



**REMANUFACTURED PRODUCTS ABOUND**

The U.S. Department of Defense is the largest remanufacturer of durable goods in the world, followed by the automotive industry, computer printer industry, remanufactured desk furniture, and the electrical industry.

## Electrical Safety, Reliability, Sustainability

*PEARL Standards Bring Safety, Reliability to Secondary Electrical Distribution Channel*

Just about every product in the world has two main markets: one for new product, and a second market for used — sometimes referred to as surplus, reconditioned, rebuilt or remanufactured — product. Cars, computers, jewelry, and electronics are just a few examples of thriving industries that trade in used goods. The commercial and industrial electrical supply markets are no exception.

Electrical equipment, like automobiles and industrial machinery, are designed to last decades. However, like other durable goods, electrical equipment can be dangerous to the inexperienced — whether it is new or used product. The confluence of these two facts means that product safety — not just availability — is critical to a healthy electrical marketplace.

In 1908, the National Association of Electrical Distributors was formed to “establish the electrical distributor as an essential force in the electrical industry and economy,” followed by the National Electrical Manufacturer’s Association (NEMA) in 1926. These venerable associations eventually expanded to include

educational programs and standards to help improve the operations and safety of the electrical supply chain with a focus on new product from electrical Original Equipment Manufacturers (OEMs).

During the next 50 years, two other associations emerged to help service the used and installed base of electrical equipment. The Electrical Apparatus Service Association (EASA) focused on rewinding standards for electric motors, while the InterNational Electrical Testing Association (NETA) offered guidance, education, and certification for field-testing electrical equipment. But it wasn’t until 1996 that a group of independent electrical distributors joined forces to promote the reconditioning of industrial electrical product. The Professional Electrical Apparatus Reconditioning League (PEARL) is the only trade association that offers technical reconditioning standards for industrial electrical product, a code of ethics, ongoing education, site and technician certification, and best practices. Today, PEARL’s corporate membership has grown to more than 70 independent electrical resellers with revenues in excess of \$500 million each year.



For a statistical analysis of how reconditioned electrical product is better for the environment than new product or product made from recycled materials, visit: [http://www.pearl1.org/downloads/Reconditioning-The-Ultimate-Form-of-Recycling\\_PEARL-WhitePaper-LowRes.pdf](http://www.pearl1.org/downloads/Reconditioning-The-Ultimate-Form-of-Recycling_PEARL-WhitePaper-LowRes.pdf)



PEARL Reconditioning Standards include lists of required test equipment for each product category. The standards require both acceptance testing before reconditioning to establish baseline performance, and verification testing after reconditioning, using OEM specifications for the original device as the minimum performance standard.



## *Why Do We Need Used Electrical Equipment?*

Why does a secondary, or “out of channel” market for electrical equipment exist? It exists for the same reason that electrical OEMs and wholesale distributors exist — supply and demand.

Consider a manufacturing plant that has a failed component in a critical electrical service. A new replacement component is not available from the manufacturer and distributors for weeks, months, or worse, not at all. So what is the plant to do?

How about the power generating station that distributes electricity through a vintage — but perfectly serviceable — 15kv switchgear built in 1959. The station needs to upgrade their integral tie breaker from 2000A to 3000A to keep up with escalating demand.

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The most cost effective (and practical) way to upgrade the service is to replace the tie breaker with one of similar vintage and design, but with the higher current rating. Unfortunately, primary supply channels

stopped stocking this product 30 years ago.

What about the new office building that is falling further and further behind schedule waiting for a certain size and type of conduit or conduit fittings, only to discover weeks past the original delivery date that the material is on backorder with no estimated time of delivery?

Each of these cases represents need-it-now demand for electrical products — critical demand from the customers’ perspectives. Enter the secondary electrical supply house. They’ve acquired and warehoused hard-to-find electrical product for just these types of situation. However, even when the replacement component is located, the question remains: How safe is the replacement?

The only way to answer the “safety” question is to validate the component through acceptance testing, and when necessary, recondition the component to meet or exceed the product’s original performance specifications, or upgrade the component with newer technologies that exceed the original specification. This is where a knowledgeable secondary channel for electrical product performs a valuable and necessary service, particularly as OEMs continue to adopt ‘lean’ manufacturing processes that extend lead times for many pieces of electrical equipment.

