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Third Party Study Shows Tennant Company's ec-H2O™ Technology Reduces Environmental Footprints

EcoForm study demonstrates environmental sustainability of ec-H2O chemical-free cleaning technology

MINNEAPOLIS, MN, October 5, 2009—Tennant Company (NYSE: TNC), a world leader in designing, manufacturing and marketing solutions that help create a cleaner, safer world, today announces that its ec-H2O technology has been shown to significantly reduce environmental footprints across seven key categories when compared to traditional cleaning with chemicals. The findings are the result of an independent study conducted by the environmental sustainability group EcoForm.

"Tennant Company's ec-H2O technology has been heavily lauded by both industry and environmental leaders for its benefits to cleaning performance and the environment," said Chris Killingstad, president and CEO of Tennant Company. "The findings of this study validate what we and leading-edge customers have known all along—ec-H2O is an environmentally sustainable cleaning technology."

To obtain footprint reduction calculations, the study compared a Tennant T3 20-inch auto-scrubber with ec-H2O technology to a conventional T3 using traditional cleaning chemicals over 25,000-square feet cleaning five times per week for education facilities and seven times per week for retail and healthcare facilities. If one would consider a larger machine or a larger cleanable area, the footprint reductions would be even more favorable. The analysis included an evaluation of the cleaning machine, the technology and the packaging, including materials used and processes employed during manufacturing. In the study traditional neutral pH cleaning chemicals were set as the base. Using ec-H2O technology will reduce the footprint significantly from that base. As an example, ec-H2O could reduce the energy footprint by 95%.

(more)

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Resulting footprint reduction percentages for ec-H2O technology are:

FOOTPRINT ê	Retail	Healthcare	Education
ENERGY	97%	97%	95%
GLOBAL WARMING	96%	96%	93%
OZONE DEPLETION	94%	94%	89%
SMOG	98%	98%	97%
ACID RAIN	94%	94%	89%
WATER POLLUTION	77%	77%	57%
AIR POLLUTION	94%	94%	89%

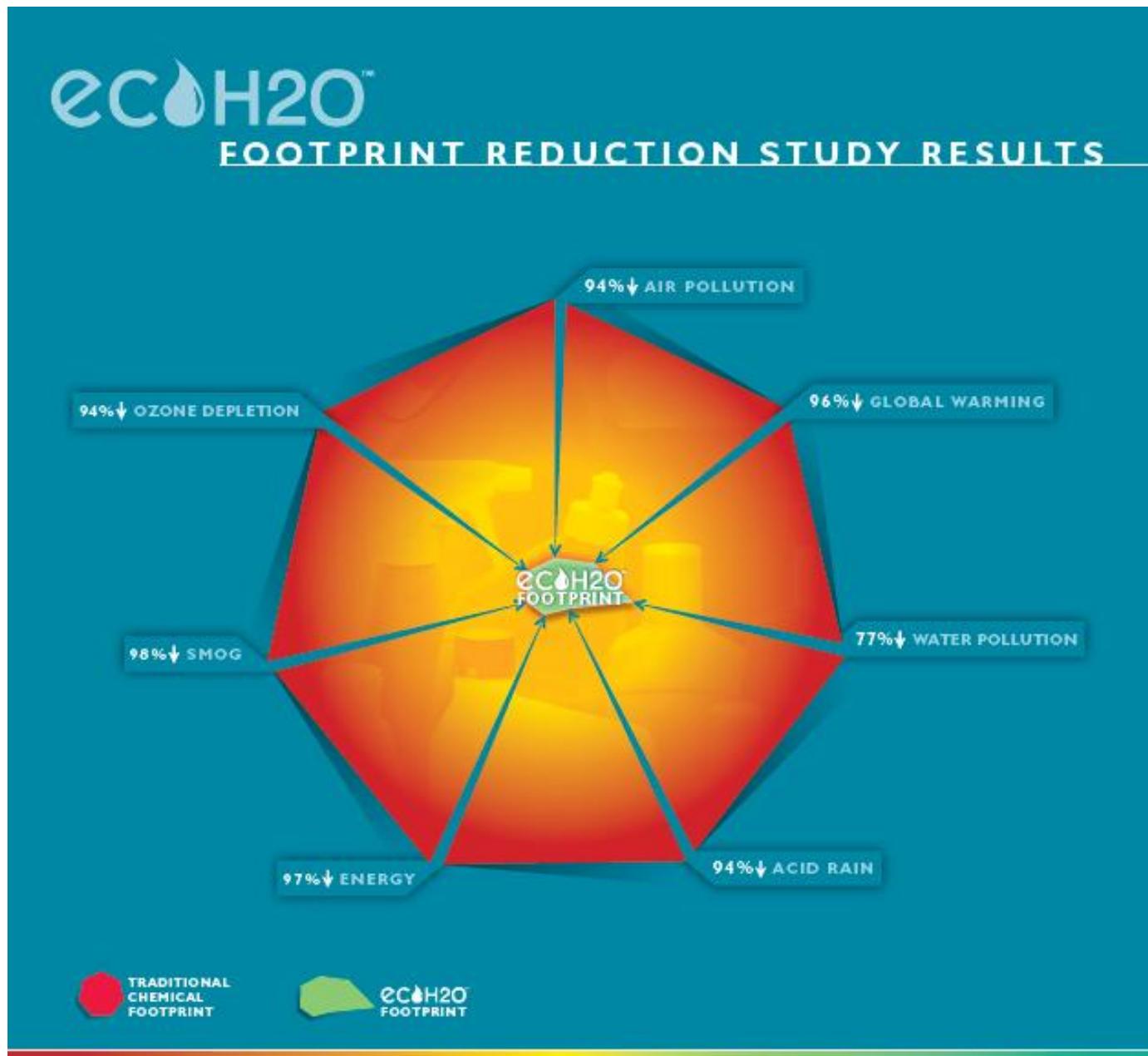
"Typical footprint reductions on 'environmentally sustainable' cleaning technologies are between 10 to 20 percent compared to traditional methods. But even taking a conservative testing approach, Tennant's ec-H2O technology is achieving environmental footprint reductions as high as 98 percent—that's a 98 percent improvement in environmental sustainability over traditional cleaning with chemicals," said Killingstad. "This report reinforces that ec-H2O is effective, safe and sustainable."

