

Exchange Network for Expanded Polystyrene Bio-Shipping Containers

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Biological research depends on the timely delivery of a large variety of temperature sensitive reagents in expanded polystyrene (EPS, *aka* Styrofoam™) containers. Thousands of these bio-shipping containers are delivered in the biotech industry everyday, and nearly all have a single use -- the lifecycle ends when the container is opened and the EPS container shifts from a critical asset (protective package) to a liability (waste). Handling the EPS container in a mixed-stream recycling program is cost prohibitive. Consequently, virtually no insulated shipping containers are recycled, resulting in significant waste and lost value in the biotech industry. Examples of these boxes on our campus are shown in Fig. 1

Large biotechnology companies including Promega, Thermo-Fisher, Sigma-Aldrich, and New England Biolabs offer free return shipping on their EPS boxes so that they can be reused in their shipping operations. However, these programs have very low participation rates, high costs, *and in most cases a negative carbon footprint compared to disposal and landfilling*. We currently have a P3 project from USEPA to develop a reuse program for these containers that includes strategies to increase participation and create quantifiable improvement in sustainability metrics (e.g., savings in energy and greenhouse gas emissions).

Universities with biotechnology research are large consumers of bio-shipping containers. During Phase I of our P3 project, we set up an EPS collection program on the University of Wisconsin-Madison campus for the analysis, reuse, and recycling of this material. Our reuse program was initiated on 1 January 2014, and as of March 2014 we had already diverted five semi-truck loads of EPS for reuse and recycling, repurposed over 100 EPS boxes into our campus surplus sales program, and delivered hundreds of reclaimed EPS boxes to three local biotech companies for reuse in their shipping operations. *Our life cycle analysis shows that these activities have resulted in reductions in energy consumption, greenhouse gas emissions, water use, and life cycle cost.*

In Phase II of our P3 project, we wish to expand the scope this program to other US universities with biotechnology research, and build an informational website that provides the information needed to set up reuse and recycling programs for bio-shipping containers at universities. We are looking for two partner universities to setup a program on their campus, and we are interested in having the University of Illinois at Urbana-Champaign as one of these partners.

We would provide collection bins and a modest budget for costs associated with EPS collection and shipment on your campus (about \$10,000). These bins would be branded with the P3 logo and could also include our logo and your logo if you wished. We would provide you with the process that we use to repurpose shipping containers on our campus and contacts at firms in your region to consider (e.g., Sigma Corporation in St. Louis). Like many shippers, Sigma Corporation uses bio-shipping containers that are nearly identical to those of their competitors and can be used interchangeably.

We would expect your university to arrange with your local biotechnology companies, biomaterials shippers in your area, and laboratories on your campus to engage in the program. We would also expect you to provide student interns who could participate in the program on your campus. On our campus, interns are responsible for managing the collection and shipment of the boxes to firms and laboratories on our campus and in our area. However, you would have complete freedom to set up the system on your campus in manner that works best for your institution.



Fig. 1. Bio-shipping boxes on the UW-Madison campus and our P3 team.





Office of Sustainability
UNIVERSITY OF WISCONSIN-MADISON



This building RECYCLES STYROFOAM



Bring Styrofoam recyclables to the South-West side of the building near the **loading dock**

What can be recycled?

- ✓ Styrofoam shipping containers
- ✓ Any Styrofoam packing materials
- ✓ Packing peanuts (MUST BE BAGGED)
- ✓ Cool packs (place in small blue bin)



Containers should be empty



Bag peanuts separately



Place cool packs in these bins



For more information visit:
<http://sustainability.wisc.edu/styrofoam/>

Fig. 2. Examples of successful marketing of program and collection at UW-Madison.