Energy Savings Reduction Presentation

VOYAGE POWER PARTNERS
GREEN ENERGY MANAGEMENT SOLUTIONS

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BBB ACCREDITED BUSINESS

Purpose of Chemsonic / SonicWave

- Reduces KW or Peak Power of Compressor
- Reduce your electric bills by one-third+
- Reduces Thermal Resistance in Heat Exchange Process of Refrigerant by reducing / eliminating oil fouling in coils and tubing.
- Improves efficiency of Heat Scrubbing Process and Heat Carrying Capacity of Refrigerant
- Reduces and Prevents Oil Fouling / Sludge in Refrigerant Filter Dryer
- Reduces kWh Consumption
- Reduces cost of Operating HVAC System
- Reduces carbon footprint of facility
- Extends operating life of system

DEVELOPMENT HISTORY

The Kyoto Protocol was signed in 1997, phasing out R22 and all HFC based refrigerants and mineral oil in compressors. This led to the development of R134A and R410A refrigerants. The replacement refrigerants are complex, multi chemical mixtures versed against R22 which is a simple molecule. The need to improve the efficiency of HVAC systems in the shuttles and the space station, initially led to NASA's research and development of the refrigerant Catalyst. NASA began independent research on synthetic oils and new refrigerants a few years later and developed HVAC treatments that have been used successfully for over 23 years. A market was secured for the Catalyst as these new refrigerants had less heat carrying capacity than the legacy refrigerants. The chemical composition of the Catalyst enhanced the performance of R134A and R410A refrigerants while substantially mitigating oil fouling. Testing and development of the Catalyst was performed on DX systems, heat pumps, GEO Source and Chillers, resulting in KWH reductions of 19%-35%.

Introduction to PROAs and their effect on HVAC systems

Introduction to PROAS

(POLARIZED REFRIGERANT OIL ADDITIVES)

PROAS were originally developed almost 35 years ago to address the problem of oil fouling in HVAC systems. Although PROA's initially showed promise in increasing efficiency and reducing oil fouling, major problems began to appear in systems that had been treated with the PROA's in the form of catastrophic compressor failures. The system failures usually started 2-4 years after the injection of the PROAs.

The problem with PROAs originated because the main chemical used was OxyChem's Chlorowax, which contains chlorine, sulfur, solvents, acids, soaps and waxes. Chlorowax when used in refrigeration systems breaksdown and produces HCI which attacks iron and zinc and destroys the bearings/seals of the compressor.

A typical example is the Crown Casino in Melbourne, Australia, where more than 150 50-ton compressors failed 3 years after installing a PROA.

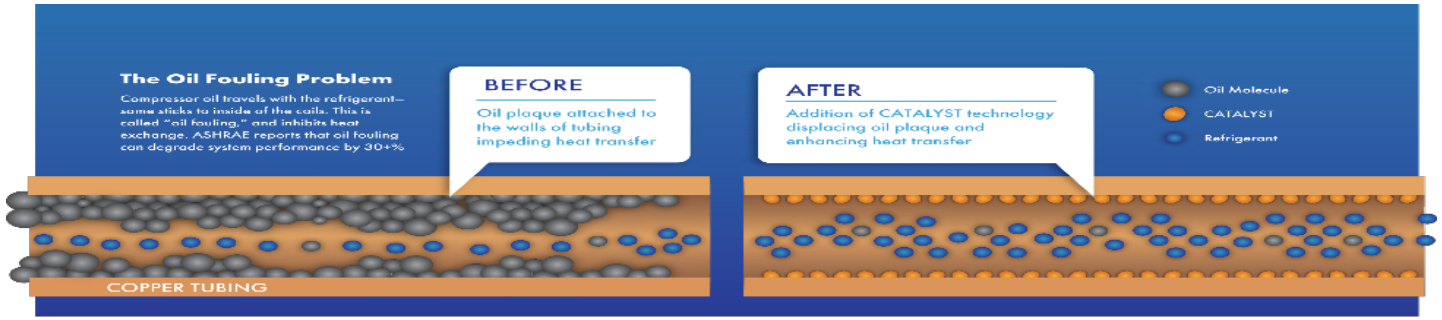
Brief Overview of Chemsonic and compatible systems

CHEMSONIC CATALYST is *a PROPRIETARY three-part synthetic, 5th-generation chemical* technology.

