Plastic Squeeze Tubes
Achieving Recyclability Beyond Design

Progress Report

June 2020

MORE™ RECYCLING

ROADMAP TO RECYCLABILITY

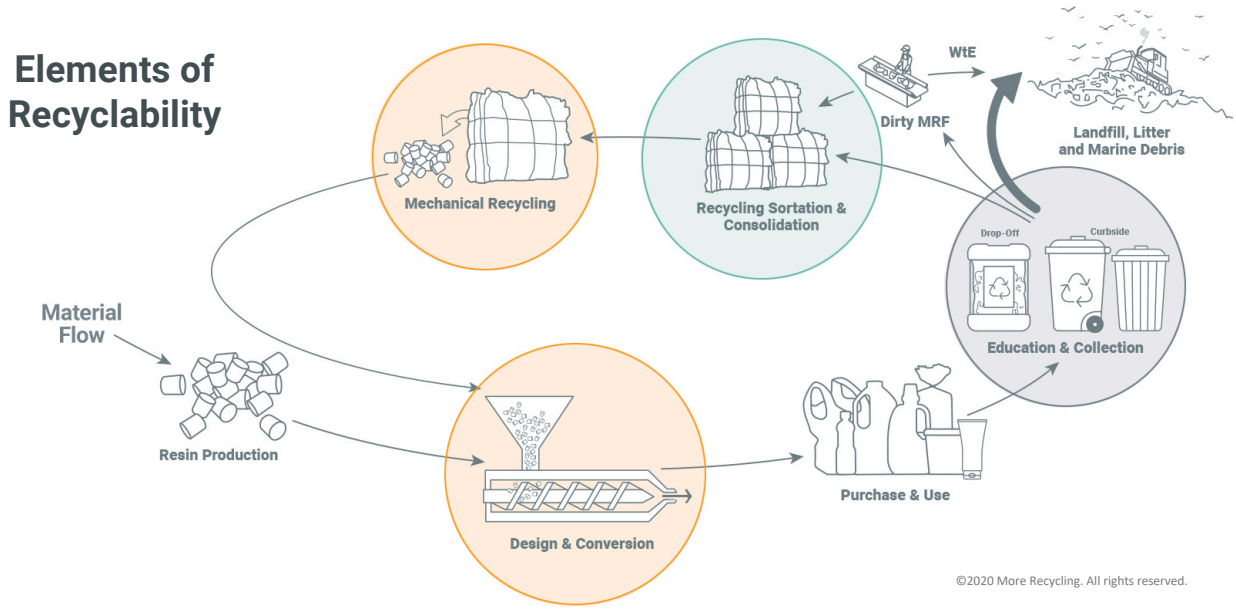
Introduction

More Recycling (MORE) is working with stakeholders to research and address barriers to plastic tube recycling. Plastic squeeze tubes are typically defined as having a semi-flexible body, pinched off at one end, and covered on the other end by a rigid shoulder and cap. The primary products packaged in plastic tubes are lotion, shampoo, conditioner and toothpaste. Tubes are found in almost every household in the U.S. and Canada, in part, because they are an effective packaging format.

Following the completion of the 2015-2016 Centralized Study on the Availability of Recycling, questions remained regarding whether plastic squeeze tubes were technically recyclable. To examine the recyclability of tubes, MORE initiated a Tubes CORE Project. To date, the Tubes CORE Project has involved four phases of research and engagement made possible by the following companies: Berry Global, Colgate-Palmolive, Estée Lauder, Johnson & Johnson, Procter & Gamble, and Unilever. The American Chemistry Council, L'Oréal, and CCL contributed to previous research as well.

The Process

MORE and the project stakeholders sought to document the technical recyclability of tubes through research about the generation, make-up, sortability, and contents of tubes. Research focused on whether or not reclaimers can recycle tubes with an existing stream (of value in the marketplace) and if there are concerns to overcome.



- **Generation & Market Compatibility:** How much is produced? What is its make-up? Is it compatible with a recycling stream that has a market? Are others like it compatible?
- **Consolidation for Market:** Can it get to a market? Can it get consolidated for market through sorting at a Material Recovery Facility (MRF) or other collection and consolidation networks?
- **Recycling Program Availability:** Does 60% of the US population have recycling program available to them to recycle it?

Clear design for recycling guidance for tubes, and reclaimers willing to take them in their commodities sends a signal to MRFs that they can include them in their commodities. Once industry acceptance of the packaging format is achieved, then education through labeling and improved community education can facilitate tubes recycling. In addition to these steps, incorporating post-consumer resin (PCR) into tube packaging and other end uses is also needed in order to create the demand for continued recycling.

