

# SSL Postings

U.S. DEPARTMENT OF ENERGY

April 15, 2015



*Although you do not often hear about growth in domestic manufacturing here in the United States, the solid-state lighting industry is steadily growing and establishing a manufacturing presence here at home. Solid-state lighting was not only born of U.S. ingenuity and R&D, but is also riding the crest of a worldwide trend toward greater energy efficiency. This offers a golden opportunity for U.S. manufacturing to take a significant role in SSL. From time to time, the Postings focus on SSL companies manufacturing here in the U.S., in a series called "SSL in America." This is not intended to endorse or promote any of the companies, but rather to describe advances in energy-efficient solid-state lighting. The activities you'll read about here are consistent with the U.S. Department of Energy (DOE) white paper "[Prospects for U.S.-Based Manufacturing in the SSL Industry](#)."*

## Spotlight on SAES Pure Gas

SAES Pure Gas manufactures gas purifiers that are primarily used in the manufacture of semiconductor and compound semiconductor devices, including LEDs. Three different gases – hydrogen, nitrogen, and ammonia – are essential to LED manufacturing, because they're used at various stages in the metalorganic chemical vapor deposition (MOCVD). But these gases are only available at a purity level of 99.999% (called "5N," to signify the five 9s). That may sound as pure as the driven snow, but it's not pure enough for LED manufacturing, which is so sensitive a process that it requires the three gases to each be 99.9999999% pure (called "9N," to denote the nine 9s). As a result, manufacturers of LEDs have to purify the hydrogen, nitrogen, and ammonia gases they use – which is where SAES Pure Gas's products come in, because they contain materials that absorb the impurities.

Steve Wallace, the company's Palladium Purification Business Manager, explains that SAES Pure Gas got its start as a California company called Cryolab, which manufactured cryogenic valves and ultra-high-purity valves, primarily for the defense industry. Cryolab was purchased in the late 1980s by the SAES Group, a multinational manufacturer based in Milan, Italy, and began manufacturing gas purifiers at that time. Gas purifiers became SAES Pure Gas's sole focus when its cryogenic valve business was sold in 1998.

SAES Pure Gas does all of its manufacturing at its headquarters, which is located in beautiful San Luis Obispo, about halfway between Los Angeles and San Francisco and just a few minutes from California Polytechnic State University and the Pacific Ocean. More than 100 people work at the San Luis Obispo facility – ranging from electrical engineers, to mechanical engineers, to R&D folks, to sales staff, to marketing personnel. Steve explains that ammonia is the most critical of the three gases for LED manufacturing, with the yield increasing as the ammonia gets purer, and that the explosion of LED manufacturers back in 2011 led SAES Pure Gas to establish a specialized laboratory at its facility that enables the company to test its products by injecting impurities into ammonia gas before flowing it. He notes that the company interacts quite a bit with other members of the SAES Group, sharing technology and expertise, and that most of SAES Pure Gas's suppliers – providing such components as tubing, valves, and heating blankets – are U.S.-based, with many of them located within a few hours of San Luis Obispo.

Steve says the company's San Luis Obispo location helped in gaining a foothold with semiconductor and LED manufacturers, many of whom were located just up the road in Silicon Valley, which enabled SAES Pure Gas to work much more closely with them than would otherwise have been possible. He explains that because the company makes ultra-high-purity products, a very high degree of cleanliness is required when manufacturing them, with even a tiny deviation from that being potentially disastrous. With such small margins for error, Steve says, manufacturing domestically makes it easier to maintain the strict quality control required than if the operation were carried out overseas. And while many of the company's customers are U.S.-based, it has customers all over the globe, with the majority located in Asia. Steve says that despite the higher labor rates here in the U.S., and the fact that a number of the materials that go into the manufacturing of SAES Pure Gas's products have to be imported, the company has no plans to move its operations overseas.

SAES Pure Gas is among a number of companies that are working to create and strengthen a solid-state lighting manufacturing base here in the U.S. This will not only help bring significant energy savings through more efficient lighting products, but will benefit our economy by adding jobs at multiple levels of the supply chain.

As always, if you have questions or comments, you can reach us at [postings@akoyaonline.com](mailto:postings@akoyaonline.com).