HYDROMX®

Energy Saving Solution

ENERGY SAVING NANO-SOLUTION

TABLE OF CONTENTS

ABOUT US

HYDROMX APPLICATIONS

ABOUT US

OUR MISSION

To provide energy efficiency and complete system protection via proven, high technology products.

OUR OBJECTIVES

To help save the planet one facility at a time through affordable, reliable cutting-edge technologies that provide baseload savings in closed-loop hydronic heating and cooling systems, heat pumps, solar panels and heat recovery loops. We would like to build this on a foundation of honesty, integrity, and impeccable customer service.

By providing unique technology to residential and commercial building owners, engineers, ESCOs, industrial processes, data centers and hospitals, we are leading by example in fostering social responsibility to ensure that we leave a better place for future generations. Because we do not inherit the Earth from our ancestors; we borrow it from our children.

THE PATENT BEHIND THE TECHNOLOGY

United States Patent for Nanofluids

US009340720B2

(12) **United States Patent**
Singh et al.

(10) **Patent No.: US 9,340,720 B2**
(45) **Date of Patent: May 17, 2016**

(54) **HEAT TRANSFER FLUIDS CONTAINING NANOPARTICLES**

(75) Inventors: **Dileep Singh**, Naperville, IL (US); **Jules Routbort**, Hinsdale, IL (US); **A.J. Routbort**, legal representative, Willowbrook, IL (US); **Wenhua Yu**, Darien, IL (US); **Elena Timofeeva**, Chicago, IL (US); **David S. Smith**, Bartlett, IL (US); **David M. France**, Lombard, IL (US)

(73) Assignee: **UChicago Argonne, LLC**, Chicago, IL (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 404 days.

(21) Appl. No.: **12/828,025**

(22) Filed: **Jun. 30, 2010**

(65) **Prior Publication Data**

US 2011/0001081 A1 Jan. 6, 2011

Related U.S. Application Data

(60) Provisional application No. 61/222,804, filed on Jul. 2, 2009.

(51) **Int. Cl.**
C09K 5/00 (2006.01)
C09K 5/10 (2006.01)
C09K 5/08 (2006.01)
C09K 5/14 (2006.01)

(52) **U.S. Cl.**
CPC ... ***C09K 5/10*** (2013.01); ***C09K 5/08*** (2013.01); ***C09K 5/14*** (2013.01)

(58) **Field of Classification Search**
CPC C09K 5/00; C09K 5/08; C09K 5/14; C09K 5/20
USPC 252/73, 70, 71, 78.1, 74, 75, 67; 361/697, 698, 699; 62/122; 165/164, 4
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,520,656 A * 7/1970 Yates et al. 423/345
4,179,299 A * 12/1979 Coppola et al. 501/90

(Continued)

OTHER PUBLICATIONS

Xie et al. International Journal of Thermophysics, vol. 23, No. 2, Mar. 2002, p. 571-580 "Thermal Conductivity of Suspensions Containing Nanosized SiC Particles".*
Singh et al. Journal of Applied Physics 105, 064306. published online Mar. 18, 2009 "An investigation of silicon carbide-water nanofluid for heat transfer applications".*

(Continued)

Primary Examiner — Jane L Stanley
(74) *Attorney, Agent, or Firm* — Foley & Lardner LLP

(57) **ABSTRACT**

A nanofluid of a base heat transfer fluid and a plurality of ceramic nanoparticles suspended throughout the base heat transfer fluid applicable to commercial and industrial heat transfer applications. The nanofluid is stable, non-reactive and exhibits enhanced heat transfer properties relative to the base heat transfer fluid, with only minimal increases in pumping power required relative to the base heat transfer fluid. In a particular embodiment, the plurality of ceramic nanoparticles comprise silicon carbide and the base heat transfer fluid comprises water and water and ethylene glycol mixtures.

18 Claims, 24 Drawing Sheets

US 9,340,720 B2

1

HEAT TRANSFER FLUIDS CONTAINING NANOPARTICLES

CROSS REFERENCE TO RELATED PATENT APPLICATIONS

The present application claims priority to U.S. Provisional tent Application No. 61/222,804, filed Jul. 2, 2009, and the ntents of which are incorporated herein by reference in eir entirety.

STATEMENT OF GOVERNMENT INTEREST

The United States Government claims certain rights in this vention pursuant to Contract No. W-31-109-ENG-38 tween the United States Government and the University of icago and/or pursuant to DE-AC02-06CH11357 between e United States Government and UChicago Argonne, LLC presenting Argonne National Laboratory.

