



**ISRI Paper Recyclability Certification:
Learning from the MRF Survey –
Executive Summary**

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PURPOSE OF THE STUDY

The Institute of Scrap Recycling Industries (ISRI) is developing a certification program for consumer packaging that will indicate when a package is fully recyclable and does not pose challenges to the residential recycling stream. This certification is being developed first for fiber-based packaging and will later be extended to other commodities such as plastic and metals. The certification will be available to brand owners and packaging manufacturers and will indicate when a package can successfully pass through current systems for collection, sorting, and processing, and ultimately be used in manufacturing.

In the phase of the project covered by this report, Moore & Associates conducted a survey with Material Recovery Facility (MRF) operators that process residential recyclables. Objectives of the MRF survey are as follows:

- Determine the relative volumes of recovered fiber processed at the MRF, including both existing grades such as OCC, Mixed Paper, and Cartons (aseptic packaging and gable-top cartons), and other types of paper packaging that are not currently allocated to a specific grade;
- Understand how types of fiber packaging other than corrugated move through the MRF and the extent to which current processes help or hinder the recycling of such materials;
- Provide an overview of the equipment used to sort paper, and insights into steps MRFs are taking to improve their ability to sort paper packaging;
- Identify strategies regarding where designers and manufacturers of fiber packaging might make changes to improve recyclability.

Overall, once the certification is completed it will help residential MRF operators process materials more efficiently because consumers will be better able to identify which types of paper packaging can be effectively recycled.

METHODOLOGY

- As shown in the table below, the 211 MRF operators for which viable contact info was available operate an estimated 380 residential MRFs. Each organization was asked to have each one of their MRF General Managers respond to the survey. A total of 68 organizations participated and 93 survey responses were generated. Eleven organizations submitted multiple surveys for different MRFs and 57 responded for one MRF.
- The number of companies participating and individual MRF responses received for each sample sub-group is shown below. Overall, 32% of organizations responded and 25% of MRFs (for which contact info was available) responded, a solid response rate for a business survey.
- While the largest five MRF operators account for well over 200 MRFs of all types, Moore & Associates data suggest that only about 120 are located in the US and process residential material, therefore qualifying for the study. The 9% response rate for this group is reasonable for a business survey but 11 completes does not represent the group very well. In order to compensate, one company in this group provided an in-depth interview and response to the survey questions. Interview discussion was very consistent with the findings of the study overall, suggesting that no data was missed due to the low response rate from this group.
- The response rate among the second group (which includes the largest MRFs and remaining large MRF organizations) is excellent and response from the third and fourth groups is also good for a business survey. Overall, we believe the study represents the residential MRF sector reasonably well.

Sub-Group	Organizations Invited	Organizations Participated	Estimated # Res. MRFs	# MRF Responses	Response Rate / Org.	Response Rate / MRF
1. Five Largest Operators	5	3	120	11	60%	9%
2. Larger MRFs/MRF Operators	30	24	80	41	80%	51%
3. Medium MRFs/Known by M&A	40	15	44	15	38%	34%
4. Other MRFs	136	26	136	26	19%	19%
TOTAL	211	68	380	93	32%	25%

EXECUTIVE SUMMARY

MRF Profile

- Most US MRFs that process Residential material handle Single Stream; 1/3 process Dual Stream; and 1/5 handle both. The majority also process Commercial material. The regional distribution of MRFs surveyed matches US population distribution quite well.
- MRFs in the study were grouped into three types for analysis based on size, ownership type, and geographic distribution. MRFs owned by the largest waste hauling/MRF companies in the US, and those owned and operated by packaging manufacturers, are categorized as 'Corporate' since these companies are all public (with one exception) and all have a global or North American reach.
- MRFs categorized as 'Owner-Operated' operate small numbers of MRFs (1-6), are not public companies, and operate in specific regions in the US. About 1/4 of the MRFs in the study are Corporate, half are Owner-Operated, and the remaining 1/4 are Public Sector or Non-Profit.
- Public sector/non-profit MRFs are more likely to process Dual Stream while Corporate MRFs focus on Single Stream. Average monthly throughput is lowest among Public/Non-profits and highest among the Corporate MRFs. Corporate MRFs are more concentrated in the South; Owner-Operated in the West; and Public/Non-Profit in the Midwest and Northeast.

MRF Operations

- On average, residential MRFs handle more paper/fiber-based material than other recyclables. #11-12 OCC and #54 Mixed Paper dominate recovered paper grades, accounting for over 80% of processing volume. Dual stream MRFs produce more lower volume grades such as #37 SOP (Sorted Office Paper), #58 SCN (Sorted Clean News), and #52 (Aseptic Packaging & Gable-Top Cartons) relative to their total paper/fiber production.
- MRFs that produce more OCC (as a percentage of total paper/fiber production) tend to produce less Mixed Paper, and vice versa. Where OCC accounts for a higher share of paper/fiber production, the percentage of OCC packed in Mixed Paper tends to be lower.
- Only 30% of MRFs in the study pack grade #52 Cartons and for those that do, #52 accounts for an average of 2.3% of their total paper/fiber produced. MRFs that process #52 are more likely to be Dual Stream, Public/Non-Profit, single MRF organizations, and located in the Northeast.

