



“What about counterfeit electrical and electronic repair parts? We’ve seen some really suspicious parts and packaging and some pretty scary failures.”

Great question. Like the fake bearings covered in my September 2011 “Uptime” column, counterfeit electrical and electronic parts can be extremely dangerous. Incidents of these parts have been grow-ing at a staggering pace since 2004. The supply chain for electrical and electronic parts used in our plants and facilities—*not to mention in our homes*—is tainted with substandard knock-offs (most of them from China). What is being counterfeited/what has made China the world’s largest source of counterfeit parts makes for a frightening story. What can we do to protect ourselves?

Sound the alarms

Hundreds of millions of dollars in counterfeit electrical and electronic parts are seized annually in the U.S. Manufacturers, trade groups and testing/certifying organizations are up in arms over the bogus products sold with their brand names, look-alike trademarks, labels and packaging. Even worse, counterfeits can kill!

These fakes are being produced at alarming rates. Product performance and reliability may be disappointing, but the bigger issue is the SAFETY HAZARD these electrical/electronic parts create: electrical shock, fires, damaged equipment and burns. The risks they pose also create a huge liability problem for authorized manufacturers, distributors and retailers. Here’s a list of the most commonly detected and seized counterfeit electrical and electronic parts:

- Circuit breakers and fuses
- Dry-cell batteries (cell phones, cameras, PDAs, radios, toys, etc.)
- Small electric motors
- Control relays
- Receptacles and switches
- Lighting controls
- Ground fault circuit interrupters (GFCIs)
- Lamps and lamp ballasts
- Extension cords and power strips

- Conduit fittings
- Microprocessors/microcircuits

China's underground economy

Historically, in China, there have been huge individual, local and state revenue streams that come from counterfeit and knock-off products. In 2003, to comply with the World Trade Organization (WTO) foreign trade regulations, China changed its foreign trade laws to eliminate the monopoly that government-owned trading companies had on exports. Prior to this, all exports had to be processed through state-owned companies. Counterfeiters had to work through these state-approved distributors and brokers to get their bogus goods into the world marketplace. When the foreign trade laws were changed in December 2003, every counterfeiter could become a first-tier exporter of its own bogus parts.

Let's back up a bit. How did the Chinese get the ability to produce counterfeit parts in the first place? From 1980 through about 1992, China's economy grew at unprecedented rates—*from a poverty-stricken, seemingly backward, closed society to one of the fastest-growing economic powerhouses in the world.*

This was made possible by massive amounts of "foreign direct investments" (FDI) from multinational enterprises. In the 1990s, China was the second-largest recipient of FDI in the world. (The U.S. was number one.) By 2002, though, China had become the largest FDI recipient.

Along with multinational businesses investing in the Chinese market came the transfer of "intellectual property" (i.e., copyrights, patents, trademarks, proprietary business information) and advanced manufacturing technology: State-of-the-art technologies and manufacturing processes were purposely transferred to China's shores. But there's more...

Eight factors that promote counterfeiting

There have been an increasing number of factors influencing the rapid and sustainable (yes, sustainable!) growth of counterfeiting in China since 2004. It started with the big three building blocks: relaxed foreign trade laws, technology transfer and little respect for intellectual property rights. Then came three local elements: lack of local enforcement of Chinese counterfeiting laws, organized crime networks and an economic boon to small communities in China.

Linked together, the six factors above were the start of a deadly tidal wave of counterfeit, knock-off, fake and bogus products hitting the Chinese marketplace, then flowing into the global

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supply chain. Two additional factors, though, combined to make the monster more dangerous: the Internet and low bid.

Online sales have grown exponentially over the past 20 years. Anybody can set up a Website and hawk his/her wares to customers around the world. Company buyers and consumers—in *their quest for low prices*—are drawn to such sites and products like moths to porch lights.

Together, these eight factors create a powerful synergy: The whole is truly greater than the sum of the parts! They work in tandem to generate a virtually unstoppable economic machine in China—and *have created a counterfeit tsunami sweeping through every economy in the world, including China's own!* Yes, China has also become a victim of its own counterfeit machine (i.e., bogus automotive parts, electrical and electronics products, foodstuffs, medicines, etc.). An unintended consequence, to be sure, it's estimated that over 90% of the consumer products used daily in China are counterfeit or trademark-infringing knock-offs.

“China is considered by many to (be) the most serious counterfeiting problem in world history” according to testimony by Professor Daniel C.K. Chow of the Ohio State University College of Law. In 2004 Professor Chow also stated, “Counterfeiting is estimated to now account for approximately 8% of China's gross domestic product.”