- **Chemsonic does not contain sulfur or other impurities that can damage your system.**
- **Chemsonic is *non-toxic* and *non-hazardous*, unlike many PROAs (Polarized Refrigerant Oil Additives).**
- **CHEMSONIC is compatible with most types of HVAC systems used in the commercial, industrial, refrigeration, home and transportation sectors, including most *compressors*, *heat exchangers* (direct exchange or DX, etc.) and *refrigerants, Heat pumps*, *Ground Source Heat Pumps/ Ground Cooling systems, Chillers,* Roof Top units (RTUs), packaged systems / split systems. It is also used in specialized systems such refrigerated trucks (reefers) and Computer Room A/C systems (CRACs)**
- **Chemsonic cannot be used in systems with COALESCING oil filters or with R123 or R11**

How does CHEMSONIC work?

It works in 3 ways.



- ***Catalyst #1*** **eliminates** ***oil-fouling**** **by breaking surface tension (van der Waals forces). The catalyst removes the plaque-like coating of oil that builds up on inner surfaces of the system, enabling the refrigerant to come in direct contact with the heat exchanger coils, improving heat transfer. The released oil circulates back through the system but does not adhere to the heat exchanger walls or tubing. The catalyst frees sticking / stuck electronic TXV valves.**
- ***Catalyst #2*** **causes the refrigerant to boil at a lower temperature releasing its heat faster. The cumulative effect of the two catalysts allows spaces to reach the set-point temperatures faster. The compressor runs less, which saves energy and extends the life of the equipment.**
- **The** ***lubricity agent*** **increases the lubricity of the compressor oil. The compressor runs cooler,** ***performs better and will last longer*****.**

SONICWAVE Development History & How it works

Chemsonic / SonicWave Clean was developed and tested to reduce Refrigerant Filter / Drier restrictions in HVAC systems. The development was carried out in systems owned and operated by the Federal Government. AEO was requested to develop an alternate method to replacing Filter / Driers in their HVAC systems. Packaged Units, Roof Top Units (RTU's) and Split Units were tested under the stringent guidelines of the Federal Procurement Regulatory System and in accordance with IPMVP Guidelines. SonicWave Clean (SWC) proved to mitigate restrictions problem in Liquid Line Filter / Drier found in most HVAC, Heat Pumps and Refrigeration Systems. Test results showed reductions of 12.8% -18.2.% KWH.

SonicWave's transducers send low intensity sonic & ultra sonic waves into the Filter / Drier which helps to remove the oil sludge buildup on the filter screens. This reduces the obstructions and allows the refrigerant to flow.

Chemsonic / SonicWave Installation & Cost

- The amount of Chemsonic® Catalyst used to treat a system is 10% of the system's oil volume or 1 ounce per ton of rated capacity, the greater thereof.
- Chemsonic is installed through the low-pressure port, the system is not breached.
- Inspection and Installation must be performed by a licensed HVAC technician. Inspection / Installation report must be submitted to American Energy Optimizers LLC to register the warranty.
- Chemsonic is a one-time treatment in DX air to air units, Chillers require a booster charge after the 3rd oil change.
- Chemsonic cost is $110.00 per ton, plus an installation fee of $13.50 per ton
- SonicWave is attached to the filter / Drier and the 24volt operating electrical input.
- The unit cost is $498.00 for each refrigerant circuit and an installation fee of $50.00.
- All installations are subject to service call charges.