Developed by Tennant researchers and engineers, ec-H2O technology converts plain tap water into a powerful chemical-free all-purpose cleaner that delivers proven cleaning results without the negative environmental and health concerns associated with producing, packaging, transporting, using, and disposing of traditional cleaning chemicals. The technology has been recognized and honored for its significance to safety, the environment and the cleaning industry by Sustainable Industries' Top 10 Green Building Products guide, the Premier Innovation Celebration, the European Business Awards, the Australian Business Awards, and R&D Magazine.

About Tennant Company

Minneapolis-based Tennant Company (NYSE: TNC) is a world leader in designing, manufacturing and marketing solutions that help create a cleaner, safer world. Its products include equipment for maintaining surfaces in industrial, commercial and outdoor environments; and specialty surface coatings for protecting, repairing and upgrading concrete floors. Tennant's global field service network is the most extensive in the industry. Tennant has manufacturing operations in Minneapolis, Minn.; Holland, Mich.; Uden, The Netherlands; the United Kingdom; São Paulo, Brazil; and Shanghai, China; and sells products directly in 15 countries and through distributors in more than 80 countries. For more information, visit www.tennantco.com.

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ec-H2O® FOOTPRINT REDUCTION

	Retail	Healthcare	Education
ENERGY	97%	97%	95%
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OZONE DEPLETION	94%	94%	89%
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ACID RAIN	94%	94%	89%
WATER POLLUTION	77%	77%	57%
AIR POLLUTION	94%	94%	89%



STUDY CONDITIONS

- Very conservative parameters used:
- 25,000 square feet
 - Small 20 inch scrubber
 - Chemical dilution: 1 oz / gallon
 - Neutral pH daily cleaner
 - 5 days a week for education
 - 7 days a week for retail / healthcare



ecoform. Study conducted by Ecoform on Tennant T3.

FAQ ec-H2O FOOTPRINT REDUCTION

What is LCA ?

LCA is a technique to assess the environmental aspects and potential impacts associated with a product, process, or service. An LCA is completed by:

- compiling an inventory of energy & material inputs and environmental releases
- evaluating potential environmental impacts associated with identified inputs & releases
- interpreting results to help make more informed decisions

LCA is a data based approach for assessing and comparing systems. An LCA can be **cradle-to-grave** (begins with gathering of raw materials from the earth to create product and ends at the point when all materials are returned to the earth), **cradle-to-gate** (includes materials & mfg, not use & disposal), or **cradle-to-cradle** (includes cradle to grave + reuse/recycle).

LCA:

- Evaluates all stages of a product's life from the perspective that they are interdependent, i.e. one operation leads to the next
- Enables estimation of the cumulative environmental impacts resulting from all stages in the product life cycle
- Often includes impacts not considered in more traditional analyses. Examples: raw material extraction, material transportation, ultimate product disposal, etc. With this holistic view, LCA can identify drivers & system wide tradeoffs of both product design and manufacturing elements.

By including the impacts throughout the product life cycle, LCA provides a comprehensive view of the environmental aspects of the product or process, a more accurate picture of the true environmental trade-offs in product selection, and leads to more informed product design and targeted improvements in product performance.