FIELD OF THE INVENTION

This invention relates to heat transfer fluids. More specifilly this invention relates to heat transfer fluids containing noparticles, frequently referred to as nanofluids.

BACKGROUND OF THE INVENTION

This section is intended to provide a background or context the invention that is, inter alia, recited in the claims. The scription herein may include concepts that could be pured, but are not necessarily ones that have been previously nceived or pursued. Therefore, unless otherwise indicated rein, what is described in this section is not prior art to the scription and claims in this application and is not admitted be prior art by inclusion in this section.

A nanofluid generally refers to a liquid mixture with a all concentration of nanometer-sized (about 1 to 500 nm gth scale) solid particles in suspension. Nanoparticles are pically made of chemically stable metals, metal oxides or rbon, in various forms. Some combinations of nanoparles and liquids have been shown to substantially increase e heat transfer characteristics of the nanofluid over the base uid.

Nanofluid heat transfer is a relatively new field being little ore than a decade old. During that time, effort has been cused on determining the levels of potential thermal conctivity and heat transfer enhancements of a variety of nofluids. In these investigations, the emphasis was usually the magnitude of the thermal phenomena and not on the ability of the fluids for commercial applications. The theral conductivity of nanofluids in particular has received conderable attention by researchers. Thermal conductivity is sier to measure than the heat transfer coefficient and has en used as an indicator of nanofluid heat transfer enhanceent.

Enhancements in the thermal conductivities of nanofluids, r the most part, follow the predictions based on Maxwell's ean field theory assuming low concentrations and spherical noparticles or the effective medium theory (EMT). For all nanoparticle concentrations, EMT predicts thermal nductivity enhancement as $(\kappa_f/\kappa_{bf}) \approx 1+3\phi$, where κ_f and κ_{bf} e thermal conductivities of the nanofluid and the base fluid, spectively, and ϕ is the nanoparticle volume fraction. However, there are instances where the actual enhancements are gnificantly higher than EMT predictions at very low conntrations of nanoparticles. These anomalous enhancements

2

have typically been reported for metallic nanoparticles in fluids. Modest thermal conductivity enhancements over EMT predictions can also be achieved by modifying the shape of the nanoparticles.

Thermal conduction in nanofluids has been attributed to a variety of mechanisms, including Brownian motion, interactions between the nanoparticles and the fluid, clustering and agglomeration. There is no clear consensus on a specific mechanism; however, the general belief is that a combination of mechanisms may be operating and would be specific to a nanoparticle/fluid system and test conditions. Further, the effect of interface layers on the nanoparticles on thermal conductivity is not clearly understood. A metal particle with surface oxidation, for example, may increase the interfacial resistance and consequently reduce the thermal conductivity.

Experimental results from various nanofluid research efforts have considered a number of parameters, including without limitation: (1) particle volume concentration, (2) particle material, (3) particle size, (4) particle shape, (5) base fluid, (6) temperature, (7) additive, and (8) pH. These studies have shown heat transfer enhancement results, based on Nusselt number, to be generally in the 15-40% range for particle volume concentrations up to 4%. Some research has found that the heat transfer enhancement was close to or somewhat above predictions from standard liquid heat transfer correlations using the nanofluid properties. Nusselt number enhancement of 40% is attractive to many applications, if the nanofluid is commercially viable.

However, studies of thermal phenomena in nanofluids have generally failed to make detailed characterizations of the fluids. For instance, it is known that particle agglomeration may occur in many nanofluids so that the nominal particle size in a powder is often not the size in the suspension. In fact, particle size distributions often exist in nanofluids but are seldom measured. As a result, literature data based on nominal particle size, may in fact have involved significantly different average particle sizes and distributions in suspension.

SUMMARY OF THE INVENTION

Industrial applications for nanofluid technology are in an embryonic stage. However, today, the nanofluid field has developed to the point where it is appropriate to look to the next level, i.e., nanofluids that show substantial heat transfer enhancement over their base fluids and are candidates for use in industrial/commercial systems. For example, potential use of nanofluids for cooling systems such as radiators in vehicles will require not only enhanced thermal properties, but also minimal negative mechanical effects of the nanofluid in a closed system. In this regard, viscosity of the nanofluid for instance is a contributing factor to pumping power needed for the circulation of the nanofluid.

