

# **NEMA Policy on Reconditioned Electrical Equipment**

## **Executive Summary:**

The option of reconditioning existing equipment (instead of purchasing new equipment) exists today. Proper electrical equipment reconditioning provides a means to extend the life of electrical products as well as an opportunity in some cases to update installed equipment with the latest performance and safety features. However, not all components of the electrical infrastructure are candidates for reconditioning.

There are a number of precautions that must be adhered to when reconditioning electrical equipment if that equipment is to operate safely and with acceptable performance. Those precautions are discussed below and include the use of design qualified parts, testing to industry-recognized safety standards, original manufacturer specification and/or recommendations, when possible, and reconditioning performed by qualified personnel. The integrity of reconditioned electrical equipment must be established by documenting and demonstrating that component replacement has not compromised the manufacturer's original specifications and accepted industry standards.

The third party certification mark must be removed or obliterated from reconditioned electrical products to indicate that an evaluation of the reconditioning process or reconditioned product has not been conducted by the original third party.

As guidance, Appendix B provides a list of electrical products and components that are considered by NEMA suitable for reconditioning and Appendix A provides a list of electrical products considered not suitable for reconditioning. Medical Imaging Equipment is specifically not addressed by this policy (reference MITA 1, Good Refurbishment Practices for Medical Imaging Equipment).

## **Introduction:**

The U.S. electrical industry includes discussions on implementing new technologies to enhance existing electrical infrastructure. Further, sustainability and safeguarding the environment are growing in importance. In the midst of this is the option for reconditioning existing equipment. Paramount in all this is the fundamental priority that all electrical systems operate while safe-guarding personnel and infrastructure from potential hazards (electrical, mechanical, fire, etc.). This forms the basis for the NEMA position on reconditioning electrical products.

Given that electrical systems are diverse in design, function, and application, not all components of the electrical infrastructure are candidates for reconditioning.

## **Definition:**

Reconditioning: the process of restoring electromechanical systems, equipment, apparatus or components to operating conditions as recommended by the

manufacturer's instructions, using only design qualified parts. Reverse engineered parts (designs copied from existing parts by other manufacturers) are not considered to be "design qualified parts" unless specifically design verified under applicable Standards. Electrical industry practitioners and other organizations may also use the following terms/words to describe the process of reconditioning: remanufacturing, refurbishing, recycling, repairing, restoring, rebuilding, reengineering, and reusing.

In addition to design considerations, it is often impossible to obtain the service records, application environment, and operation parameters of all electrical components. Not having access to such information could have an adverse impact on the final safety and reliability of refurbished or reconditioned equipment. While NEMA supports the reconditioning of some electrical equipment, the components listed in Appendix A are not recommended for reconditioning, unless otherwise indicated by the original manufacturer. Normal servicing of equipment that remains within a facility should not be considered reconditioning or refurbishing. For electrical components suitable for reconditioning listed in Appendix B, the following fundamental tenets have been established.

### **Fundamental Tenets for Reconditioning Electrical Equipment**

- Reconditioning electrical equipment may be a viable option for extending operational lifetime of equipment and enhancing equipment with additional features.
- Electrical equipment reconditioning activity must be based on available guidance documentation from the Original Equipment Manufacturer, or industry-developed standards. Where any conflict in guidance is noted between the OEM and industry standards, the OEM guidance should take precedence.
- Electrical equipment must be reconditioned and qualified to an industry-developed standard that ensures equipment is in a usable and safe operating condition. An industry-developed standard is a widely agreed upon rule, set of rules, procedures or requirements for a product, assembly or process which are developed by members or organizations of an aggregate of manufacturing and technically productive enterprises in a particular field. Products deemed to be candidates for reconditioning must be reconditioned and qualified to industry standards containing the most relevant and critical design aspects, testing criteria and manufacturing specifications when the item was built.
- Reconditioning work must be performed by qualified personnel.
- Electrical equipment that has been exposed to adverse conditions, such as fire, water damage, etc., may not be suitable for reconditioning.
- A comprehensive assessment of the electrical equipment being considered for reconditioning with service records, application, environment, service life, and operating parameters is critical before deciding to pursue reconditioning of the electrical equipment and system. Trained, skilled technicians should be able to assess whether a device or system is suitable for reconditioning through physical inspection and test.
- Appendix A provides guidance on which components or assemblies of the electrical system are not suitable for reconditioning because they may pose a

hazard. Appendix B provides guidance on the components or assemblies are suitable for reconditioning.

