



RIC2015

Specifications for the Process of Remanufacturing

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1. Introduction

The Remanufacturing Industries Council (RIC) is a strategic alliance of businesses and academic institutions that works across industry sectors to support the entire remanufacturing industry through a combination of collaboration, education, advocacy and research. RIC is committed to promoting the growth of all sectors of the remanufacturing industry and working to increase awareness and grow the reputation of the benefits of remanufacturing in government organizations and the general public worldwide.

Remanufacturing is a comprehensive and rigorous industrial process by which a previously sold or leased product or component is returned through a controlled, reproducible and sustainable process to a “like-new” or “better-than-new” condition, and warranted in performance level and quality for form, fit and function.

A number of terms are commonly used to describe different processes of product restoration,¹ and these processes may share characteristics that are similar to those described in Section 6. The purpose of this standard for the process of remanufacturing is to provide a standardized set of specifications to characterize remanufacturing and differentiate it from other processes.

While a consensus definition of remanufacturing is provided in Section 5 of this standard, some industries may be required to use alternative terms such as refurbishing, rebuilding or reconditioning in order to comply with government regulations. In such circumstances, conformance with this standard may be claimed provided that the organization complies with the requirements detailed in Section 7.

2. Purpose

Remanufacturing is a rapidly growing, global, high-technology industry that includes a wide variety of business sectors. The U.S. is the world’s largest producer, consumer, and exporter of remanufactured products. In a study² commissioned by the Office of the U.S. Trade Representative, the U.S. International Trade Commission identified two major impediments to growth for the remanufacturing industry: (i) the lack of a commonly accepted definition of remanufacturing, and (ii) the absence of standards for the remanufacturing process. RIC’s standards activities are designed to address these deficiencies and promote the understanding and credibility of the remanufacturing industry.

3. Scope

This standard defines and provides a benchmark for the process of remanufacturing, and establishes specifications that characterize the remanufacturing process and differentiate remanufacturing from other practices.

¹ Other related restoration processes may include refurbishing, rebuilding, recycling, repairing and reconditioning

² **U.S. International Trade Commission Investigation No. 332-525, Publication 4356. *Remanufactured Goods: An Overview of the U.S. and Global Industries, Markets, and Trade.* 2012**

The specifications in this standard will promote continual improvement in the remanufacturing process and ensure that the products provided to customers by the remanufacturing industry are dependable and of a consistent high quality.

This standard is intended to serve as a baseline for additional standards for specific remanufactured products and product groups to be developed in the future.

4. Compatibility with other standards

While this is a stand-alone standard, the following documents may be of value in developing processes that ensure the highest quality remanufactured products:

BS 8887 -2:2009 – Design for manufacture, disassembly and end-of-life processing (MADE)
– Part 2: Terms and definitions

BS 8887 -220:2010 – Design for manufacture, disassembly and end-of-life processing (MADE) – Part 220: The process of remanufacture – Specification

IPC 7711/7721B:2007 – Rework, Modification and Repair of electronic Assemblies

ISO 9001:2008 – Quality management systems - Requirements

ISO 13485:2003 – Medical devices – Quality management systems – Requirements for regulatory purposes

ISO 14001:2004 – Environmental management systems – Requirements with guidance for use

5. Definitions and terms

For the purposes of this standard, the following definitions and terms apply:

(a) **Remanufacturing**

Remanufacturing is a comprehensive and rigorous industrial process by which a previously sold, leased, used, worn, or non-functional product or component is returned to a “like-new” or “better-than-new” condition, from both a quality and performance perspective, through a controlled, reproducible and sustainable process in conformance with the specifications listed in Section 6 of this standard.

(b) **Remanufactured product**

The as-new/like-new remanufactured finished article resulting from the recovery and transformation of core using the remanufacturing process described in this standard.

(c) **Core**

A worn, failed, or end-of-use part, component, assembly, or product of a branded or Original Equipment Manufacturer product that is retained with the objective of restoring or improving its original functionality through remanufacturing, or for use as a source of components or parts for a remanufactured product. A core may have

already been placed on the market and used, been damaged after production but before sale, or been subject to an extended shelf life.

(d) **Lifecycle of the remanufactured product**

The complete process from recovery at the end of a product's first useful life, through the remanufacturing of the core, sales, remarketing and use of the remanufactured product, to the disposition of the product when returned at the end of the use cycle of the remanufactured product.

(e) **Technical specifications**

A collection of product documents that provide a detailed description of technical requirements, with specific acceptance criteria, and form the basis for the design, development and production processes of a product and ensure that a remanufactured product delivers a performance and service life functionally equivalent to that of a new product.