Further, any erosive and clogging effects of the nanofluids on the fluid transmission lines or radiator can have an adverse effect on its use. Various nanofluids that may find widespread acceptance for industrial use should preferably be, as a minimum, stable suspensions with little or no particle settling, available in large quantities at affordable cost, environmentally neutral, and non-toxic. In addition, such applications would generally prefer that there be little change in particle agglomeration over time and that the nanofluid not be susceptible to adverse surface adhesion.

A favorable combination of desirable nanofluid characteristics can be achieved with, for example, ceramic nanoparticles disposed in a base fluid. Ceramic nanoparticles are not susceptible to surface oxidation, and enjoy significantly better chemical stability over longer periods of time than metals.

SUMMARY OF THE INVENTION

Industrial applications for nanofluid technology are in an embryonic stage. However, today, the nanofluid field has developed to the point where it is appropriate to look to the next level, i.e., nanofluids that show substantial heat transfer enhancement over their base fluids and are candidates for use in industrial/commercial systems. For example, potential use of nanofluids for cooling systems such as radiators in vehicles will require not only enhanced thermal properties, but also minimal negative mechanical effects of the nanofluid in a closed system. In this regard, viscosity of the nanofluid for instance is a contributing factor to pumping power needed for the circulation of the nanofluid.

Further, any erosive and clogging effects of the nanofluids on the fluid transmission lines or radiator can have an adverse effect on its use. Various nanofluids that may find widespread acceptance for industrial use should preferably be, as a minimum, stable suspensions with little or no particle settling, available in large quantities at affordable cost, environmentally neutral, and non-toxic. In addition, such applications would generally prefer that there be little change in particle agglomeration over time and that the nanofluid not be susceptible to adverse surface adhesion.

A favorable combination of desirable nanofluid characteristics can be achieved with, for example, ceramic nanoparticles disposed in a base fluid. Ceramic nanoparticles are not susceptible to surface oxidation, and enjoy significantly better chemical stability over longer periods of time than metals.

Since the discussion for the nanofluids' acceptance ends with the published US Patent, the only viable, feasible, commericially available and nontoxic product is now Hydromx®.

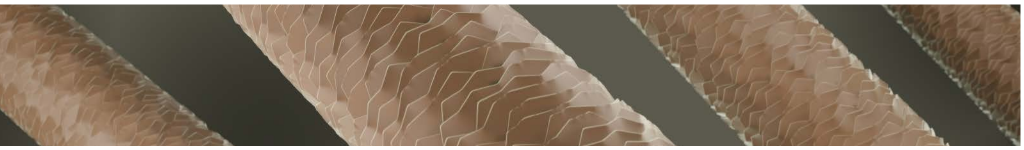
As stated in the US Patents a viable commercial nanofluid must be:

AFFORDABLE ⟶ Hydromx guarantees 3-year ROI

ABUNDANT ⟶ Hydromx is "Made in USA"

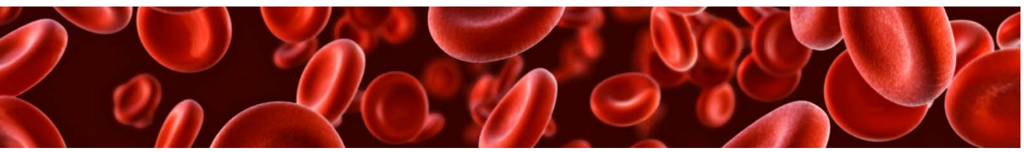
NON-TOXIC ⟶ Hydromx has been approved by NSF for HT1 and HT2 certificates as a nontoxic product.

HOW SMALL IS A NANO?



