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# SILVER NEWS

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SECOND QUARTER 2009



## Silver is the Key to Today's Hand-Held Electronics

By Samuel Etris, Senior Technical Consultant to The Silver Institute

Millions of owners of mobile phones, iPhones, picture-phones, and a host of other hand-held electronics have silver to thank for the high performance of their devices.

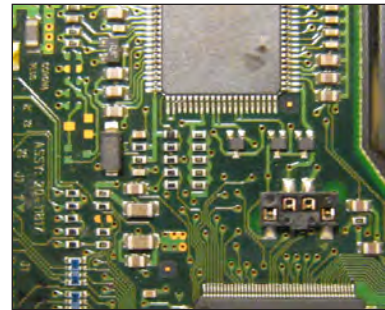
An innovative and economical mass production technology for building these devices relies on a production method known as 'surface mounting,' which allows components to be fastened both mechanically and electronically to printed circuit boards. Components such as condensers, resistors, and diodes are placed in indentations on circuit boards and a wave of molten silver alloy solder flows across its surface to create an instantaneous permanent bond between the two. The technology permits upwards of 200 contacts for components and connections on a small board, increasing the range of features possible in the device while keeping it extremely small.

Surface mounting technology replaces the old-style use of holes into which component wire leads were dropped for soldering. In today's drop-on technology, components are now dropped close together at precise locations for soldering, greatly increasing the useable area of a board and employing both sides to double the density of components. The fluid silver-tin alloy rapidly wets the metal surfaces to provide an instantaneous, highly conductive connection between all the components and the circuits of the board to permit rapid assembly. With the circuitry complete, the only remaining connections are those to the controls and the viewing screen.

Surface mounting has been a significant labor and cost-saving technology, bringing down the price of the most advanced devices to an affordable level -- along with shrinking component size -- while greatly increasing the complexity and sophistication of the device.

Developed about 20 years ago, the technology had used a lead-based solder with only a small amount of silver to assure the strength and adherence of the connections. Now, however, the use of lead is forbidden by the European Market Directive on Reduction of Hazardous Substances, and several US states currently are considering similar regulations. The Directive prohibits the use of lead and cadmium from electrical and electronic equipment which has long used these metals for soldering electronic components.

One US company meeting the lead-free solder challenge is Heraeus, Inc., of West Conshohocken, Pennsylvania. It has developed a low-temperature lead-free solder that meets all the requirements of surface mounting technology using 96.6 percent tin and 3.4 percent silver. Lead-free solder means a 30 percent increase in the use of silver over the former lead-containing solders for the billions of connections made daily by the electronics industry. According to The Silver Institute's *World Silver Survey*, 61.4 million ounces of silver were used for electrical and electronics fabrication in the US in 2008, with world use at 201.7 million ounces. Substituting this new solder will greatly increase the proportion of silver used in the coming years.



Surface mounting technology with silver-based, lead-free solder has replaced old-style use of holes into which component leads were placed for soldering

# Silver Nanotechnology Working Group Established

## Organization Will Help Companies with Regulatory Approval Process

The Silver Institute and the Silver Research Consortium have established the Silver Nanotechnology Working Group (SNWG), an industry effort intended to foster the collection of data on silver nanotechnology. The group's goal is to advance the science and public understanding of the beneficial uses of silver nanoparticles in a wide-range of consumer and industrial products.

The formation of the group was inspired by the regulatory challenges some companies are facing in registering new products containing silver nanoparticles. The SNWG will allow industry participants to share environmental and human health information on their respective nanosilver products and processes, including research, findings, and other data that can be combined into a summarized format. This combined information can then be used by individual SNWG members for their registrations of silver nanoproducts with regulatory agencies, to provide technical assistance on ongoing federal programs in nanotechnology, and to put to rest unsubstantiated claims about products containing silver nanoparticles, according to Rosalind Volpe, SNWG's Executive Director.

The SNWG is based in Research Triangle Park, North Carolina, and is operated under the auspices of the Silver Research Consortium, a research initiative funded by the silver industry.

# Stronger Wound Dressing Contains Silver to Combat Pathogens

New Jersey-based medical technology developer and marketer ConvaTec has introduced their AQUACEL Ag Dressing with Strengthening Fiber, a ribbon dressing that is up to 20 times stronger than the original ribbon dressing, according to company officials.

The wound dressing also offers reduced shrinkage and is the only absorbent filler dressing to offer the gelling benefits of Hydrofiber Technology plus the antimicrobial properties of ionic silver, said ConvaTec officials. They added that the additional strength of the AQUACEL Ag ribbon dressing makes it ideal for use in packing a wide variety of cavity wounds, such as post-surgical wounds, excised abscesses, pilonidal cysts, and stage III and stage IV pressure ulcers. In addition, the new dressing provides the broad-spectrum antimicrobial properties of ionic silver, which kills a broad range of pathogens.