To answer this demand, independent resellers of new, surplus, and reconditioned electrical products have acquired massive inventories of electrical service equipment from closed industrial plants, scaled-back

construction projects, and electrical distributors themselves when OEMs discontinue or change product lines. Unlike OEMs and franchise electrical distributors, these independent electrical distributors hold inventory much longer than the primary channel so that when customers need a component for expansion or replacement, the device is available and the customer can get back to business.

### *Caveat Emptor: Buyer, Be Smart*

While secondary electrical markets fulfill a critical gap in today's modern supply chain, purchasing equipment from these vendors requires some expertise and a smart approach. For instance, in their landmark study of the U.S. remanufacturing industry, Boston University professors William Hauser and Robert Lund point out that, "...buying reconditioned goods is best accomplished by a buyer with some expertise." This is particularly true for electrical product because of the potentially fatal dangers of electricity.

Like customers that buy new electrical products, buyers of surplus or reconditioned electrical equipment need to know and trust their vendors to manage their risk. After all, a new circuit breaker that offers inadequate circuit protection for a given application is just as dangerous as a right-sized breaker that has been inadequately reconditioned — or worse — cleaned and resold as new or reconditioned.

"Until PEARL, the problem has been that the secondary electrical distribution channel existed with no organization or standardization," explains David Rosenfield, one of the original PEARL charter members and president of ROMAC Supply Inc. (Commerce City, CA). "Consequently, dealing with this network has always come with some degree of risk. Among the many traders of surplus and reconditioned electrical equipment are some very sophisticated product- and service-providers with engineering departments and test centers employing trained and certified technicians. Many secondary-channel electrical suppliers, however, do not have such qualifications. Some are peddlers who search demolition sites and liquidations to buy materials that they can sell quickly. Some are electrical contractors who augment their income by selling from their accumulated inventory of used and surplus materials taken as trade outs or simply left over from jobs. Finally, there are the unscrupulous dealers who willfully misrepresent products just to get them sold. Electricians and maintenance managers need to know who they are buying from to make sure they're buying material that has been reconditioned or verified by industry-accepted electrical testing."

## **RECONDITIONED ELECTRICAL: THE FINEST FORM OF RECYCLING**

Each year, electrical reconditioners and recyclers save millions of pounds of waste from landfills, making it the 'greenest' of the electrical sustainability programs.

Unlike recycling, which uses energy and generates pollution to take finished products and return them to raw materials, reconditioning products uses a fraction of the electricity required to recycle raw materials.

A recent study by PEARL determined that reconditioning a 3000 kVA dry-type transformer saves the atmosphere from more than 63 tons of CO<sub>2</sub> when compared to manufacturing a new transformer. That's the equivalent of more than 10 cars driven on U.S. roads for a full year.

So how does reconditioning do this? It uses human energy and technical skill instead of power-hungry automated manufacturing processes.

Reconditioning creates jobs while saving the environment. For these reasons and more, reconditioned electrical is the finest form of recycling\*.

### *Safety First With PEARL*

In response to the unregulated secondary electrical distribution channel, PEARL adopted a set of rules based on generally-accepted electrical industry best practices and developed more than 100 standards for the safe reconditioning of commonly-used electrical products. PEARL-certified electrical apparatus have been reconditioned by a certified PEARL member company, and accompanied by test documentation that shows the apparatus performs to or exceeds the original performance specifications. PEARL members have to have been in business for a minimum of 2 years, have at least \$1 million in annual sales, \$350,000 in inventory, and follow a strict Code of Business Ethics.