Key Takeaways

- Tubes make up a very small percentage of plastic packaging produced — non-toothpaste tubes with caps likely make up close to 30-40 million pounds (~2% of the colored HDPE bottle stream) and all tubes, including toothpaste, with caps may be closer to 40-70 million pounds in the U.S.;
- Tubes primarily hold soaps/shampoo, conditioner, lotion and toothpaste;
- The vast majority of plastic squeeze tubes are Polyethylene (PE) with some Polypropylene (PP) tubes. There are extruded and laminated PE tubes and both typically have PP caps;
- Market share research informed that non-toothpaste tubes are mostly PE without known problematic barriers, and therefore the project focused on testing compatibility of PE tubes as a start. Non-toothpaste tubes, collected from 5 MRFs, were tested using the Association of Plastic Recyclers (APR) critical guidance methods.
    - Testing found the addition of 25% flake from the collected non-toothpaste plastic squeeze tubes to HDPE bottle flake did not significantly change the physical properties of the resulting pellet.
    - Given the amount of non-toothpaste tubes in the marketplace according to the initial assessment, the testing suggests the impact of non-toothpaste tubes making their way to the recycling stream (i.e. colored HDPE stream) should be minimal. Even so, adhering to APR Design Guides or going through Critical Guidance testing would require inclusion of rPE tube flake at 50% for any individual tube package;
- For toothpaste tubes, known to-date to likely contain non-compatible barriers, there are efforts underway by major toothpaste brands and converters to make their toothpaste packaging recyclable. In 2019, three companies received APR Critical Guidance recognition for innovations in toothpaste tube design, affirming their design compatibility with the HDPE bottle stream in the U.S. and Canada;
- A consumer outreach pilot in British Columbia gathered additional market share data by product and size and also demonstrated that clear messaging can positively support the collection of tubes for recycling by improving the emptiness of tubes collected for recycling;
- Based on market share research, the majority of tubes are greater than 2 ounces in volume. Sorting tests show that typical tubes in the market that are greater than 2 ounces can be put into the recycling bin and sort to the intended commodity stream and, therefore, the desired market;
- Due to the lightness of the package, remaining product residue in an empty tube package can be a significant portion of the weight of a tube without the cap. The actual amount of residue likely varies depending on the viscosity of the product packaged in tubes, as well as on the specific tube design.

Although residue is not a current barrier to recycling tubes, improving evacuation percentages improves the value of a tube package for recycling; and,

- Tube caps can make up a significant portion of the package by weight, given the lightness of the tube, and preferred design increases the value of the tube for recycling. This is one of many design guidance considerations being discussed within the Tubes Working Group at the Association of Plastics Recyclers (APR).

Critical Next Steps on the Roadmap to Recyclability

The critical next steps to achieving recyclability that ensures tubes collected can get recycled, include:

1) Clear tubes design guidance through the Association of Plastics Recyclers;
2) Engagement across the value chain on handling the transition from non-recyclable to recyclable tubes and inclusion of tubes in bale specifications; and,
3) Utilization of MRF communication tools and partners to inform MRFs on tube acceptance once confirmed.

Based on the knowledge gained through the research to date, the Tubes CORE Project achieved an important milestone for tubes to be designated as technically recyclable. At the June 2019 APR Meeting, a working group formed to evaluate design considerations specific to tubes as part of the Rigid HDPE Design Guide and Rigid PP Design Guide. The working group is developing and will recommend tube-specific design for recycling guidance in 2020. The focus will be the make-up of tube packaging and the boundaries to maintain material compatibility.

Until the working group provides its recommendations for tubes specific design guidance, current tube packaging must go through Critical Guidance testing individually, in order to assess technical recyclability. The forthcoming design guidance specific to tubes will inform the design specifications for compatibility with the existing streams and negate the need for Critical Guidance testing of each tube design (unless testing a new innovation). However, as referenced above, the steps beyond design are essential to achieving recyclability in the U.S. Tubes as a packaging format must be considered technically recyclable *and* accepted for recycling, otherwise individual company efforts won't be fully realized on the path to recyclability.

Consumer product goods company collaboration is essential in moving an entire packaging format towards recyclability. Expedient conversion of non-recyclable tubes to recyclable ones is critical to avoid burdens to the system and overcome the issue of "look-alikes" (tubes that look like technically recyclable tubes but are not). Tools such as clear recycling labels (e.g. How2Recycle) and MRF notification protocols can help aid in the transition from the non-recyclable tubes to packaging compatible for the recycling stream. As the Tubes CORE Project finalizes the necessary remaining steps on this recyclability journey, we look forward to supporting organizations like APR, the Sustainable Packaging Coalition (SPC), the Tubes Council, Institute of Scrap Recycling Industries (ISRI), and the Recycling Partnership in engagement and communication with the value chain to advance tube recycling.