



## **RCA Specification**

### **Specification for Paper Labels Coated with Recycling Compatible Pressure Sensitive Adhesives**

#### **1. Scope**

- 1.1 This specification is for the qualification of recycling compatible paper label products and pressure sensitive adhesives (PSA's) intended for use on paper label products that conform to US Executive Order 13148, Section 702 "Greening the Government Through Leadership in Environmental Management – Environmentally Benign Adhesives".
- 1.2 Recycling compatible adhesives (RCA's) are preferentially removed during the paper recycling process. Adhesive removal is essential to avoid contaminating the paper machine, the paper, or the waste water of a paper mill.
- 1.3 In this document, test methods are referenced that allow the adhesives industry to quantitatively test adhesives for their degree of removal following three unit operations typically used in the paper recycling industry. The unit operations are pulping, screening, and flotation.

#### **2. Referenced Documents**

- 2.1 RCA LRP - Laboratory Testing Protocol For Paper Labels Coated With Recycling Compatible Pressure Sensitive Adhesives.
- 2.2 RCA MRP - Mill Recycling Protocol.
- 2.3 RCA IAP - Determination of the Adhesive Content of Handsheets by Image Analysis.
- 2.4 RCA standards are available on the TLMI web site, [www.tlmi.com](http://www.tlmi.com), Environmental Committee page.
- 2.5 United States Executive Order 13148, Greening the Government Through Leadership in Environmental Management, Section 702- "Environmentally Benign Adhesives".
- 2.6 USPS -P-1238F U.S. Postal Service Specification, Paper, Stamp, Pressure Sensitive Adhesive, Section 60, LRP-7.
- 2.7 USPS -P-1238F U.S. Postal Service Specification, Paper, Stamp, Pressure Sensitive Adhesive, Section 70, LRP-3.

#### **3. Definitions**

- 3.1 Recycling compatible pressure sensitive adhesive label – A paper label with an adhesive that can be preferentially removed during paper recycling by screening or other conventional paper recycling processing operation. Furthermore, recycling the label cannot cause any processing problems such as plugging screens, valve sticking, adhesive build-up in closed loop systems or effluent problems.
- 3.2 Recyclables – Recyclables are reclaimed materials that are collected, separated or processed and reused as raw materials or products
- 3.3 Recycling – Recycling is defined as the activities by which materials that would otherwise remain waste are collected, separated, or processed and reused in the form of raw materials. Recycling may be further defined by type.
  - 3.3.1 Primary recycling is remaking the recyclable material into the same material in a process that can be repeated a number of times (e.g., white office paper into white office paper).
  - 3.3.2 Secondary recycling is remaking the recyclable material into a material that has the potential to be recycled again (e.g., newspaper into recycled paperboard).
  - 3.3.3 Tertiary recycling is remaking the recyclable material into a product that is unlikely to be recycled again (e.g., glass into glassphalt, paper into tissue paper).

#### **4. Significance and Use**

- 4.1 Mixed office waste (MOW) is mainly composed of printing and writing grades of paper with various forms of printing and writing on the paper. Other sources of paper in MOW include computer print outs, envelopes, and coated paper. Mixed office waste is potentially a good source of fiber for recycled printing and writing papers. In addition to inks and toners on the paper, mixed office waste can also contain contaminants such as plastics, staples, paper clips, adhesive tape, and labels with pressure sensitive adhesives. For MOW to be recycled into fine paper, it is essential that the paper deinking process remove as many contaminants as possible. Failure to eliminate enough contaminants within a commercial deinked pulp process can result in the recycled pulp being downgraded in quality, and subsequently diverted to towel, tissue, or corrugated grades of paper.
- 4.2 Adhesives can cause several problems during paper recycling if not removed during the deinking process. The problems include build up or deposit of residue on the paper recycling equipment, on the paper machine, or in the water recycled in the paper plant. Adhesives can also cause defects such as holes or spots in the recycled paper.
- 4.3 A typical recycled paper deinking operation includes most of the following unit operations:
  - 4.3.1 Pulping to defiber the paper product into a pulp slurry. Continuous films of adhesives on paper labels are broken down into smaller particles by pulping.
  - 4.3.2 Screening to remove contaminants based on size. Only contaminants larger than paper fibers can be removed by screening.
  - 4.3.3 Centrifugal cleaning to remove contaminants based on density differences between adhesive particles and paper fibers. Forward centrifugal cleaning removes contaminants with a higher density than cellulose fibers while reverse centrifugal cleaning removes contaminants with a lower density than paper cellulose fibers.
  - 4.3.4 Flotation to remove small, hydrophobic contaminants that are attracted to the air water interface of air bubbles. Flotation is particularly useful for removing toner power particles.
  - 4.3.5 Dispersion or kneading of pulp to remove contaminants adhering to the individual fibers and break up contaminants into smaller particles that are less visible.
  - 4.3.6 Bleaching to decolorize pulp through oxidation or reduction reactions.
  - 4.3.7 Washing to remove contaminants smaller than paper fibers by passing water through the pulp on a fine screen.
  - 4.3.8 Retention to retain small contaminants in the paper made on a paper machine so that they do not deposit on the machine or build up in the wastewater of a paper mill. Chemical retention aides are used to retain contaminants as well as fillers and small fibers in the paper.
- 4.4 It is preferable that during pulping, adhesives from labels remain as large as possible so that most of the adhesive can be removed by screening. In addition, the adhesives should have sufficient cohesive strength to avoid being deformed and extruded through the screens. The adhesive should also be hydrophobic so that flotation can remove small adhesive particles. Finally, the residual adhesive that passes through the deinking process may be retained on the paper by retention aides to avoid passing into the waste water of a paper mill.

**5. Requirements**

- 5.1 Adhesion – The non-print side of the face stock shall be laminated with a PSA that shall enable the paper label to adhere and perform as required for its intended end use application. The adhesion requirements of the PSA are independent of this protocol and are determined by the appropriate specification for adhesion performance in the specific paper label application.
- 5.2 Test the adhesive laminate according to the laboratory recycling protocol (RCA-LRP) and the image analysis protocol (RCA-IAP). The requirements of this protocol require only that the adhesive on the face stock shall conform to the requirements in Table I below.
- 5.3 Adhesive laminates that fail the specification when tested according to the laboratory recycling protocol, can be qualified by performing a recycling trial at a recycled paper mill according to - RCA MRP.

Table 1. Specifications for the laboratory recycling protocol

Operation	Measure, Units	Units	Values
Pulping	Average size	mm <sup>2</sup>	> 0.23
Screening	Adhesive area	Ppm	< 430
Flotation	Adhesive area	Ppm	< 10