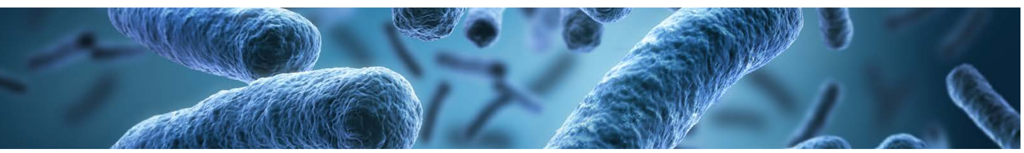
Strand of Hair

~100,000 nanometers



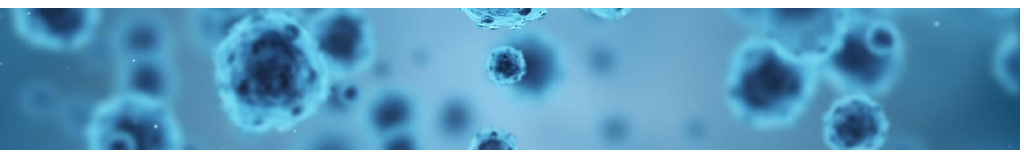
Red Blood Cell

~10,000 nanometers



Bacteria

~1,000 nanometers



Average virus

~70–90 nanometers

COVID-19

~60–140 nanometers

Gold Atom

~0.33 nanometers

THE MOST NON-INTRUSIVE SOLUTION FOR GREENHOUSE GAS REDUCTION

WIDE APPLICATION RANGE

Residential and Commercial Buildings

Data Centers

Hospitals

Industrial Process

Ice Rinks

and more!

EASY INSTALLATION

Simply replace the hydronic heat-transfer fluid running in the system with Hydromx®.

