original form as possible. Such efforts may require refinishing, resurfacing, reupholstering, and/or replacing worn or abused components. Replacement parts for many products can be furnished directly

from izzy+ to assist in your furniture recovery efforts. This strategy prevents functional components from entering the waste stream.

To assist our customers in their material reuse efforts, izzy+ may consider the possiblity of a future implementation of a furniture take-back program. Please check back on the izzy+ website (http://www.izzyplus.com) for updates on these and other recovery efforts.

When considering manufacturing waste streams, material reuse seeks to reuse materials which would otherwise be considered waste within its original or alternative application.

Material Recycling

When reuse of products or materials in their original form is not feasible, the next best method to recover their inherent value is through traditional recycling of the materials which comprise them. Many of the materials used in izzy+ furniture exhibit a high level of recyclability. Recycling of such components will ensure that the material value will not be lost to the solid waste stream.

While many materials may be considered theoretically recyclable, the actual recyclability and value obtained from traditional recycling of used furniture components is dependent upon several factors including:

- Material separation (e.g. assembled, disassembled)
- Material characteristics (e.g. grade, condition, coatings, impurities)
- Material quantity (e.g. truckload, less than truckload)
- Logistics (e.g. pick-up, drop-off)
- Local recycling infrastructure (e.g. processing facilities, recycling technology)
- Material markets (e.g. raw commodity prices, recycled commodity prices)

In general, higher recovery value for a given material can be obtained when the following conditions are met:

- Material exists in large quantity (e.g. truckload)
- Material composition is correctly identified (e.g. metal grade, base polymer and additives)
- Recycling infrastructure readily exists (e.g. collection infrastructure, processing facilities, recycling technology)
- Resultant recycled commodity is of a high quality (e.g. similar or equivalent to virgin commodity)
- Markets exist for the recycled commodity (e.g. demand for recycled material is high, recycling is cost effective)

Typically metals (e.g. steel, aluminum) have the greatest market value for traditional recycling. This is due to factors such as a well established recycling infrastructure, increasing raw commodity costs, and low loss in material quality.

Plastics found in furniture components are engineering grade plastics and as such do not fall into the #1-6 recycling codes typically used for commodity (i.e. container) grade plastics. When recycling such plastics, the recycler will often seek to know the ISO 11469 resin code which details the base polymer, polymer blends, fillers, and flame retardants which may comprise the plastic. This information is valuable for recyclers of engineering grade plastics in order to separate material streams according to material composition. izzy+ is currently working with its suppliers to identify and communicate the

composition of its plastic components according to ISO 11469 to facilitate the recycling of its plastic components.

Energy Recovery

In cases where the original functionality of a product or the materials which comprise such a product cannot be recovered through material reuse or recycling activities, energy recovery is the last option that remains for recovering some of the energy and molecular value embodied in the material composition. There are several strategies available for energy recovery including traditional methods such as incineration or emerging methods such as pyrolysis or gasification. While energy recovery is lowest value recovery opportunity, for certain materials it may currently be the best option for value recovery. Such methods should only be employed in facilities with adequate pollution control technologies.