CONVATEC

The AQUACEL Ag Dressing with Strengthening Fiber is up to 20 times stronger than the original ribbon dressing.

# Silver Reaches Second Highest Historical Price in 2008

## Investor and Industrial Demand Push Prices Upward: World Silver Survey 2009

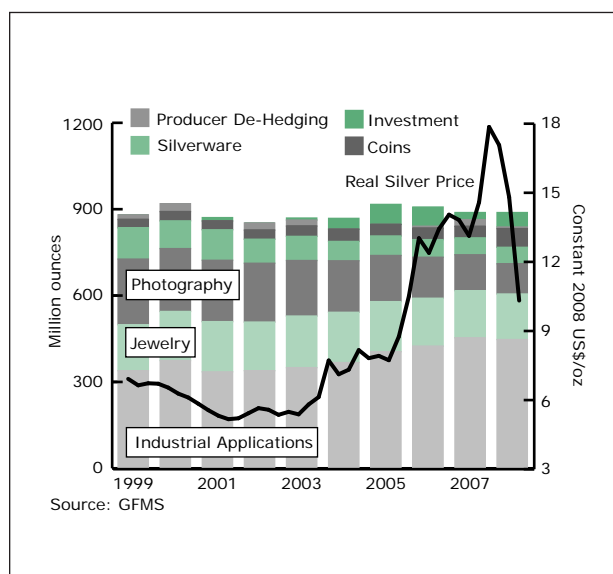
Strong investor interest and solid industrial demand last year drove silver's annual average price to its second highest level in the metal's history, according to *World Silver Survey 2009*. Last year represented a 12 percent increase in the average price, US\$14.99 per ounce over 2007, and was the seventh consecutive annual rise for the metal, highlighting silver's dual role as both an investment vehicle and an industrial metal.

The Survey stated: "During the first half of 2008, investors drove prices up to well above the \$20/oz mark (a high of \$20.92 was recorded in March) against a backdrop of still generally firm fabrication demand." It was a different story in the second half, though, as the economic outlook deteriorated, but the first four months of this year saw the price recover a good part of lost ground, the Survey noted.

### Demand

Coins and medals fabrication in 2008 jumped 63 percent to a record 64.9 million ounces mainly due to a surge in investment-related purchases of bullion coins, both in the United States and Europe. U.S. Silver Eagle bullion coin sales reached a record 19.6 million ounces last year, almost twice the 2007 figure. Sales would have been higher if the U.S. Mint had sufficient blanks to produce coins to meet demand. In 2009, the U.S. Mint has achieved a nearly 70 percent year-on-year rise in the first quarter.

Total global fabrication demand slipped a modest .09 percent in 2008 to 832.6 million ounces, mainly due to poor economic conditions. Jewelry fabrication dropped by 3.2 percent to 158.3 million ounces in 2008 because of weaker offtake in Italy and Thailand, although growth was stronger in India, China and Russia. Silverware demand fell by 2 percent in 2008 to 57.3 million ounces as losses in western markets were partially offset by gains in India, which saw a 7 percent rise, as well as Russia, which also enjoyed growth in consumption last year.



### Supply

Driven by gains in Latin America, Asia and the CIS, global silver mine supply recorded its sixth year of consecutive growth, totaling 680.9 million ounces, representing a record high. "Looking at individual countries, the strongest gain was seen in Bolivia, where output more than doubled owing to a full year of production from the San Cristobal property," the Survey noted. Russia experienced a 24 percent gain.

On the government side, net sales in 2008 fell by 27 percent to 30.9 million ounces, their lowest annual level for over a decade. Last year's decline was primarily due to a reduction in Russian official bullion sales in conjunction with the absence of sales by both India and China.

The World Silver Survey was independently researched and compiled by London-based GFMS Limited and has been published by The Silver Institute since 1990. Eighteen companies and organizations from North and South America, Europe, Australia and Asia sponsored the report.

Copies of the *World Silver Survey 2009* are available from The Silver Institute for US\$225 and can be ordered from [www.silverinstitute.org](http://www.silverinstitute.org) or, for orders outside the US, from GFMS at [www.gfms.co.uk](http://www.gfms.co.uk).

# Registering Antimicrobial Silver as a Generic Pesticide with the US EPA

## Learning from the Copper Experience

By Jeffrey R. Ellis, Senior Technology Consultant to the Silver Institute

The success of the Copper Development Association (CDA) in obtaining US Environmental Protection Agency (EPA) registrations as biocides for copper and some of its alloys has prompted manufacturers of antimicrobial silver and the Silver Institute to see if something similar could be done for products using silver.