CO_2 EMISSION REDUCTION

Verified, certified and published EPD by NSF.org

THE NANOFLUID TECHNOLOGY BEHIND HYDROMX

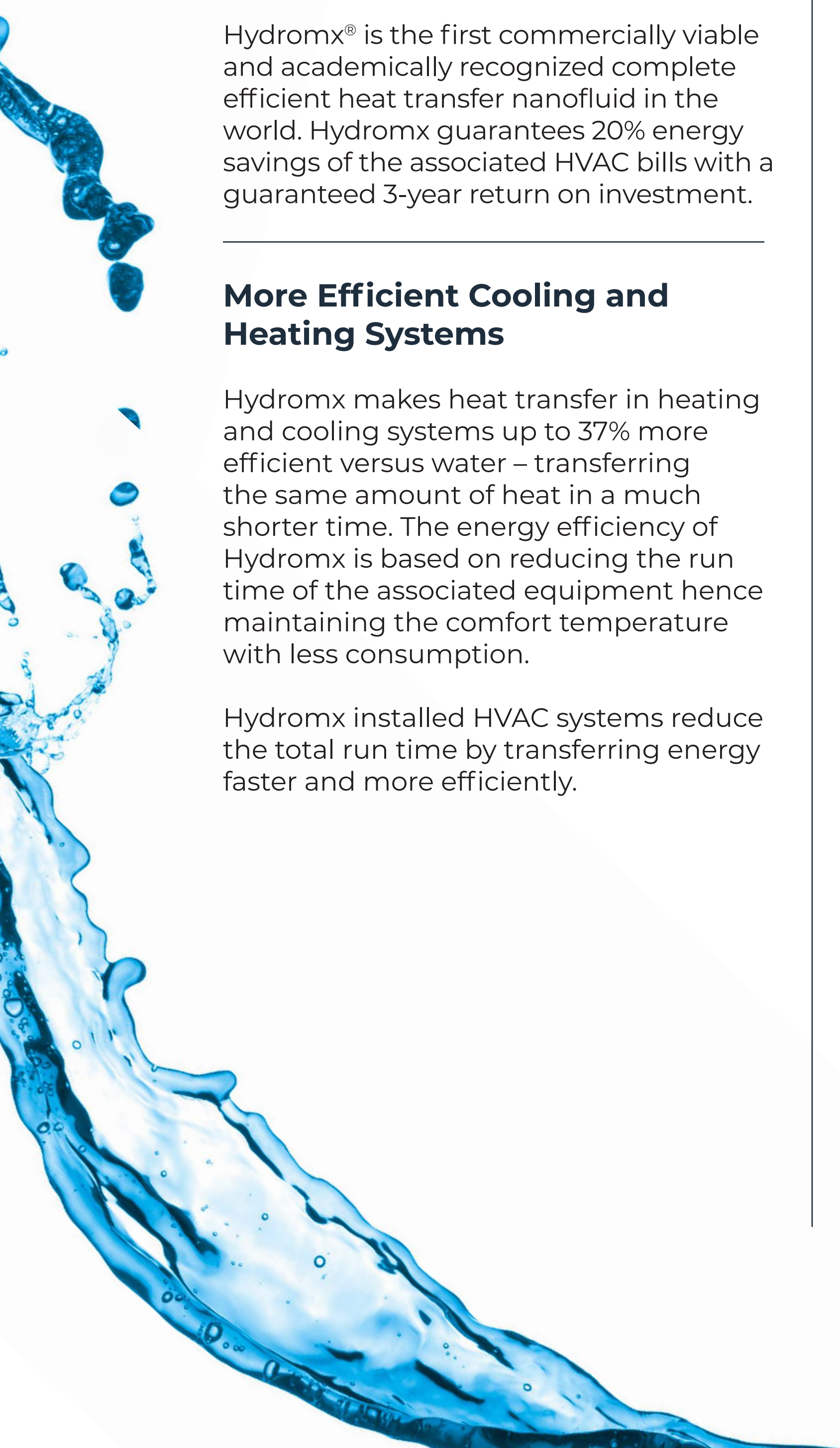
Saving Energy = Saving Money

Hydromx® is the first commercially viable and academically recognized complete efficient heat transfer nanofluid in the world. Hydromx guarantees 20% energy savings of the associated HVAC bills with a guaranteed 3-year return on investment.

More Efficient Cooling and Heating Systems

Hydromx makes heat transfer in heating and cooling systems up to 37% more efficient versus water – transferring the same amount of heat in a much shorter time. The energy efficiency of Hydromx is based on reducing the run time of the associated equipment hence maintaining the comfort temperature with less consumption.

Hydromx installed HVAC systems reduce the total run time by transferring energy faster and more efficiently.



Reducing CO_2 is Our Goal for a Better Future for All

To protect the sustainability of life on Earth, it is imperative that we decrease the amount of CO_2 emissions that are released into the atmosphere.

The world faces soaring energy demand, increased energy costs and the effects of global warming caused by the use of fossil fuels.

Hydromx is willing to accept this challenge on a scale unlike any product. The company is dedicated to helping meet global COP26 goals with a guaranteed ROI.

Total System Protection

CORROSION PROTECTION
Corrosion is a common problem that may cause your system to destroy zone valves, tanks, ball and check valves, etc.

SCALING PROTECTION
Hydromx provides complete protection against scaling without decreasing the efficiency of your system.

FREEZING & BURST PROTECTION
Glycol is the most common anti-freezing agent used in the industry.

BACTERIA PROTECTION
Hydromx protects your system from the occurrence of pseudomonas and legionella bacteria.

HISTORY OF NANOFLUIDS

Certification	Description	Significance
	1990: Japanese Professor Choi first published a research paper on nanofluids.	Since then, there are over 100,000 research papers published globally showing the potential of nanofluids.
NanoHex Enhanced Nano-Fluid Heat Exchange	2011–2013: Companies from six EU countries investigated the mathematical model of nanofluid effectiveness. The conclusion was that up to 40% greater efficiency could be achieved with successful implementation of nanofluids.	€8,5 million was the largest budget spent on a research program. This indicates the importance and expectations from the technology. Toxicology was deemed to be the main hurdle.
University of South Carolina	2013: The first patent by the US government is published in conjunction with South Carolina University and the US Air Force Laboratories.	The Patent was based on ZnO particles at a radiator efficiency test rig. Heat transfer coefficient increased 18% on average.
Argonne National Laboratory	2016: A second patent was issued by the US government in conjunction with Argonne National Laboratory.	The nanofluid was based on SiC particles. Heat transfer coefficient increased 28% on average. Unfortunately, SiC particles cannot clear FDA's toxicology standards.
NSF, Hydromx	2016: The first ever nanofluid was registered with NSF International, clearing FDA's CFR 21 Code under HT2 category.	Commercialization of nanofluids has commenced in the US and Europe.
Synano, HTF Compact, HT Smarter Heat Transfer Fluids, Aqua+ Nanofluid	Different nanofluid brands emerged in different parts of the world, none with toxicology clearance.	NSF International is the only authorized governmental organization with the authority to register products as safe for humans and the environment.
NYC Buildings	2021: New York City Department of Buildings (NYC DOB) included nanofluids in NYC building material code.	This established acceptance criteria, installation, and maintenance requirements for heat transfer nanofluids used in hydronic closed-loop HVAC systems in New York City.
Proud Service Provider NYC Accelerator	2022: NYC accepted Hydromx as a service provider to fight CO_2 emission in New York City.	This is a program to help control costs, meet local law compliance, boost building performance, increase energy savings, and reduce carbon emissions across NYC buildings.

CORROSION CERTIFICATION

System Protection

NSF APPROVAL FOR CHEMICAL INHIBITORS

NSF approval for nontoxicity is important. Also, Hydromx® is tested and approved by NSF for the closed-loop system's health and durability. Not only do we care for the environment by reducing energy consumption, but we also provide the best protection formula for the machinery.

