



LIFE CYCLE ASSESSMENT



A HUBER COMPANY

PRODUCT

DESCRIPTION



Vapor Gard® anti-transpirant serves as a Pinolene® terpene polymer-based product for use on specialty crops as a full-coverage spray to reduce water evapotranspiration. Vapor Gard forms a soft, microscopic film over the leaf and plant surface that allows for normal growth and development to continue while protecting against adverse weather conditions.



BENEFIT



MINIMIZES DROUGHT STRESS

BENEFIT



IMPROVES PLANT WATER AVAILABILITY

BENEFIT



AIDS IN MAXIMIZING IRRIGATION EFFICIENCY

BENEFIT



CAN ASSIST IN INCREASING CROP SIZE, WEIGHT, AND QUALITY

BENEFIT



APPLICATION EQUIPMENT FRIENDLY

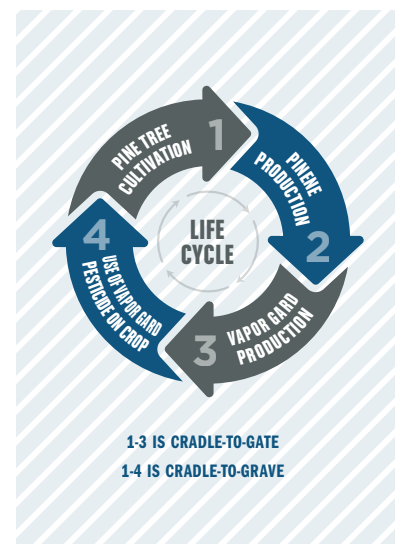
OUR COMMITMENT TO SUSTAINABILITY

One of J.M. Huber Corporation's (Huber's) top priorities is being a responsible neighbor and steward of the environment. Our actions are guided by the Huber Principles and help us deliver on our commitment to long-term, sustainable business performance. As part of Huber Engineered Material's commitment to sustainable product development, we conducted a Life Cycle Assessment (LCA) to provide transparency to our customers and to better understand and improve product performance.

WHAT IS A LIFE CYCLE ASSESSMENT?

Life cycle assessment (LCA) is an analytical tool used to comprehensively quantify and interpret the environmental impacts of the entire life cycle of a product or system from raw material extraction to the gate of the manufacturing site (cradle-to-gate) or to disposal of the product (cradle-to-grave).

Miller purchases pinene and further blends and mixes additional raw materials to yield the Vapor Gard product. Vapor Gard is then sold to farmers who mix Vapor Gard with water and apply to their crops. As shown in the figure to the right, impacts measuring the raw material phase up to the production and packaging of Vapor Gard is considered the cradle-to-gate impacts of this study. The cradle-to-grave impacts include the Vapor Gard cradle-to-gate impacts as well as impacts associated with transportation to final customer and of the use of the product.





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LIFE CYCLE IMPACTS

TABLE 1 : CRADLE-TO-GRAVE IMPACTS OF VAPOR GARD (PER ACRE)

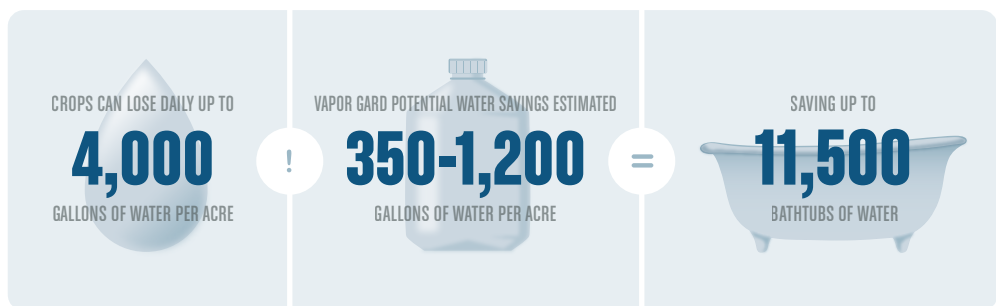
IMPACT CATEGORY	UNIT	CRADLE-TO-GATE	DISTRIBUTION	WATER PUMP ENERGY	PLASTIC WASTE	TOTAL
Global warming (GWP100a)	kg CO2 eq	9.9034	0.7897	0.0003	0.0975	10.7910
Abiotic depletion	kg Sb eq	>0*	>0	>0	>0	>0
Abiotic depletion (fossil fuels)	MJ	167.9569	11.8468	0.0031	0.0135	179.8203
Photochemical oxidation	kg C2H4 eq	0.0029	0.0003	>0	>0	0.0032
Acidification	kg SO2 eq	0.0470	0.0075	>0	>0	0.0546
Eutrophication	kg PO4--- eq	0.0433	0.0012	>0	0.0019	0.0464
Ozone layer depletion (ODP)	kg CFC-11 eq	>0	>0	>0	>0	>0

*Denotes that the number is greater than zero but less than 4 decimals (i.e., 0.00001) - Note: This study assumed that on average one gallon of Vapor Gard would be applied to one acre of land.

The following products are not included in the scope of this LCA however are assumed to have similar cradle-to-gate environmental footprints due to similar raw materials, process, and energy use: Nu-Film® 17 Adjuvant, Pod Ceal® Crop Production Aid, and Spur Shield® Crop Production Aid. All mentioned products are Pinolene® terpene polymer based products and use rates may vary.

PRODUCT BENEFITS

One acre of growing crop can lose up to 3,500-4,000 gallons of water per day through transpiration. As such, Vapor Gard has the potential to save roughly 350-1,200 gallons of water per acre. For an average sized farm of 445 acres, this would be an estimated 345,000 gallons of water. Assuming an average bathtub uses 30 gallons of water, this would be equivalent to a water savings of 11,500 bathtubs of water.



LIFE CYCLE STUDY INFORMATION

A cradle-to-grave life cycle assessment was conducted and went under an independent third-party critical review to demonstrate the study was done in accordance with ISO 14040/14044. The period of data used for the study was 2021 data. The functional unit utilized for the study is the applied amount of product for the coverage of one acre of land. The declared unit is one gallon of product. The LCA Software utilized was SimaPro v9.1.1 using the CML 2000 methodology. Contact HEM.Sustainability@huber.com for any questions related to this fact sheet.