



788 Palomar Ave.
Sunnyvale CA 94085

SDN™

SDN™ Technology allows for low-cost, high-throughput nanocomposite multifunctional coatings deposition on almost any substrate.

PRESS RELEASE

September 22, 2014
For Immediate Release

Advenira's F1A12 High-Performance, Toxic-Free Coatings Enter the Chinese Market

Outperforming the competition by 6x, F1A12 coating to be used to fight corrosion in water filtration and treatment systems

SUNNYVALE, Calif. –(September 22, 2014)– Advenira Enterprises Inc., a developer of Solution Derived Nanocomposite (SDN™) coating technology, announced that its patented high-performance, toxic-free F1A12 coating has entered the Chinese market in cooperation with US engineering company ConQuip to fight corrosion in water filtration and treatment systems.

Advenira was founded by Dr. Elmira Ryabova as a means to address the world's increasing energy consumption and waste through the development of cost-effective, high-performance and environmentally friendly nanoscale coatings.

"We are entering new markets through cooperative agreements to bring safer, more efficient products to governments and businesses for the longevity of high manufacturing products, and, ultimately, for the betterment of our environment." Advenira CEO/CTO Dr. Elmira Ryabova states.

F1A12 significantly increases the corrosion resistance of metal. Due to the absence of toxic components, the protective coating will be used in the water filtration and treatment systems in China on the principle of reverse osmosis and distillation systems. The advanced coatings have been proven to extend the lifetime for steel and aluminum parts more than six times with an approximate content of corrosive substances 0.02-0.97% SO₄²⁻, 0.02-0.05% MPD, 0.02-0.05% HCl (Cl⁻ concentration: 0.01-0.02%). The average cost of the coating is \$0.132-0.265 per square meter, depending on the shape and complexity of the parts to be coated.

F1A12 Results

Advenira's F1A12 coating has also performed well in customer specific evaluations. For example, F1A12 has been shown to be a very effective coating for metal rollers used in RO and DI water systems, and coating systems that use high purity water. Immersion tests of coated 316L stainless steel in an acidic liquid with a composition similar to the following: 0.02-0.97%wt SO₄²⁻, 0.02-0.05%wt MPD and 0.02-0.05%wt HCl (Cl⁻ concentration: 0.01-0.02%wt) have shown that coating with F1A12 significantly increases the corrosion resistance of the metal. Without a coating, the 316L stainless steel corrodes in approximately one week.

The 316L samples coated with F1A12 have been found to be corrosion free after more than six weeks of continuous exposure. The reported six times improvement is a minimum value as the testing is still in progress. F1A12 is also being evaluated as an anti-corrosion coating for automotive applications and is currently undergoing accelerated weathering tests at a major US automobile manufacturer.

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Technical information

Advenira's F1A12 is a unique protective coating to protect metals, alloys and other materials at the same time from corrosion and wear. The coatings are multiphase nanocomposite materials consisting mainly of metal oxides, which contain no toxic components and can be used without restriction in any industrial facilities.

Advenira Enterprises, Inc. produces a unique alternative to the commonly used vacuum (PVD, CVD, ALD, etc.) and non-vacuum (electroplating, CBD, screen-printing, etc.) deposition techniques. The key advantages of SDN™ technology are improved material, capital and operating costs, high throughput and high material utilization. Advenira's unique approach to coating methodology is free from typical drawbacks and limitations of other methods, both vacuum-based and non vacuum-based. It allows the company to coat parts of virtually any shape with complex geometries.

Corrosion/Abrasion protective coatings, developed by Advenira, demonstrate substantial superiority over conventional coatings in acid corrosion testing and circular rotary abrasion testing. Coatings have an outstanding hardness values.

Performance

Corrosion resistance is defined by the time of coating's failure to prevent acid reaction with metal that manifests itself with the stream of H ² bubbles LAM 202-047671-001	Time to Failure (hrs)	Time to Failure per micron (hrs)
Al 6061	0.08	-
Anodized Al 6061 Type III	2	0.03
E-less Ni plated Al 6061	12	0.5
Advenira-coated Al 6061	2000	250
Mild Steel	0.02	-
Galvanized Steel	0.4	0.006
Stainless Steel	0.7	-
Advenira-coated Mild Steel	2200	220

- more -

Abrasion resistance is defined by the mass loss and decrease in coating's thickness after 1000 cycles by Rotary Taber Abrader with 1 Kg load and CS-10 wheels ASTM D4060	Mass Loss (mg) after 1000 cycles	Thickness Loss (um) after 1000 cycles
Galvanized Steel	39	3
Mild Steel	26	2
Al 6061	16.6	1.93
E-less Ni plated Al 6061	16.3	1.14
Stainless Steel	11.5	0.8
Anodized Al 6061 Type III	1.9	0.25
Advenira-coated Al 6061	1.4	0.15

Micro hardness	Pencil Hardness	Martens Hardness (N/mm ²)	Vickers Hardness (Kg/mm ²)	Indentation Modulus (GPa)
Advenira	9H	446	102	7.3

About Advenira Enterprises, Inc.

Advenira Enterprises, Inc. is a California-based company located in the heart of Silicon Valley known for its novel Solution Derived Nanocomposite (SDNTM) technology that allows for low-cost/high-throughput multifunctional coatings deposition on practically any type/shape/material substrate. Advenira commercializes its patented coatings technology in the Glass, Corrosion and Semiconductor markets – spanning the world's most important industries - with dramatic advantages over traditional techniques. For more information, please visit <http://www.advenira.com>.

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Media Contact

Elisabeth Morris-Maragoula
euronique+communications
+1 (916) 500-8772
elisabeth@euronique-communications.com