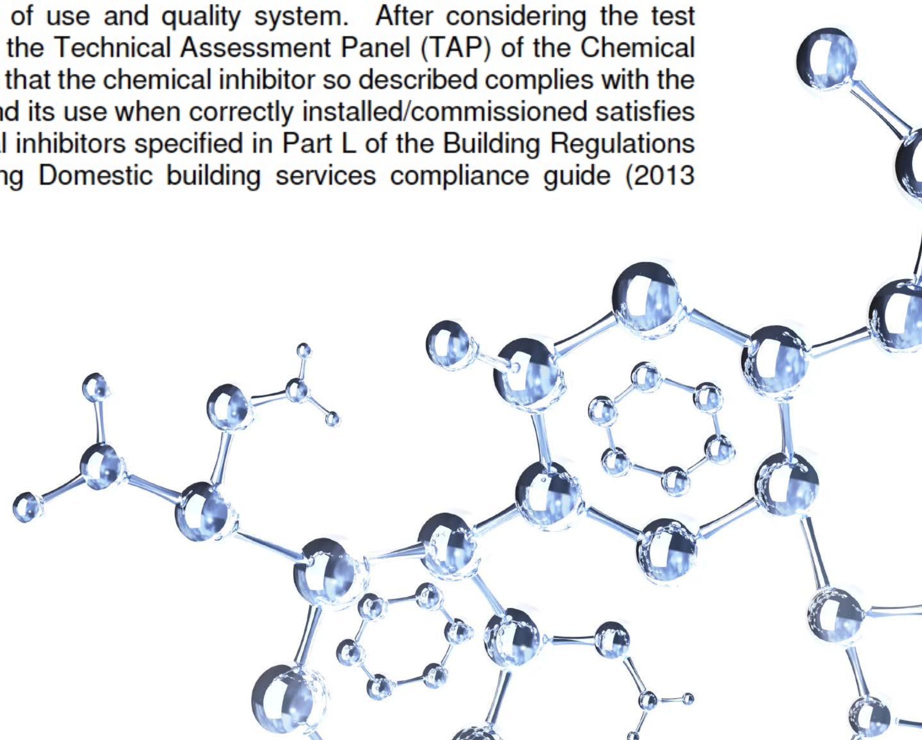
Certificate No: NSF2102/0219
Sample No: NSF2102

21st February 2019

Mr Berkin Airkan
Hydromx Inc
5875 57th Road
Maspeth
New York
11738
USA

Dear Mr Berkin

1. Samples of the chemical inhibitor described below have been subjected to relevant tests as detailed in the "NSF standard specification for the performance of Chemical Inhibitors for use in Domestic Hot Water Central Heating Systems", and verified as complying with the Scheme's requirements for marking, instructions of use and quality system. After considering the test reports and supporting documentation, the Technical Assessment Panel (TAP) of the Chemical Inhibitor Approval Scheme (CIAS) finds that the chemical inhibitor so described complies with the requirements of the above standard, and its use when correctly installed/commissioned satisfies the minimum requirements for chemical inhibitors specified in Part L of the Building Regulations (England & Wales), and the supporting Domestic building services compliance guide (2013 edition).



US Green Building Council (USGBC) Recognized

Hydromx®'s Comparative LCA and EPD are verified and certified by a panel put together by NSF, which is headed by Thomas P. Gloria, Ph.D., Director of Harvard University's Sustainability Department.

NSF International certified and verified EPDs are type III environmental product declarations and will help new building or retrofit projects qualify for points through the Leadership in Energy and Environmental Design (LEED) US Green Building Rating System (LEED V4).

For the whole Comparitive LCA report:
tinyurl.com/vt22e8se

For the whole EPD Document:
tinyurl.com/p3fcpxth

Carbon Effect | LCA/EPD

PROUD
SERVICE PROVIDER

NYC Accelerator does not endorse any participant products or services.

NYC
ACCELERATOR

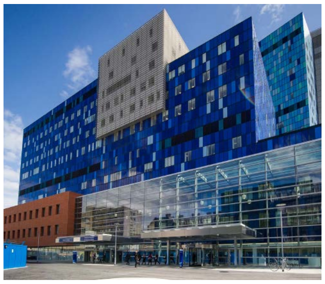
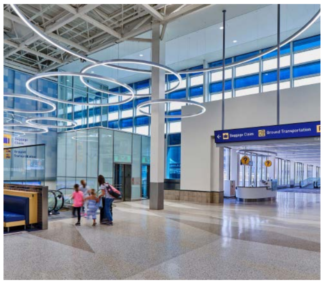
"New York City Department of Buildings (NYC DOB) included nanofluids to NYC building material code"

"NYC accepted Hydromx as a service provider to fight CO2 emission in New York City"

Field of Applications

Hot water, chilled water closed-loop HVAC systems, heat recovery loops, industrial processes, space climatization, sub-freeze




GREENHOUSE GAS REDUCTION BY HYDROMX

In order to protect the sustainability of the life on Earth, it is imperative that we decrease the amount of CO_2 released into the atmosphere. CO2 emissions, the single biggest cause of global warming, have become an even larger threat with the global increase in energy demand.