Who performed the Life Cycle Analyses?

- A third party company, focused on environmental sustainability



Jack Geibig, President of Ecoform, is also Director of the Center for Clean Products, a multidisciplinary research center within the Institute for a Secure and Sustainable Environment, University of Tennessee - Knoxville.

How do I read this footprint reduction for a T3 ec-H2O?

It is the footprint reduction of a T3 ec-H2O compared with a **Conventional** T3 model with traditional chemical. The environmental footprint of the conventional model is considered to be 100%.

What does it simply say?

Cleaning an area of 25,000 ft² with a T3 with ec-H2O, 20inch scrub path and 10.5gallon tank following a typical cleaning program:

5days per week in Education

7days per week in Healthcare and Retail

One can reduce the footprint with ec-H2O technology in 7 environmental categories largely compared to cleaning with the same conventional machine, but then with a chemical dilution of 1oz/gallon neutral pH daily cleaning chemical.

How do those footprint reductions relate to the market?

Typically footprint reductions will be somewhere around 10-20% compared to traditional methods.

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What does each group stand for?

Category	Reduction of:	Definition
Embodied Energy	MJ	Total energy required to manufacture & use the product - in mega joules
Global Warming	CO ₂	Climate change caused by atmosphere warming from greenhouse gases like methane, CO, and CO ₂ - in CO ₂ equivalents
Ozone Depletion	CFCs	Consequence of man-made emissions of halocarbons (CFC's, HCFC's, haloes, chlorine, bromine, etc.)
Smog	NO _x	Occurs when Volatile Organic Compounds (VOC's) are released in the atmosphere and oxidized, in the presence of oxides of nitrogen
Acid Rain	SO ₂	Caused by acids, and compounds which can be converted into acids, that contribute to death of fish and forests, damage to buildings, etc.
Water Pollution	PO ₄	Eutrophication, nutrient enrichment causes algal bloom in inlets and springs causing oxygen depletion and death of fish - in phosphate (PO ₄) equivalents
Air Pollution	PM _{2.5}	Fine particle pollution or PM _{2.5} describes particulate matter that is 2.5 micrometers in diameter and smaller. A consequence of both mobile and point source operations, usually involving combustion of materials.

This calculation is for a T3. Can I use this also for bigger machines?

Yes, you can use this as an indication of what level of savings a customer could realize.

However, we made the calculations on a 20inch T3 to get very conservative footprint calculations.

This means that if you increase the size of the machine (i.e. T7 with wider path, bigger tank, and higher operating speed), increase the frequency of cleaning, increase the cleanable area, your footprint reductions will be even bigger than calculated in this document.

What are the actual study data per category?

EC-H2O vs Trad Chem -		Education	5-Year		
LCA Categories		Education-Trad Chem	EC-H2O Cleaning System	Benefit %	Difference
Energy	(MJ)	27193.01	1323.48	95	25869.52
GWG	(kg CO ₂)	959.85	71.12	93	888.73
Ozone	(g CFCs)	0.0000566	0.0000061	89	0.0000505
Smog	(kg NO _x)	0.0001313	0.0000037	97	0.0001276
Acid	(kg SO ₂)	2.9734	0.3263	89	2.6470
Eutro	(kg PO ₄)	0.0339	0.0145	57	0.0194
Particulate	(kg PM _{2.5})	0.6704	0.0757	89	0.5947

EC- H2O vs Trad Chem		Retail/Healthcare	5-Year		
LCA Categories		Retail/Health- Trad Chem	EC-H2O Cleaning System	Benefit %	Difference
Energy	(MJ)	49626.90	1323.48	97	48303.42
GWG	(kg CO ₂)	1751.72	71.12	96	1680.60
Ozone	(g CFCs)	0.0001033	0.0000061	94	0.0000972
Smog	(kg NO _x)	0.0002397	0.0000037	98	0.0002360
Acid	(kg SO ₂)	5.4264	0.3263	94	5.1000
Eutro	(kg PO ₄)	0.0618	0.0145	77	0.0474
Particulate	(kg PM _{2.5})	1.2235	0.0757	94	1.1478

How does this compare to the calculations done for Activeion Pro?

Activeion Pro is based on the same technology where it is integrated in a smaller device, with different power sources, various cleaning products (carpet, glass, all purpose cleaner, other) impacting the environment different.

References:

- "Clean Product Evaluation of the ec-H2O Water-Based Floor Cleaning System," Preliminary Report, Ecoform, September 2009.
- U.S. Environmental Protection Agency and Science Applications International Corporation. LCAccess - LCA 101. 2001. Retrieved from <http://www.epa.gov/ORD/NRMRL/laccess/lca101.htm>.