MRF Perspectives

- MRFs were asked about nine types of paper packaging that, with the exception of Aseptics and Gable-tops, are not explicitly included in any recovered paper grade and tend to end up in Mixed Paper. Over 1/3 of MRFs did not refuse to accept any of these materials in their inbound stream.
- The more Mixed Paper a MRF produces, the more likely it is to be open to all types of paper packaging and not refuse specific types.
- Of the nine paper package types, composite poly/fiber/metal containers with metal bottoms and containers with foil are refused most often (by 4 out of 10 MRFs), followed by paper cups, foodservice packaging, and poly-coated containers. Aseptic packaging and gable-top containers, and pizza boxes, are refused by 2 out of 10 MRFs while molded fiber and paper mailing envelopes are less problematic and are rarely refused.
- Package types that are more widely accepted also tend to be the higher volume package types such as pizza boxes, paper mailing envelopes, and molded fiber products. Composite containers and containers with foil, followed by paper cups and aseptics/gable-tops, are present in lower volumes and are more frequently refused.
- Containers with foil are the most likely to end up in residue/be disposed, followed by those with poly coatings, paper cups, and foodservice packaging.
- MRF paper grades are not downgraded or rejected by mills very often but when this occurs, containers with foil, containers with poly coatings, and foodservice packaging are most often the reason.
- When asked about the market potential of five of the above nine paper packaging types *if inbound volumes were higher*, 3/4 of MRFs say "none of the above". A small number indicate aseptics and gable-tops would have more potential if volume was greater.
- Aseptics, gable-tops, multi-layer, and poly-laminated fiber-based packages are most often lost to the container line, followed by foodservice packaging. MRFs currently mostly use manual quality control and screens to improve sorting and keep these packages on the processing line. As optical sorters become more prevalent, they could be valuable in this area.
- Single stream, larger MRFs that handle less fiber relative to other inbound materials are more likely to have installed optical sorters, and to have more of them. Robots are still in the early stages of adoption. Installing more optical sorting is the main change that MRFs are planning to make to their systems and equipment in order to improve sorting of paper packaging.
- MRFs' greatest challenge in the current environment is the need to reduce contamination, both in the inbound stream and outbound baled commodities. Some point out that educating consumers, simplifying recycling programs, and keeping packaging simple will help. Others mention the growth of corrugated, proliferation of small boxes, and greater efforts to keep the OCC out of Mixed Paper.
- MRFs' main message to packaging designers and manufacturers is "don't combine fiber with other materials". As one respondent said, "paper cannot be made from non-paper products".
- MRFs would also like to see more consultation with MRFs, brokers, and mills before new packaging gets to the market, and market development to ensure pricing and volume for specific materials are in sync with recycling objectives.

NEXT STEPS

- Overall, it is not clear there is a compelling business reason for MRFs to sort and bale the variety of small paper package types discussed here beyond the level they do now. Mill buyers in the US and abroad typically work with the outthrow and contamination percentages indicated by ISRI specifications. Most of the paper packaging types discussed here are accommodated within those specs and baled in Mixed Paper.
- As the study suggests, the percentage of bales that are downgraded or rejected by mill buyers in the US is low, even when bales don't meet specifications. The quality issues experienced in Mixed Paper markets in recent years have in part been the result of buyers accepting material that is below ISRI standards. With the decline in export markets, MRFs are actively working to improve the quality of Mixed Paper and we expect to see this trend continue and intensify.
- As the move away from plastic packaging increases, we expect to see growth in the various types of paper/fiber packaging addressed in this study. The rapid adoption of optical sorting will help keep 3-dimensional fiber packaging in the paper stream and may make it easier to recycle more of these package types. Pizza boxes are the largest volume package among the nine types examined and a recent initiative supporting their recyclability could expand the number of pizza boxes that make it to the MRF. Paper mailing envelopes and molded fiber are also large categories with rapid growth and may have similar expansion potential. Public education may be needed to raise awareness regarding the recyclability of these materials which are rarely addressed explicitly in recycling programs.
- OCC accounts for a substantial share of total fiber grades for most MRFs, and with a weak market for Mixed Paper, many MRFs are focused on improving OCC capture versus leaving corrugated boxes in Mixed Paper. A few MRFs produce and sell grade #52 but the majority include aseptics and gable-tops in Mixed Paper.
- There has been an initiative to recover paper cups and a small number of MRFs bale paper cups -- but most MRFs pack them in Mixed Paper. If initiatives were developed to promote recycling of other poly-coated boards, such as frozen dinner boxes or ice cream containers, this could improve the rate of recycling of these low volume package types.
- The remaining package types in the study are multi-layer and/or poly-coated containers, including fiber-based foodservice containers. From an end market perspective, aseptics and gable-tops, paper cups, and other multi-layer and poly-coated packages are similar to each other in material composition – a good fiber base but metal or plastic layers that need to be removed, reducing yield in production. If grade #52 was broadened to include these types of items, it could potentially expand volume to the point where broader markets could be developed.
- An ISRI Recyclability Certification will be welcome in this environment to help differentiate packages that are more easily recyclable such as molded fiber and pizza boxes (mostly fiber) from those that are less recyclable (anything with foil). The forthcoming ISRI Design Guide for Paper Packaging will emphasize the need for manufacturers to focus on keeping non-fiber elements to a minimum.