(f) **Reverse engineering**

The process of analyzing the construction, operation, technical specifications and technological principles of a product in order to recreate or copy the product in the absence of the original design specifications.³

(g) **Disassembly**

Complete sequential removal of components of an assembled product into its constituent materials, components and/or parts.

(h) **Part**

The smallest, indivisible unit of a remanufactured product; individual parts may be combined or connected together to create a component or incorporated into a subassembly, assembly, system, or remanufactured product.

(i) **Component**

Two or more parts combined or connected together to create or be incorporated into a subassembly, assembly, system or remanufactured product.

(j) **Assembly**

The process by which qualified parts and components (whether remanufactured or new) are combined or connected together to create a component, subassembly, assembly, system or remanufactured product.

(k) **As-new/Like-new**

A product returned to a condition where it meets its original manufacturer's specification from a quality, performance and service-life perspective.

(l) **Product verification**

Process of using established, documented test and/or inspection procedures to confirm that the specific requirements are fulfilled for the intended use of a product.

³ The process of reverse engineering may be prohibited for certain industry sectors or products

6. Specifications for the process of remanufacturing

The order of the various steps may vary depending upon the product being remanufactured. An example of a typical flow map for the process of remanufacturing incorporating the specifications in this section is illustrated in Figure 1.

6.1. Quality management system

Product remanufacturing shall be conducted in a manner consistent with a recognized quality management system, such as ISO 9001:2008 or ISO 13485:2003.

6.2. Control of nonconforming product

The organization shall ensure that product which does not conform to minimum product technical specifications is identified and addressed to prevent reintroduction into the market, as detailed in the quality management system referenced above. A documented procedure shall be established to define the process for dealing with such a nonconforming product.

When nonconforming product is corrected such a product shall be subject to re-verification to demonstrate conformity to these specifications.

6.3. Obtain technical specifications

The organization shall obtain or create technical specifications for the remanufactured product to validate the “equivalent, or better, condition and performance” compared to the new original product.

6.4. Core collection/acquisition

The organization shall collect or acquire the core using appropriate documented quality control processes.

6.5. Inspection of core

The core shall be inspected against documented acceptance criteria to determine whether the core is suitable for remanufacturing⁴. Documentation shall include the appropriate criteria, such as quality, condition, economic, cosmetic, etc., as well as the techniques to be used to conduct the evaluation, and the disposition of cores that fail to meet the acceptance criteria.

⁴ In some situations, a core must be disassembled (Section 6.6) before inspection

