

CARBON

SEQUESTRATION

The image features a photograph of a pine forest. The foreground shows the trunks of many tall, thin pine trees on a ground covered with brown pine needles. The background is a dense canopy of green pine needles. A large, vertical rectangular overlay with a dark blue background and a bright cyan border is centered over the image. Inside this overlay, the text 'A BRIEF INTRODUCTION TO THE CARBON SEQUESTRATION BENEFITS OF BROCKFILL' is written in white, uppercase, sans-serif font. The text is arranged in four lines. To the left of the text, there is a sunburst effect with several rays of light extending from a point on the left edge of the overlay towards the center.

**A BRIEF INTRODUCTION TO THE CARBON
SEQUESTRATION BENEFITS OF
BROCKFILL**

”

IT IS OUR
COLLECTIVE AND
INDIVIDUAL
RESPONSIBILITY...
TO PRESERVE AND
TEND TO THE
WORLD IN WHICH
WE ALL LIVE

“

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WHAT IS CARBON SEQUESTRATION?

Carbon sequestration is the process of capturing and storing atmospheric carbon dioxide. In the case of BrockFILL®, carbon is captured as the trees that become BrockFILL photosynthesize and grow. As these trees grow, they store carbon in their roots, leaves, branches, and trunks.

Each of these storage opportunities is important, but for this study, we direct our efforts toward the direct impact of BrockFILL®, a Brock USA sustainable infill for artificial turf.



HOW MUCH CARBON

DOES BROCKFILL CONTAIN?

First, we consider the species of tree harvested to produce BrockFILL. Each species of tree processes carbon differently, and those differences must be considered.

Next, we need to know the actual weight of the wood used for each field installation. Research performed by independent universities and government agencies has established that the carbon content of the species of tree used for BrockFILL is approximately 50% of its biomass^{1,2}





HOW DOES THIS TRANSLATE

TO ATMOSPHERIC CO₂?

Carbon naturally bonds with oxygen to form CO₂ very easily; whenever a material containing carbon is burned, one of the byproducts is CO₂. CO₂ then enters the atmosphere and increases the atmosphere's ability to retain heat. Therefore, for every pound of carbon sequestered, approximately 3.6 pounds of CO₂ is kept out of the atmosphere.¹





WHAT ABOUT

END OF LIFE?

The carbon that's been sequestered in BrockFILL doesn't simply re-enter the atmosphere when it decomposes. Proper composting strategies carefully manage inputs to ensure that the carbon captured by the BrockFILL enters the soil as it decomposes, meaning the benefits of BrockFILL extend even beyond the field!



HOW MUCH CO₂ IS MY FIELD KEEPING OUT OF THE ATMOSPHERE?

The average BrockFILL field contains approximately 80,000 lb of BrockFILL. That means that the average BrockFILL field contains approximately 40,000 lb of sequestered carbon. Therefore, each BrockFILL field is keeping 146,583 lb of CO₂ from entering the atmosphere!

According to EPA estimates³, that's the equivalent of keeping 14 passenger vehicles off our roads for an entire year. Simply put, the emissions savings is similar to recycling 22.6 tons of waste instead of sending it to the landfill.



THE MATH

- First, we know the average BrockFILL field contains approximately 80,000 lb; because we know that ~50% of the weight of the wood for BrockFILL is carbon, we can suppose that each BrockFILL field has sequestered approximately 40,000 lb of carbon.
- The atomic weight of carbon is 12.011 g/mol
- Carbon dioxide is 44.009 g/mol
 - This is because CO₂ is one atom of carbon chemically bonded to 2 atoms of oxygen.
- Therefore, we have:
 - $CO_2 = \text{Carbon Sequestered} * CO_2 \text{ mass} / \text{Carbon mass}$
 - $CO_2 = 40,000 \text{ lb} * 3.664 = 146,583 \text{ lb}$

THE CITATIONS

- 1. Johnsen, Kurt H.; Teskey, Bob; Samuelson, Lisa; Butnor, John; Sampson, David; Sanchez, Felipe; Maier, Chris; McKeand, Steve. 2004. Carbon sequestration in loblolly pine plantations: methods, limitations, and research needs for estimating storage pools. P. 373-381 in Rauscher, H. Michael; Johnsen, K. Southern Forest Science: Past, Present, Future. Gen. Tech. Rep. SRS-75. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station.
- 2. Skog, Kenneth E. 2008. Sequestration of carbon in harvested wood products for the United States. Forest Products Journal. 58(6): 56-72.
- 3. "Greenhouse Gas Emissions from a Typical Passenger Vehicle." EPA, <https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle>



BROCK



IMPROVING THE FIELD OF PLAY

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