

## Harvard Science and Engineering Complex – Boston, Massachusetts, USA

Essay by Jonathan Kerr

The Harvard Science and Engineering Complex (SEC), designed by Behnisch Architekten, located in Boston, MA, is Harvard's newest engineering building. The complex is 544,000 square feet and has 8 total stories, with two being below ground. The building has been awarded LEED Platinum; the highest award given by the US Green Building Council (USGBC) and has also earned 3 of the 7 total pedals of the Living Building challenge – for materials, beauty, and equity<sup>1</sup>. Considering only 28 buildings worldwide have been awarded all 7 pedals, the SEC is considered one of the greenest and environmentally academic buildings in the US.

A significant part of the SEC's attempt to reduce energy consumption is through passive solar design. The building is wrapped with the world's first hydroformed stainless-steel façade, which helps reduce the building's carbon emission by roughly 42%<sup>2</sup>. Since the 14,000 total façade panels could not be made using a standard two-form press, Behnisch reached out Edelstahl Mechanik GmbH, a German steel distributor, and had the panels made using high-pressure water and a laser cutting method. Once placed on the building's exterior, the panels selectively reflect sunlight to interior spaces, block direct sunlight during the summer, and allow it during the winter. The windows behind the façade are triple-glazed, providing five times more efficiency than that of a single-pane window, which saves energy and reduces noise<sup>3</sup>.

The building's mechanical and HVAC design are also designed to maximize energy efficiency. Any outside air that enters the building is immediately run through an air cascade system, meanwhile the exhaust air is sent through a heat-recovery system, which captures and recycles waste heat<sup>4</sup>. The ventilation system also allows for adjustable airflow – allowing building operators to control ventilation rates, based on the needs of occupants. This creates a safer building environment, stopping condensation and removing dust and other impurities from the air. In other areas of the building, a hydronic heating and cooling system regulates temperature. Hydronic heating works by circulating water throughout the building, radiating heat. This system eliminates the need for a fan driven system, which typically is more expensive to run and has a shorter furnace filter life.

Following research published by Harvard's own schools of public health, engineering, and science, the materials used during construction of the SEC were carefully picked to ensure none were harmful to human health or the local environment. Overall, 6033 different materials were tested, and over 1700 products were approved to be used. Many of the materials produced had to be redesigned and reformulated by the manufacturers in order to remove all harmful chemicals. Not only do the materials meet the criteria for Harvard's Healthier Building Academy, but also the Living Building Challenge's "Red List," which catalogs prevalent building materials used in construction that threaten both human health and our ecosystems<sup>5</sup>.

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1. [Living Building Challenge](#)

## **Sources**

- 1). **Green Harvard** - <https://green.harvard.edu/topics/green-buildings/harvard-science-and-engineering-complex>
- 2). **Fast Company** - <https://www.fastcompany.com/90639278/it-looks-like-a-cheese-grater-but-this-new-harvard-building-has-environmental-superpowers>
- 3). **SEAS Harvard** - <https://www.seas.harvard.edu/news/2021/03/science-and-engineering-complex-named-one-worlds-healthiest-lab-buildings>
- 4). **SEAS Harvard** - <https://www.seas.harvard.edu/news/2018/03/building-innovation>
- 5). **Living Future Red List** - <https://living-future.org/declare/declare-about/red-list/>

**Designboom** - <https://www.designboom.com/architecture/harvard-behnisch-architekten-worlds-healthiest-lab-buildings-sec-interview-06-14-2021/>

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**Living Future** - <https://living-future.org/lbc/basics4-0/https://living-future.org/declare/declare-about/red-list/>

**Boston Planning & Development Agency** - <http://www.bostonplans.org/getattachment/1f648ef5-faef-4d55-b3f1-b61c55f9896c>