- Reconditioning electrical equipment must utilize electrical product safety standards as they contain design aspects, testing criteria and manufacturing specifications to ensure a given product will function as intended. These requirements are established to deliver a usable and safe operating condition as a key component of intended product functionality.

## **Electrical Infrastructure and Worker Safety**

Electrical equipment that is properly installed, tested, maintained, and operated will provide reliable power as well as protect the electrical infrastructure. The reconditioning of electrical equipment requires the electrical industry, in collaboration with manufacturers, to establish performance specifications and accepted industry standards to help ensure safe and reliable equipment that help protect our electrical infrastructure so workers and users can continue to benefit from a safe and effective electrical system. Reconditioning standards must include prescriptive actions and performance requirements that result in equipment that complies with standards that include but are not limited to CSA, IEC, IEEE, NEC, OSHA, NFPA 70E, NFPA 70B, NETA ATS, NETA MTS, and EASA AR100 for example. Qualified personnel must possess the knowledge of how to assess equipment condition, potential hazards, and specifications to accurately determine the suitability for reconditioning. A safe and reliable electrical infrastructure that can be safely maintained is dependent on compliance with manufacturers' instructions, qualified workers, proper maintenance, and accepted industry standards for reconditioning activities.

## **Electrical Equipment Reliability, Performance and Safety**

Proper electrical equipment reconditioning provides a means to extend the life of electrical products as well as an opportunity to update installed equipment with the latest performance and safety features. Establishing well defined guidelines for those performing the reconditioning activity, based on original manufacturer's requirements, creates a solid foundation for the electrical industry and users. It is paramount that reconditioned electrical equipment be reliable in not only providing power, but also in safely performing its intended function as part of a safe operating electrical system. Understanding the environment, electrical load characteristics and historical maintenance performed on equipment being considered for reconditioning are all important parts of an assessment for reconditioning that can have a significant bearing on reliability, performance and safety. The electrical equipment manufacturer is the foremost authority on the design, performance and intended safe application of their product. Reconditioned electrical equipment must not compromise the reliability, performance, safe operation, or maintenance of the electrical system.

## **Integrity of Reconditioned Equipment**

Reconditioned electrical equipment must comply with all applicable standards at the time the equipment was initially built as a minimum as well as the original manufacturer's performance requirements in accordance with the nameplate markings and ratings. Replacement parts shall meet the design criteria (form, fit, and function) for the device to perform its intended function and provide safe operation. Replacement parts shall not include counterfeit parts (i.e., parts that have been misrepresented to be an authorized item of the legally authorized source.) Equipment shall operate safely in its intended application after reconditioning occurs. Care must be taken to ensure specific operations such as timing, sequencing, control, transfer, etc. continue to function in the manner originally intended, unless changes are specified during the reconditioning process. The integrity of reconditioned electrical equipment must be established by documenting and demonstrating that component replacement and performance changes have not compromised the manufacturer's specifications and accepted industry standards.

### **Listing or Certification Marks**

NEMA members manufacture products that are more than likely to be evaluated as part of a third party certification program to nationally recognized safety standards. These products can be marked with a listing or certification mark when the products are manufactured and shipped from the factory. The organization that reconditions the product is responsible for adhering to the guidelines from the issuing agency authorizing the mark to determine if the mark can remain on the product after reconditioning. The organization that reconditions is responsible for any actions necessary for the mark to remain on the product (analysis, testing, etc.). Otherwise, reconditioned electrical products must have their mark removed or obliterated to indicate that an evaluation of the reconditioning process has not been conducted by the original third party.