LCA and EPD (S-EP-00633) certifications, which are prepared by independent testing and approval organizations, clearly show that using Hydromx® decreases CO_2 emissions by 26% compared to water. This decrease in emissions spikes up to 37% when compared to a water-glycol solution (see Table 1). The LCA and EPD reports have verified that Hydromx contributes to the new LEED v.4 standard in three different areas as a green and sustainable solution. These are:

1. Optimizing Energy Performance
2. Building Life-Cycle Impact Reduction
3. Building Product Disclosure and Optimization - Environmental Product Declarations

Hydromx contributes approximately 10 points for LEED qualification when it is used within new constructions.

According to 2011 data from the UN regarding the environment, yearly CO_2 emissions worldwide have reached 28.8 trillion tons. The IEA (International Energy Agency) data suggests that if only 5% of the world used Hydromx today, the value of the yearly energy savings would exceed $50 billion USD. This way, 86.5 tons of CO2 would be prevented from being released into the atmosphere.

Table 1 Comparative LCA Study of Hydromx® , Ethylene Glycol and water as Heat-Transfer Fluids, Third Party Verified by Vladimír Kocí Prague, Czech Republic, 2015

ENVIRONMENTAL EFFECT	HYDROMX® REDUCES THE PARAMETERS WITH RESPECT TO WATER	HYDROMX® REDUCES THE PARAMETERS WITH RESPECT TO ETHYLENE GLYCOL-WATER (30/70)
GLOBAL WARMING POTENTIAL (GREENHOUSE GASES), IN CO_{2E}	25%	37%
DEPLETION OF THE STRATOSPHERIC OZONE LAYER, IN KG CFC-11	25%	35%
ACIDIFICATION OF LAND AND WATER SOURCES, IN MOLES IN KG SO_2	25%	35%
EUTROPHICATION, IN KG PHOSPHATE	25%	40%
FORMATION OF TROPOSPHERIC OZONE, IN OR KG ETHANE	23%	40%
DEPLETION OF NONRENEWABLE ENERGY RESOURCES, IN MJ	26%	35%

HYDROMX APPLICATIONS

FIELDS OF APPLICATION

The Nanofluid's performance may differ depending on the comfort temperature and HTF temperature. As the difference between the target temperature and the HTF increases, studies have determined that Nanofluid performance increases. For this reason, different performance expectations from different applications are possible. Hydromx® installations' performance results, have varied between a 22% and 37% increase in efficiency.

When grouped by application types, similar performances can be expected under the same temperature difference conditions.

One of the most important factors affecting this difference is the "method of performance calculations" setup.

For this reason, Hydromx's performance measurement must be done with the participation of Hydromx and/or its authorized business partner.

Considering the brief explanation above, we can group Hydromx's fields of application into three categories:

1. Space Climatization

Comfort temp: 20–25°C (68–77°F)
HTF temp:
Heating 50–30°C (122–86°F)
Cooling 7/12°C (44/54°F)

- Commercial & residential buildings
- Apartments, villa house
- Shopping mall
- Factories
- Schools
- Hospitals

2. Process Cooling & Heating

Comfort temp: 20–25°C (68–77°F)
HTF temp:
Heating 85–65°C (185–149°F)
Cooling 1/6°C (33/43°F)

- Data center cooling 18–23°C (65–74°F)
- Mold cooling 180°C (356°F)
- Dye casting room cooling
- Dye production batch cooling
- Hot water generation 50–60°C (122–140°F)
- Metal plating hot bath 40–65°C (104–149°F)
- Swimming pool 27°C (80°F)
- Electrolysis bath
- Engine cooling
- Blower cooling
- Dehumidification
- Pharma process

3. Sub-freezing

Below -5°C (-23°F)