Biocidal silver is used in appliances such as refrigerators and ice makers, as crop protection, in water treatment and on housewares. Many in industry hope that the precedent derived from the CDA registrations will allow for generic registrations of silver-based biocides without requiring manufacturers of treated articles to obtain additional registrations. This hopefully would make it much easier to distribute products and make public health claims for treated articles containing antimicrobial silver. This does not include medical devices, which are largely under the jurisdiction of the Food and Drug Administration (FDA).

Unlike copper, however, biocidal silver will likely not be used as a hard, impervious surface, but instead as a component, usually at parts per million or less, in coatings, laminates or textiles. Therefore, the exact protocols developed for copper will not have direct applicability for products containing silver.

The EPA requires that potential registrants submit data on kill times, under hospital conditions, against each organism for which claims are going to be made. In addition, abrasion and leaching data of silver from the surfaces of coatings and laminates must be submitted. Studies must also be undertaken on the loss of silver during washing of textile products. Other data about the matrix, the method of embedding silver in it, and the methods of maintaining antimicrobial activity of the product are also required.

Manufacturers of antimicrobial silver (often in partnership with their customers) currently are submitting registration applications to the EPA and other regulatory agencies, and more are expected.



Many industrial icemakers use imbedded silver particles to help kill pathogens.

## Continued Growth Expected in Silver Investment Demand

Investment demand for silver, mainly from Exchange Traded Funds (ETFs) and in the form of direct purchases of bars and coins, will increase sufficiently to offset a projected fall in industrial demand, according to *The Silver Investment Market*, an independently prepared report by precious metals consultancy GFMS Ltd., commissioned by the Silver Institute, and released in April, 2009.

“The growth in investment over recent years can be linked to a number of important developments,” the report noted. “First, improving supply/demand fundamentals, in particular the erosion of near market stocks due to the heavy supply deficits in the 1990s, set the scene for investors to return to the buy-side in the early part of this decade.”

The growth in silver investment has been helped by a general flow of funds into commodities. “Not only has this helped to reaffirm silver as an asset but also investment in the white metal has taken place ‘indirectly’ through investors purchasing index and basket products that contain some weighting in silver,” the report noted. This increase in silver demand has taken place in an environment of firm silver prices. During the first quarter 2009, the silver price averaged \$12.60 an ounce, up 23 percent compared to the fourth quarter of 2008.

The 40-page report can be downloaded free from the Silver Institute and GFMS web sites, [www.silverinstitute.org](http://www.silverinstitute.org) and <http://www.gfms.co.uk>.

## Partnership Teams Antibacterial Silver-Based Medical Devices With Those That Prevent Clotting

Coatings maker Biocoat, Inc. and Agion Technologies have announced a co-marketing agreement to develop and promote a medical device line combining anti-clotting coatings with silver's antibacterial properties.

Coatings that release silver are used on catheters, particularly central venous and urological catheters, where they have been shown to reduce the amount of microbes found on their surfaces. Recently, Medicare, the US government's administered system of health insurance to senior citizens, declared it will no longer reimburse hospitals for the treatment of some preventable conditions, creating a strong incentive for companies to develop antimicrobial protected devices for prophylactic and therapeutic use, according to Agion officials, headquartered in Wakefield, Massachusetts.

Likewise, physicians and surgeons often prefer to use devices that are covered with anti-clotting coatings. By adding Biocoat's HYDAK product line of anti-clotting coatings, based on hyaluronic acid – which occurs naturally in the body – and silver-based coatings, medical professionals will have the best of each device's properties.

"We believe that Agion's silver zeolite technology and the unique properties of coatings based on hyaluronic acid will be a major advance in medical coatings," said Djoerd Hoekstra, CEO of Horsham, Pennsylvania-based Biocoat. Added Paul Ford, CEO of Agion Technologies: "Medical devices that incorporate Agion's natural antimicrobial technology actively inhibit the growth of microbes on the device's surface for the life of the product. This partnership will allow us to extend our antimicrobial protection to medical devices that choose Biocoat as their coatings provider."

For more information: [www.biocoat.com](http://www.biocoat.com) and [www.agion-tech.com](http://www.agion-tech.com).

## FDA Okays Silver Nitrate-Hydrogen Peroxide Solution for Bottled Water Additive

The U.S. Food and Drug Administration (FDA) has amended the food additive regulations to allow for the safe use of a solution of silver nitrate and hydrogen peroxide as an antimicrobial agent in bottled water.

The final ruling in March 2009 permits levels not to exceed 17 micrograms per kilogram of silver and 23 milligrams per kilogram of hydrogen peroxide in the treated bottled water. In its ruling, the FDA stated that the estimated daily intake (EDI) of silver from the petitioned use in bottled water to be 26 micrograms per person per day. Currently, silver is permitted as a component of an antimicrobial agent in water filters and the EDI from this filter use is 27 micrograms per person per day for more than 90 percent of consumers over two years old.