Performance Guarantee Warranty

- American Energy Optimizers, LLC, (AEO) Chemsonic guarantees that if the Catalyst does not produce a minimum reduction of 12% of KWHs used in the HVAC unit(s) that are treated, AEO will return 100% cost of the product, excluding any labor / service call charges.
- Warranty: AEO furnishes a sixty (60) month warranty, from the date of the Catalyst installation to protect the units in case of catastrophic failure. The warranty is backed by a $3,000,000 product liability insurance policy. For systems that are within 24 months of expected service life, the warranty term is reduced to 24 months.
- AEO / SonicWave furnishes a 12-month warranty from the date of installation. If for any reason the unit fails, simply return to the manufacturer and a replacement will be returned via FedEx.

Most Frequently Asked Questions

Can installing The Catalyst void my warranty?

The Federal Trade Commission Magnuson-Moss Act (Equipment Warranty) 15USC ss230, January 1, 1997; 61 FR 69366, states that "a manufacturer cannot void or refuse to honor their equipment warranty because a non-OEM second party / or an aftermarket component or supply is installed in or with their equipment".

If the Chemsonic system is so great, why doesn't the Original Equipment Manufacturers (OEM's) support it?

The primary reason originates from "conflict of interests": ASHRAE states that "Typically + / - 85% of OEM revenues are derived from repair, replacement parts, maintenance and the sale of replacement units". The Catalyst® does not eliminate this income to the OEM – but it does delay these revenues.

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Chemsonic Business case for reduced HVAC/Chiller kWh Consumption

Customer:	LAFAYETTE CONSOLIDATED GOVERNMENT													
Site:	ROSA PARKS TRANSPORTATION CENTER		101 E. CYPRESS, LAFAYETTE, LA.											
System	**Annual Hours of Operation**	**kW/Ton**	**# of Tons**	**HVAC Duty Cycle**	**Annual kWh Consumed**	**Rate**	**Cost per year**	**Chemsonic Savings Factor**	**Annual kWh Saved**	**Annual Cost Savings**				
HVAC	3,380	1.1	180	52%	348005	$ 0.09	$ 31,842.44	32.0%	111,362	$ 10,189.58				
Refrigeration	-													
								Total Annual Cost Saving		$ 10,189.58				
Chemsonic Project	**Tonnes for Catalyst Install (Catalyst per tonne)**	**Additional Catalyst for excessive flow return pipes (Catalyst per tonne)**	**Number of SonicWave Devices for Filter /Drier**	**Catalyst Cost Installed**	**SonicWave cost Installed**	**Total**					QTY	Product	Install	Total
HVAC	180	0	4	$ -	$ 1,740.00	$ 1,740.00					180	$ 110.00	$ 13.50	$ 22,230.00
Refrigeration											4	$ 385.00	$ 50.00	$ 1,740.00
				Total Cost of Chemsonic Install		$23,970.00								$ 23,970.00
Simple Payback	**Years**	**Months**									Installation 2 days.			
	2.35	**28.2**												
Annual Consumption (kWh) see tab 2 BIU analysis	**Reduced Consumption (kWh)**	**Total Store kWh % saving**	**Carbon Reduction rate per kWh 2020 rate**	**Annual Carbon Reduction (Tonnes)**	**Carbon Reduction over project lifetime**									
731,840	111,362	15.22%	0.823	50.53	303.18									

Proof of Performance Testing

Proof of Performance

American Energy Optimizers offers “Proof of Performance testing in compliance with IPMVP guidelines option “B”.

The results are certified by a third-party engineering company, Impact Industrial Services, Inc. Steven King, P.E., CEM.

Testing uses Revenue Grade Onset data loggers and follows a strict protocol. Data is collected at 60 second intervals on all operating parameters, including unit cycle, amp draw, KwH, ambient temperatures / humidity, supply - return air / humidity.

Test results include certification of KWH reduction and Carbon / GHG emissions, which qualify for use in securing rebate, carbon credits. Under the Paris Accord, the carbon reduction must be recertified within 6 years to qualify for rebates and Carbon Credits.

We appreciate the opportunity to introduce you to Chemsonic & SonicWave

We will be pleased to answer any questions that you may have.

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