

Krystal-Aire™ DATA SHEET

Anti-Microbial Air-Duct Sanitizer

The Solution for HVAC Air-Borne Contagions,
aka "Sick Building Syndrome".

Krystal-Aire™ is a polymeric, water-based coating, which provides protection against metal corrosion and growth of bacteria, viruses, fungi, yeasts, molds and other micro-organisms, including the most difficult to control: Staphylococcus aureus; Legionella pneumophila (Legionnaires' disease); M. Tuberculosis var. bovis (BCG); and Herpes Simplex I & II. **Krystal-Aire™**, when properly applied with standard coating equipment, forms a monolithic film with excellent adhesion to metals, plastics, and other materials. This continuous film coating prevents "scale" and "pinhole" corrosion of thin metal surfaces, which would otherwise enhance growth of disease-causing microbes. All such contagions in the airflow of a treated ducting system, are killed upon contact and exposure to the **Krystal-Aire™** coating on Heating, Ventilation & Air Conditioning (HVAC) inner duct walls, baffles, filters, heat-exchangers, etc. In addition, **Krystal-Aire™** displays excellent water-resistance, even under prolonged immersion and cleaning.

INDOOR HEALTH HAZARDS

In recent years, increasing evidence of re-circulated air-borne contaminants in living and working environments, have been accurately documented by the media affecting ships, airplanes, high-rise office, commercial and industrial buildings, bio-tech clean-rooms, hospitals, clinics and other institutional structures. Office workers, passengers, patients, medical personnel, shoppers, conventioners, etc., have all been afflicted with illnesses ranging from the lingering common cold to the infamous Legionnaires Disease, which lead to a significant number of deaths and has been directly linked to air-borne contagions. The source of contamination is often traced to recirculated air from contained HVAC installations. Normal filtration will remove air-borne dust, ash, smoke and most odors, but is ineffective against air-borne microbes and viruses.

CONTRIBUTING FACTORS

The basic functions of any HVAC system, are: (1) to maintain clean and filtered air, fresh and/or re-circulated; (2) to provide conditioned air, heated or cooled; and (3) to regulate the flow, direction and amount of air provided. Very little consideration, if any, is given to the hygienic quality of this air. Most HVAC systems constantly re-circulate about 85%-90% of the indoor air, and only 10%-15% is fresh air from the outside. It can be safely concluded that there are numerous HVAC systems circulating potentially unhealthy air, particularly those whose air-ducts have never been serviced, or at best only infrequently cleaned.

THE SANITIZING SOLUTION

Pure-Duct™ Systems, a division of **TradeWinds International Inc.**, is marketing **Krystal-Aire™** the most potent, efficient and stable sanitizing agent yet developed. This unparalleled combination of desirable qualities, is made possible by physical "carbo-xylation", with an ethylene solution, of the most effective and powerful disinfectants known to date. This blend of compatible, active anti-microbial ingredients, unique to the **Krystal-Aire™** formula, results in a sanitizing agent exhibiting a broad spectrum of activity against the most common, as well as the most dangerous, gram-positive and gram-negative micro-organisms, bacteria, viruses, yeasts, molds and fungi (Chart on reverse side).

APPLICATION

All standard "painting" equipment can be used for application by brush, roller, high-pressure, or low-pressure/high-volume air or airless spray guns. Special controllable, multi-directional, remote spray equipment has been developed for application within existing and functioning HVAC ducting systems. Monitoring, measuring and closure devices are also available. Normal HVAC usage may be resumed immediately upon re-sealing of enclosed systems.

PACKAGING

KRYSTAL-AIRE™ is available in 5-gallon pails and 55-gallon drums.

INDEPENDENT VERIFICATION

Documentation of completed studies from Silliker Laboratories, Angus Chemical Company (Biocides Division), and other hospitals & research institutions are available, to verify and certify the efficiency of **Krystal-Aire™** in killing normally strain-resistant microbes and viruses, such as Staphylococci, Legionella pneumophila, and Herpes Simplex types I & II. The following tables are derived from these standardized studies:

	<u>ORGANISM</u>	<u>KILL TIME</u>
SPORES	Bacillus subtilis	10 hrs.
	Clostridium sporogenes	10 hrs.
	Aspergillus niger	25 min.
BACTERIA	Pseudomonas aeruginosa	10 min.
	Proteus vulgaris	10 min.
	Escherichia coli	10 min.
	Streptococcus mutans	10 min.
	Staphylococcus aureus	10 min.
	Coagulase Pos. (Staph. aureus)	5 min.
	Coagulase Neg. (Staph. epid.)	5 min.
	Salmonella typhimurium	30 sec.
	Salmonella choleraesuis	10 min.
	Klebsiella pneumoniae	5 min.
MYCO-BACTERIA	M. Tuberculosis var. bovis (BCG)	10 min.
	M. Sme gmatiss	10 min.
FUNGI	Candida albicans	10 min.
	Trichophyton mentagrophytes	10 min.
LIPOPHILIC VIRUSES	Asian Influenza type A	10 min.
	Influenza A (PRB)	10 min.
	Herpes Simplex type I	15 sec.
	Herpes Simplex type II	15 sec.
	New castle Disease (viral)	10 min.
	Infectious Bronchitis	10 min.
HYDROPHILIC VIRUSES	Poliovirus type I	10 min.
	Poliovirus type II	10 min.
	Rotavirus type SA-11	10 min.
	Feline Parvovirus	10 min.
	Bovine Parvovirus (VR 767)	10 min.
	Canine Parvovirus	10 min.
	Rhinovirus Ia.	10 min.

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STANDARDIZED LABORATORY TESTING

ASTM C-665 is a standardized test used to measure the ability of insulation material to support fungi growth of known strains, under conditions favorable to fungal development (high humidity and a warm atmosphere).

ASTM C-665

Microbial Growth Resistance Test

<u>Sample</u>	<u>Rating</u>	<u>Status</u>
Krystal-Aire™	NGS	Pass
Untreated Air-Ducting	GS2	Fail
Standard Particle Filter	GS2	Fail
Petri-Agar Control	GS3	Control

Rating

NGS = NO Growth on Sample.

GS1 = Fungal growth covers less than 10% of sample surface.

GS2 = Fungal growth covers 10% to 50% of sample surface.

GS3 = Fungal growth covers more than 50% of sample surface.

Organisms used to Contaminate Test Samples

Aspergillus niger	ATCC 9642
Aspergillus flavus	ATCC 9643
Aspergillus versicolor	ATCC 11730
Penicillium funiculosum	ATCC 11797
Chaetomium globosum	ATCC 6205

PHYSICAL PROPERTIES

Appearance	Clear Film
Odor	None
Viscosity	1000 cps
"Tack" Dry Time	@ 1 Hour
Solids Content	32%
pH	5.5
Adhesion	Excellent
Water Resistance	Excellent
Flexibility	Excellent
Wet Brush Test	Excellent Adhesion after 1000 Strokes

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