ETA DX TECHNOLOGY - ENVIRONMENTAL ISSUES

ETA systems are ultra environmentally friendly. There are only two fluid components that circulate below the ground. The first, and primary, is an R-410A refrigerant fluid. The second is a small amount of clear polyol ester compressor lubricating oil that mixes with the refrigerant. Both of these fluids are sealed within rugged, pressure tested, copper tubing that is often encased by a solid cement type grout 111. Thus, any leak is highly unlikely. However, even if a leak occurred, there would be no harm done, as neither of these fluids are hazardous, as verified by their respective Material Safety Data Sheets, which are matters of public record.

For example, R-410A's Material Safety Data Sheet states: The product is stable…Hazardous polymerization will not occur…and, the unused product is not an RCRA hazardous waste. Polyol ester's Material Safety Data Sheet states the "Product is non-hazardous according to OSHA (1910.1200)."

Commonly used refrigerant gases are typically non-poisonous, stable, and harmless. This is why refrigerant gases are safely and commonly used in home and commercial refrigerators and freezers. Most refrigerants are safer underground than above, simply because many common refrigerants currently in use (not ETA's refrigerant) can be harmful to the earth's upper ozone layer.

In the past, competitors of DX technology, being unable to match the superior DX system operational efficiencies, have circulated rumors that potential refrigerant and compressor lubrication oil leaks would be harmful to the environment. Factually, these rumors were untrue and were intentionally designed to frighten away potential DX customers. Neither the first generation DX design equipment using R-22 refrigerant, nor the new, state-of-the-art, ETA design, which utilizes non-ozone depleting R-410A refrigerant, have been prohibited, in any manner, from any sub-surface direct expansion heating/cooling application by the U.S. Environmental Protection Agency, as written documentation provided to ETA management (on file at ETA headquarters) from the U.S. Environmental Protection Agency so verifies. Neither the R-410A refrigerant, nor the polyol ester compressor lubricant it mixes with, are hazardous. They are both non-hazardous products. Statements to the contrary by potential ETA competitors would simply be false.

In fact, unlike other older and first generation DX designs which utilize R-22, or a similar refrigerant, all ETA systems have been engineered to operate on the new R-410A refrigerant. Since R-410A poses absolutely no threat to the earth's ozone layer, it is one of the most environmentally friendly and safest refrigerants possible to utilize. While any refrigerant can unsafely displace oxygen in a confined area, and should, therefore, always be safely reclaimed by a licensed professional, ETA's R-410A refrigerant is not poisonous itself and would have the same effect as displacing oxygen in a confined space with nitrogen or any other non-poisonous gas. Further, since all R-22 (Freon) systems in the U.S.A., and in other countries adhering to the Montreal Protocol, will have to be retrofitted or replaced as R-22 production is being phased out, a client's selection of ETA's environmentally friendly R-410A refrigerant system design will eliminate this expensive obsolescence concern, which will present itself to millions of other conventional heat pump owners.

The rugged copper tubing which contains the refrigerant circulating in ETA's sub-surface system is also safe. Copper is a naturally occurring metal element. Copper forms a reddish/greenish-brown film of cuprous oxide when exposed to the elements. This film tends to actually provide an additional safe, protective, layer for the underlying copper. Copper artifacts have reportedly been found intact in the Middle Eastern area beneath the clay deposited by Noah's Flood, which is believed to have occurred about 4,000 B. C. It is also reported that under-ground copper pipes used to convey water in Egypt thousands of years ago are still in existence. Copper tubing has been routinely and safely utilized to convey drinking (potable) water for hundreds of recent years.

When compared to water-source geothermal systems, since the ETA units do not require the sub-surface circulation of water and anti-freeze (as do water-source geothermal systems), there is no associated potential risk of sub-surface bacterial, or other potentially harmful, contamination which has been reported to have occurred in various geothermal water-source system applications. Some water-source systems have utilized poisonous antifreeze circulated underground with their water so as to avoid the use of propylene glycol (a food grade anti-freeze) that becomes thicker when cold and increases the water pump's power draw, thereby decreasing operational efficiencies. Such concerns, inherent with water-source systems, are non-existent with ETA designs, as there is no need for either water or antifreeze of any type.

When compared to fossil fuel based systems (gas/oil/coal), since the ETA units are all-electric (a totally clean system operation), there is no open flame (a potential fire hazard), there are no exhaust gases or soot, and there is no danger of explosion or carbon monoxide poisoning, which does periodically occur with fossil fuel systems.

When compared to conventional air-source heat pumps, there is no requirement for two fans (only one), there is zero outdoor noise, there is no defrost cycle (resulting in both lower bills and lower maintenance costs), there are minimal refrigerant pressure swings when outdoor temperatures reach highs and lows (eliminating periodic material compressor operational power increases), and there is no necessary outdoor equipment subject to early deterioration when exposed to salt water air near the seashore.

In areas with high humidity, ETA systems are far more comfortable than conventional air-conditioning designs. This is because the heat removed from the interior air is being rejected into approximate 50 degree F to 60 degree F earth instead of into approximate 80 degree F to 100+ degree F air. Thus, the refrigerant in the ETA system is much cooler and is further below the dew-point, and, as a result, removes far more humidity. For example, the ETA unit in ETA's initial test home (a 2,000 sq. ft. house north of Nashville, Tennessee, USA) has been operating for two years with the compressor running on about a 1.5 KW power draw (approximately the same as a small ladies' hand-held hair dryer). Besides keeping the house warm during the winter, the unit has been keeping the home cool during the summer, while keeping the home's humidity level near and/or under 50%, which is virtually unheard of with a conventional air-source heat pump. This significantly lower humidity level assists in making the interior feel cool and crisp, and assists in reducing health concerns over mold, dust-mites, etc., which are inhibited from rapid growth in areas of lower humidity. Plus, of course, the ETA systems optionally generate virtually free hot water when operating in the cooling mode, further reducing the unnecessary generation and expenditure of energy. This factor provides yet additional significant value to the homeowner/business owner.

Electric utilities companies will typically be very supportive of the ETA technology because ETA systems help to eliminate peaking problems. Further, ETA systems can reduce power consumption so significantly that the utility is afforded extra capacity without having to build a new generating facility, thereby facilitating their demand side management programs and helping to reduce their dependency on outsourced fuel supplies.

In conclusion, the ETA heating/cooling system is one of the most advanced, state-of-the-art, safest, environmentally friendly, cleanest, long-lasting, low-maintenance, economical, and quietest systems that one can own.