The organization that reconditions the product is additionally responsible for applying a mark or seal that indicates that the equipment has been reconditioned. This mark must provide traceability to the reconditioning organization in the event that it is necessary to determine the details of who reconditioned the equipment and the report on what was completed during this process.

There are a number of NEMA products that are not allowed to be reconditioned due to the inherent safety characteristics and requirements for those products to be evaluated according to a regular follow up program to evaluate the safety performance requirements as a condition of maintaining the listing or certification mark. This process cannot be applied to reconditioned electrical products since these are normally destructive tests and sample sets of reconditioned products are not possible due to limited quantities or ratings of specific devices.

### **UL Guidance on the UL Mark**

When the manufacturer places the UL Mark on the product at the factory, it is their attestation that the product complies with the applicable requirements. Unless there is further oversight or review/inspection (field inspection) UL cannot ascertain that the

product continues to comply with all requirements should field repairs, modifications or component replacements be made to the product.

Obviously there is little control over what manufacturers will or can do to equipment which left the factory with a certification mark. UL has created rebuilt categories where the reconditioning of product is done in an organized consistent manner under the supervision of UL's FUS (Follow-Up Services) field representatives. In these cases the first action conducted with equipment being rebuilt is the removal of the initial certification mark (if provided). Upon completion of the reconditioning, in accordance with the surveillance document, the manufacturer is permitted to affix a mark which clearly identifies the product as reconditioned.

Cases where a reconditioner is instructed to NOT remove any certification mark will result in confusion. Clearly such equipment in the field, which has undergone modification or reconditioning, is ineligible to bear a mark which designates a compliance with a certification standard.

# APPENDIX A

## COMPONENTS OR ASSEMBLIES NOT SUITABLE FOR RECONDITIONING\*

Adjustable speed drives  
Arc fault circuit breakers  
Ballasts  
Busway (mylar wrapped)  
Busway (powder coated)  
Cable tray  
Cast resin transformers  
Components containing semiconductors and transistors  
Control transformers  
Dry type transformers  
Electrical Connectors  
Electrical submetering equipment  
Electrical vehicle supply equipment  
Enclosed switches  
Fire detectors, smoke alarms, co detectors  
Fire pump controllers  
Flexible and extension cords  
Flexible conduit  
Ground fault circuit breakers  
High performance wire and cable  
Lighting controls  
Liquid filled transformers  
Low and medium voltage fuse holders  
Low and medium voltage non-renewable fuses  
Low voltage power circuit breaker electronic trip units  
Luminaires  
Meters (electromechanical, electronic or digital)  
Meter sockets  
Molded case circuit breakers  
Non-Metallic conduit, tubing, raceways and fittings  
Non-metallic surface raceways and fittings  
Outlet and junction boxes  
Overload relays  
Pin and sleeve plugs receptacles and connectors  
Power and control cable  
Protective relays (electronic or digital)  
Residential panel boards  
Solid state contactors and starters  
Solid state drives  
Strut type channel raceway  
Surface metal raceways and fittings  
Surge protective devices  
Transfer switches  
Wire or cable  
Wireway  
Wiring devices

\*The components or products listed above are not recommended for reconditioning, unless otherwise indicated by the original manufacturer.

## **APPENDIX B**

### **COMPONENTS OR ASSEMBLIES WHICH MAY BE RECONDITIONED**

Electromechanical protective relays, and current transformers  
High voltage circuit breakers  
Industrial and commercial panel boards  
Low and medium voltage power circuit breakers  
Low and medium voltage replaceable link fuses  
Low voltage switchgear  
Manual and magnetic controllers  
Medium voltage switchgear  
Metallic conduit, tubing, raceways and fittings  
Motor control centers  
Motors  
Switchboards  
Uninterruptible Power Supply Equipment