- Cold stores
- Food processing
- Ice rink cooling

HIGHLIGHTED PROJECTS

1350 Broadway
Ajit Bahawan
BAS Surgical
Blue Star Chiller Manufacturer
BPS Electricity Production Plant
Camp Ripley
Carrefour Shopping Mall
Cass County Data Center
CIPET
Club Mahindra Hotel
CNC Stone
Colonial Church
CTC Data Center
Cuyuna Regional Medical Center
Dubai Ice Arena
Empire State Building
Equinix Atlanta Site
Erzurum Air Base
Forest Green Rovers Football Club
General Directorate of Mining Affairs
Hamworthy Boiler Manufacturer
Hayat Kimya
HBO Data Center
Hennepin County Forensic Science
Holiday Inn
Honda Motorcycle Factory
Hotkovice
ITC Maurya
Jezenice Electricity Production Plant
Lalit Hotel
Liben Electricity Production Plant
Luna Fluid Tech
Madison School
Mahindra Tractors
MBA Engineering
Mechanical and Chemical Industries Association
Microlab
Minneapolis-St. Paul Airport (MSP)
Montana State University
Nestle Chocolate Factory
Northwestern College
Radion Building
RedFox Hotel
Residential Care Home
Ridgeview Medical Center
Royal Bank of Scotland
Royal Orthopedic Hospital
Samsung Electronics
SL Green
Student Accommodation
Sujan Rajmahal Palace
SV Development
Temple Israel
The Roseate
Tierpoint Data Center
University of North Dakota
University of St. Thomas
Virginia Tech University Data Center
Voets & Donkers

DISTRIBUTORS

USA
HYDROMX INC DISTRIBUTOR

58-75 57th Road,
Maspeth, NY 11378

+1 (718) 381 0351
TOLL FREE +1 (844) 449 3766
(+1 (844) 4HYDROMX)

info@hydromx.com

USA SUB-DISTRIBUTORS

SVL, INC.

Exclusively Wisconsin, Ohio, Minnesota, Illinois, North & South Dakota

---

INDIA
GALAXY ENERGY SOLUTIONS LLP

5 Gem Enclave, Pradhan
Marg, Malviya Nagar, Jaipur,
Rajasthan, India-302017

+91 978 472 31 97
+91 141 4054853
7877000555

info@galaxyens.com

HOLLAND
GREENLIFE TECHNOLOGY BV (PART OF ENVIEM GROUP)

Gaffel 4, 3891 KC Zeewolde

+31 (0) 6 12 16 57 57

sales@greenlifetechnology.eu

UK
NANOTECH ENERGY SAVE LTD

9 West End
Kemsing Sevenoaks Kent. TN15 6PX
United Kingdom

+44 (0) 7831 981551

info@nanotechenergysave.com

UK
HMXUK LTD. DISTRIBUTOR

39 High Street Billericay
Billericay CM12 9BA, UK

+44 (0) 7960 790804
+44 (0) 7549 145222

info@hmxuk.com

UK & IRELAND
ENERGY EFFECTIVE LTD

Tredomen Business &
Technology Centre, Tredomen
Park Ystrad Mynach, Hengoed,
Caerphilly, Wales CF82 7FN

+44 (0) 2920026381

m.mcgavin@energyeffective.co.uk

CZECH REPUBLIC
DATRIA

Tovární 1112, 537 01 Chrudim
IV Czech Republic

+420 773 835 909

d.jezek@datria.cz

SLOVAKIA
VIASUN

Na Výhone 805/8A, Moravany and Váhom 922 21 Slovakia

+421 903 833 939

viasun@viasun.sk

MEA
JOHNSON CONTROLS INTERNATIONAL (JCI)

Suite 1304, API World Tower, Sheikh Zayed Road, Dubai United Arab Emirates (UAE, Saudi Arabia, Yemen, Oman, Egypt, Pakistan & South Africa)

+90 216 636 53 94

mustafa.ozcam@jci.com

SOUTH KOREA
DASANST

South Korea

+82 2 514 9242

dasanst@dasanst.com

TURKEY
TURKEY LIAISON OFFICE

Workinton İcerenköy Mah.
Topçu İbrahim Sok.
Quick Tower No:8/10 34752
Ataşehir İSTANBUL

+90 5326153322
+90 5322122020

tkonuk@hydromx.com
cgoker@hydromx.com

HYDROMX

HEADQUARTERS

58-75 57th Road, Maspeth, NY 11378

+1 (718) 381 0351
TOLL FREE +1 (844) 449 3766
(+1 (844) 4HYDROMX)

info@hydromx.com

E-1-0322