The petition that prompted this ruling proposed as a condition of safe use that the silver nitrate and hydrogen peroxide additive not be used in bottled water that has been or is intended to be filtered with a silver-containing water filter because this might add additional silver to the water. "Thus, the use of the subject additive in bottled water will not increase consumer exposure to silver. Because there is no increase in the intake of silver beyond a level that has already been established as safe, FDA has no concerns regarding the petitioned use of silver as a component of this additive," the ruling noted.



New FDA regulations allow a solution of silver nitrate and hydrogen peroxide in bottled water to kill germs



## New Jewelry Case Lining Promises to Keep Silver Tarnish Free

After four years of research, Wolf Designs has introduced a line of jewelry boxes that promise to keep silver tarnish free for up to 35 years.

The company's LusterLoc jewelry boxes are lined with an anti-tarnish cloth that absorbs gases that cause silver to tarnish,



WOLF DESIGNS

LusterLoc jewelry boxes are lined with an anti-tarnish cloth that absorbs gases that cause silver tarnish.

according to company officials. Wolf Designs has been producing jewelry cases since 1834 and also offers watch rotators and personal and home accessories.

LusterLoc cases come in several styles and sizes, including the new *Torino* collection ranging in price from US\$45 to US\$375. For more information: [www.wolfdesigns.com](http://www.wolfdesigns.com)

## CME Group Starts Trading E-mini Silver 1,000 Ounce and E-mini Gold Kilo Futures

The CME Group Inc. opened trading in April on the E-mini silver 1,000 ounce and E-mini gold kilo futures contracts. These contracts are listed with and subject to NYMEX rules and are only available on the CME Globex electronic trading platform.

The E-mini gold kilo futures contract is 33.2 ounces with a minimum price fluctuation of \$0.10 per ounce. The E-mini silver 1,000 ounce futures contract is 1,000 ounces with a minimum price fluctuation of \$0.01 per ounce.

The first listed month was May 2009 for both contracts. The E-mini gold kilo futures contract trades the current calendar month, the next two calendar months, and every February, April, June, August, October, and December for a 23-month period from the current calendar month. The E-mini silver 1,000 ounce futures contract trades the current calendar month, the next two calendar months, and every March, May, July, September, and December for a 23-month period from the current calendar month. The contracts terminate on the third last business day of the contract month.

### For Future Reference Silver Prices 1980-2009

2009	High	Low	Average
May	15.60	12.48	14.11
Apr	13.02	11.79	12.50
Mar	13.86	11.95	13.09
Feb	14.49	12.30	13.41
Jan	12.56	10.42	11.39
2008	High	Low	Average
Dec	11.39	9.35	10.32
Nov	10.46	8.80	9.78
Oct	12.72	8.79	10.39
Sep	13.46	10.46	12.22
Aug	17.48	12.80	14.48
July	19.18	17.25	18.07
June	17.62	16.46	17.01
May	18.24	16.12	17.01
Apr	18.31	16.50	17.48
Mar	20.69	16.81	19.16
Feb	19.81	16.30	17.66
Jan	16.95	15.17	16.05
2007	High	Low	Average
Dec	14.8	13.83	14.37
Nov	15.5	13.96	14.66
Oct	14.38	13.25	13.57
Sep	13.79	12.19	12.91
Aug	13.12	11.47	12.28
July	13.36	12.47	12.93
June	13.76	12.21	13.09
May	13.53	12.81	13.15
Apr	14.06	13.29	13.74
Mar	13.53	12.64	13.11
Feb	14.69	13.33	13.95
Jan	13.51	12.13	12.83
Year	High	Low	Average
2006	14.85	8.82	11.62
2005	9.00	6.43	7.32
2004	8.21	5.51	6.67
2003	5.98	4.35	4.89
2002	5.11	4.22	4.60
2001	4.81	4.03	4.36
2000	5.55	4.56	4.97
1999	5.76	4.87	5.22
1998	7.26	4.62	5.51
1997	6.34	4.16	4.88
1996	5.82	4.68	5.18
1995	6.10	4.38	5.19
1994	5.78	4.57	5.28
1993	5.44	3.52	4.30
1992	4.32	3.63	3.94
1991	4.55	3.51	4.03
1990	5.35	3.94	4.82
1989	6.20	5.02	5.47
1988	8.06	6.01	6.53
1987	11.25	5.35	6.99
1986	6.32	4.85	5.49
1985	6.89	5.48	6.14
1984	10.17	6.25	8.15
1983	14.74	8.38	11.46
1982	11.30	4.81	7.93
1981	16.53	7.97	10.53
1980	50.35	10.20	20.66

(COMEX settle)

### The Silver Institute El Instituto de la Plata

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