"The objective of the standards document was to outline the best practices for the reconditioning and shop verification of used and surplus electrical products being returned to service," explains Bill Schofield, PEARL Charter Member and President of Circuit Breaker Sales Co. Inc. (Gainesville, TX). "Safety of the operator was the overriding concern. Consistency of workmanship from dealer to dealer was another objective. PEARL needed to provide the market with certainty that a product will perform as intended by the original manufacturer. Committees were created to review existing technical data from manufacturers, engineering, maintenance, and service shops such as, UL, NEMA, NFPA, OSHA, NETA, EASA, NECA,



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and, of course, the procedures of existing remanufacturers. This information was compared, sifted, reviewed and assembled into a final draft by the various product group committees and the chairperson. That draft was delivered to a group of third-party professional engineers from two reputable independent consulting firms for review and comment. Finally, the reviewed draft was presented to the PEARL membership for ratification.”



After initial inspection and apparatus testing, PEARL Reconditioning standards require full disassembly as part of the reconditioning process. After all parts have been cleaned, reconditioned — and when necessary — replaced, the device is tested again to make sure it meets minimum performance specifications as set out by the OEM when the apparatus was first manufactured.

Each PEARL Reconditioning Standard details specific inspection points and processes relevant to each product group. It defines tests, test equipment, and calibration for that test equipment. A low-voltage molded case circuit breaker (MCCB), for example, has ten specific inspection points, and no less than six different conditions relating to contamination, overheating, contact surfaces, torque values, insulation integrity, and more. Tests for MCCBs include insulation resistance, contact resistance, time overcurrent (thermal) trip test, instantaneous overcurrent (magnetic) trip test, and auxiliary device tests. PEARL Reconditioning standards regularly refer to the OEMs maintenance procedure for that device. The Standards reference accepted industry min/max test values, when appropriate. And tolerances and values are contained in tables that are part of the standards. As part of PEARL’s Reconditioning Standards, all tests are recorded before and after the reconditioning process on test forms that bear a unique identifying number — a serial number that is also on the PEARL Seal, which is applied to the PEARL-certified reconditioned electrical device. Customers that install PEARL Sealed devices can be sure that the device performs at least as well as it did when it came off the production line.

PEARL developed a series of Inspect & Test Standards for products that are not suitable for reconditioning; product that may not require reconditioning; as well as for components being sold to another dealer who will perform their own reconditioning. PEARL’s Inspect & Test Standards guarantee that the product performs, today, as expected, while PEARL’s Reconditioning Standards are designed to extend the life of the product through the reconditioning process.

## A Brighter Tomorrow

Adopted in 1997, the first set of PEARL Reconditioning Standards included six sections dedicated to low voltage switches; six sections for low voltage circuit breakers; three sections for low voltage switchboards and panel boards; a similar number of sections corresponding to medium voltage equipment; six sections for low and medium voltage transformers; and thirty sections for various types of conduit, fittings and accessories. Now, in revision 5, PEARL’s Reconditioning Standards include hundreds of technical reconditioning guidelines and cover most common industrial and commercial electrical service components.

As with every durable product, there is more ‘used’ inventory in circulation than ‘new’ inventory, which is why Professors Hauser and Lund referred to the U.S. remanufacturing industry as a “Hidden Giant,” accounting for more than \$53 billion in sales each year in the U.S. alone. The number of remanufacturing and reconditioning companies in the U.S. exceeds 73,000 firms, directly employing more than 480,000 people. EPA definitions of recycling now include language about remanufacturing and refer to it as the “ultimate form of recycling.”

The demand for secondary channel electrical product is not going to change as maintenance budgets, “just-in-time” manufacturing, and environmental concerns put pressure on both manufacturers and customers to keep inventories low.

The most important role PEARL plays is to inject safety and reliability into the secondary channel electrical supply chain, and help support the primary supply chain by making hard-to-find electrical products available to OEM distributors, electrical contractors and industrial maintenance personnel; it’s a fact that OEM distributors make up one of the largest segments of PEARL’s customer base.

The business and operational requirements set forth by PEARL raise the professionalism of all its members. PEARL members offer a safe and trustworthy electrical supply network that cannot be found in any other segment of the U.S. electrical marketplace. By offering alternative electrical product sourcing and educating the electrical community to the financial and environmental benefits of reconditioned electrical product while limiting risk to all parties through standardized reconditioning and business practices, PEARL is helping to create a safer and more useful supply chain that brings needed obsolete and surplus electrical materials back to the market, while creating skilled jobs and saving the environment. ■