Today, many small local Chinese economies depend on counterfeiting in both domestic and global export markets. So, if you think the problem can be controlled at its source, think again: It's going to get worse before it gets worse! (You can quote me on that.)

How counterfeit parts are made

When you think about it, the manufacture of fake parts is not easy. Or is it? There are a number of ways counterfeiters produce their wares:

Scrap materials: Asian countries, including China, are buying up much of the world's electronic scrap (e-scrap) and “recycling” it. Components are removed from the equipment, cleaned up, re-packaged and sold as “new.”

Substitute parts: A similar new, recycled, obsolete or knock-off part is re-labeled as a higher-end or newer part. (It may look right, but it won't function properly.)

Manufacturing defects: Legitimate manufacturers in China—and elsewhere—occasionally scrap out products because of defects. Rather than these parts being destroyed as directed, they're stolen by employees and sold on the black market as first-quality parts.

Brand new parts: Many counterfeit parts are made from scratch using similar-to-the-original manufacturing processes and equipment—*thanks to decades of technology transfer*. But shortcuts are taken in component selection quality and assembly methods. Often, these products contain high levels of toxic substances not allowed in most countries. There are also cases of authorized Chinese manufacturers making their own counterfeit lines of products on the same equipment as the authentic products.

Fakes: These items may look authentic, but they're nothing more than non-functional rip-offs.

Caveat emptor

Let the buyer beware! You simply can't be too vigilant. Here are some suggestions to protect yourself, your facility, your operations and your home from counterfeit electrical/electronic parts.

Check the price: If the price sounds too good to be true, it probably is. Beware of brokers, independent non-franchised distributors, exclusive Internet sources and individual sellers offering parts at a significantly lower price than your normal reputable suppliers. These sources may not be authorized by the original component manufacturers (OCMs). While the prices are attractive, the goods may be counterfeit.

Check the country of origin: Carefully consider and inspect any critical component "made in China" or other countries/regions known for counterfeiting electrical/electronic parts—*i.e., Hong Kong, Taiwan, Malaysia and Singapore, to name a few*. China heads this parade with more than seven times as many counterfeit products as the second in line. But the problem doesn't stop there: Some Chinese counterfeiters are transshipping their bogus products through other countries, marking them as made in that country versus "made in China." In some cases the sub-standard materials are shipped to the

U.S. and assembled here to get the label “Assembled in the USA.”

Check for improper packaging: Sometimes, the packaging of counterfeit parts just doesn't look right. Look for fuzzy and unclear printing on products, labels and boxes. Spelling mistakes on packaging and instructions flyers are also common. Missing product-information sheets or the wrong instruction sheets are typical red flags. A discrepancy between the package and the contents may also be a sign of counterfeit parts.

Check for authentic certification labels: Look for genuine, detailed and reputable certification marks on the packaging and on the product. When in doubt about authenticity, check the certifying organizations' Websites for sample certification marks. Inspection laboratories and certifying organizations are starting to use more holographic labels and unique and permanent identification on the parts and the packaging of authentic parts to make counterfeiting more difficult.

For end-users and consumers of electrical/electronic parts, look for recognized testing and certification labels and consult with the following organizations when something looks suspicious:

- **ESFi** – Electrical Safety Foundation International (www.esfi.org)
- **ETL** – Edison Testing Lab (www.Intertek.com)
- **NAED** – National Association of Electrical Distributors (www.naed.org)
- **NEMA** – National Electrical Manufacturers Association (www.nema.org)
- **UL** – Underwriters Laboratories (www.ul.com)
- **CSA International** – Canadian Standards Association (www.csa-international.org)

Verify specific industry certification/registration: Look for evidence of quality-management systems' certification such as ISO-9001: 2000 for manufactured components, or AS9120 for aerospace product distributors.

Visit www.CounterfeitsCanKill.com : There are a number of counterfeit-related news articles and resources here. Their purpose is to distribute an “anti-counterfeiting message” to professionals in the distribution, specification, purchasing and installation of electrical products. Sponsors of this Website include Alcan Cable, Eaton, Fluke, GE, Siemens and Square D (and it's endorsed by NEMA, NAED, NECA, CSA and UL).

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Dealing with this ever-lurking danger

The more I study and experience first-hand the impact of the growing incidents of counterfeit parts in American plants and facilities, the more I believe we as maintenance and reliability professionals must take a stand to seek out quality repair parts and speak out when we discover counterfeit, bogus and/or fake parts. Price has to be a secondary consideration from now on.

In the meantime, we're not done with this topic. It's too big and poses too much danger. If you and/or your operations have had experience with counterfeit repair parts—*of any type*—please let us know. We're very interested in your story.

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