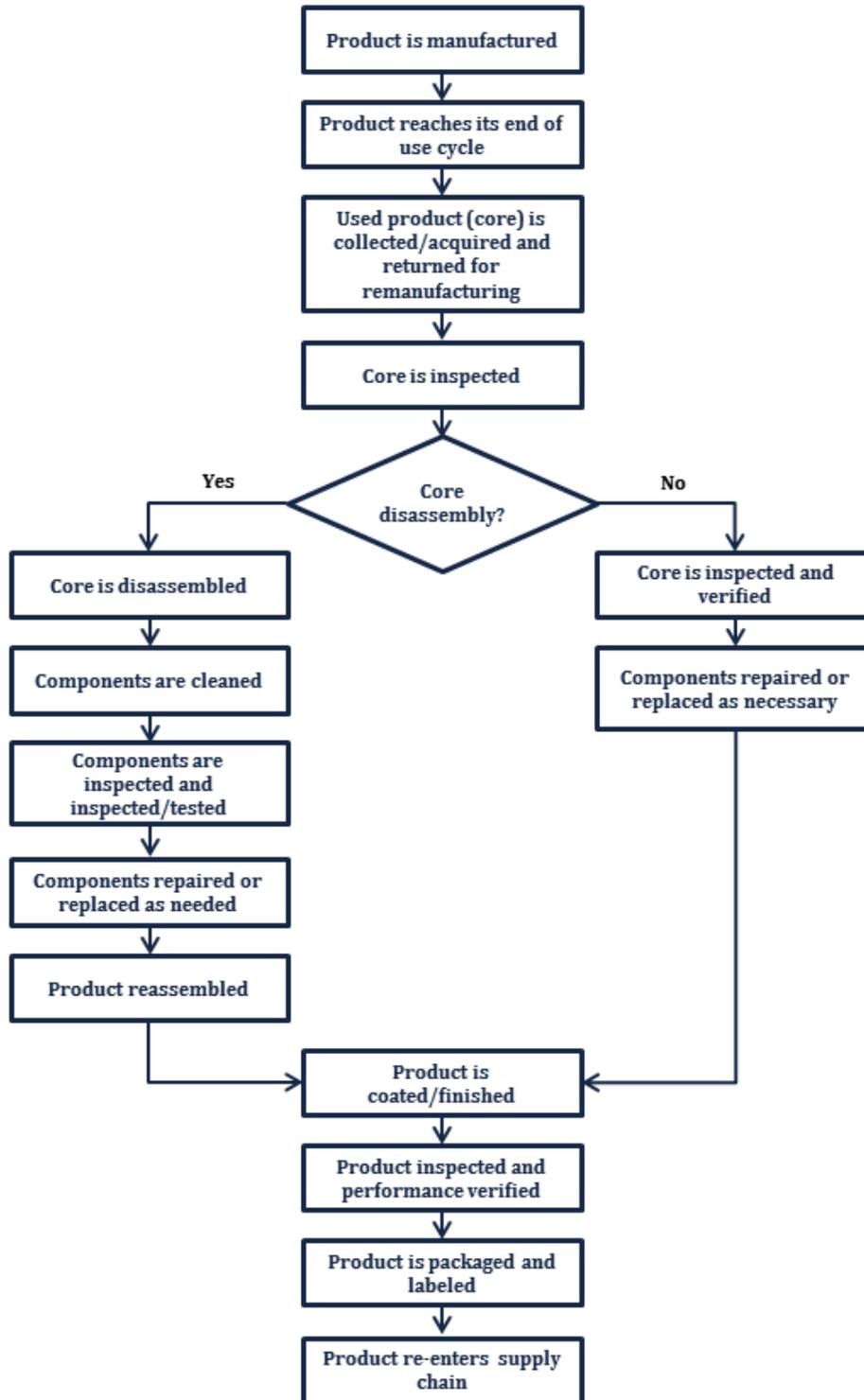


Figure 1: Example of Flow Map for the Process of Remanufacturing

6.6. Disassembling the core

The core shall be disassembled to the appropriate level into its constituent components, parts and/or materials. The organization shall obtain or create documentation to ensure and record the appropriate level of disassembly for each product and process.

6.7. Cleaning

The core may be cleaned (and disinfected, if appropriate) before disassembly, as necessary. After disassembly, components and parts shall be cleaned using documented procedures to remove all foreign materials (e.g., soil, grease, paint, surface oxidation, etc.) to facilitate appropriate inspection of the core components and parts before their use in reassembly of the product.

6.8. Inspection of components

Product components shall be inspected and functionally evaluated using documented procedures to determine their eligibility for reuse. Components that do not meet the documented acceptance criteria shall be repaired, refurbished or replaced to ensure conformance with original specifications from both a quality and performance perspective.

6.9. Reassembly

The product shall be reassembled, applying engineering updates and replacing worn or damaged components with new or like-new parts or components, as appropriate according to documented technical specifications.

6.10. Finishing

The product shall be coated/finished to meet the necessary cosmetic finish in accordance with documented technical specifications. This may include coating/finishing with appropriate surface coating materials or casing, as appropriate.

6.11. Performance verification

The product shall undergo performance testing using established, documented test procedures to confirm that its performance meets the technical specifications described in Section 6.3.

6.12. Packaging

The product shall be packaged in accordance with any applicable legal requirements and conform to any prevailing business practices for packaging.

7. Conformance with this standard

In order to conform to this standard, the organization shall document consistent implementation of the specifications described in Section 6 of this standard. If the organization determines that any specification is not applicable to the remanufacturing of its product, the organization shall detail

fully any deviation, variance or omission of any particular specification and the rationale for such determination in its process documentation⁵.

8. Verification of conformance with this standard

The organization may apply to RIC in order to qualify for self-declaration of conformity to this standard. Such an application shall include detailed, written documentation to establish systematic implementation of the process described in Section 6 of this standard.

Absent any accredited third-party verification, the validity of any claim of conformity with this standard made by, or on behalf of, the remanufacturing organization shall be understood to be the responsibility of the claimant.

9. Marking and labeling of product

The organization may label products that meet or exceed this standard with a label or mark certifying conformance with this standard. The label should be clearly visible on the product, associated packaging, or documentation, as appropriate, and should include a reference to this standard, i.e., RIC2015. In addition, the label may include one or more of the following:

- Information to identify the product
- “Remanufactured by [REMANUFACTURING COMPANY NAME]”
- “Remanufactured on behalf of [NAME OF ORIGINAL EQUIPMENT MANUFACTURER]”
- “Remanufactured by [REMANUFACTURING COMPANY NAME] on behalf of [NAME OF ORIGINAL EQUIPMENT MANUFACTURER]”

10. Product warranty

The organization may issue a warranty for the product that matches or exceeds that of original or similar articles that have never been placed on the market or operated by an end-user customer.

⁵ Some industries may be required to use other terms, such as refurbishing or reconditioning, in order to comply with regulatory requirements even though their processes conform to the remanufacturing specifications described in this standard.