



Voice of the Recycling Industry™

Curbside Recycling Guidelines & Specifications Subcommittee, ISRI Paper and Plastic Division, Joint MRF Council. V.1 FINAL

CURBSIDE RECYCLING GUIDELINES

INBOUND RESIDENTIAL CURBSIDE MIXED RECYCLABLES for MATERIAL RECOVERY FACILITIES

SPECIFICATION & ADDITIONAL MATERIALS

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1 Introduction and How Document is Laid Out

- Section 2 presents a recommended Material Recovery Facility (MRF) standard specification for inbound curbside residential single stream and dual stream materials, mirroring the ISRI practices included in the ISRI Scrap Specifications Circular 2016 (for detailed specifications of outbound MRF materials please refer to the ISRI Circular). The purpose of this stand-alone document is to assist ISRI members, markets, and municipalities in designing effective programs with the most common and included recyclable materials, while aiding with the buying and selling of the commodities derived from such programs. It can also be utilized as a resource for teaching recycling curricula and to provide up to date information on inbound residential recyclables. ISRI recommends that residential programs utilize at least this base specification for inbound recyclable materials from residential programs into a MRF.
- Section 3 presents “Additional Inbound Materials” that have, and may be accepted in curbside residential single stream and dual stream programs based on local practices, goals, and capabilities. ISRI offers a simple checklist of up to date pros and cons derived from consulting its Paper and Plastic division membership and subject matter experts for additional materials that are sometimes added in curbside residential single stream and dual stream programs.

****- Section 2 and 3 are not inclusive and, from time to time, ISRI reserves the right to change its opinion, and add, modify, or delete the comments provided. The sections may not cover a particular local condition or program. Programs should consult published papers and research, along with other advisements, including the MRFs and markets themselves, to ascertain whether to include any given material in the inbound specification for a particular program.***

2 Inbound Material Recovery Specifications- Minimum Recommended Materials List

NOTE: The information provided by ISRI is for general guidance only and not for legal purposes. Anyone utilizing these Specifications or the Additional Materials which may be added to Curbside residential single stream and dual stream programs (below) is advised to consult with their legal counsel on all matters with respect to any particular situation involving contracts and agreements implied or written, or any other potentially litigious situations. The application and impact of laws can vary widely based on the specific locality and facts involved, and this document is not meant to be inclusive of all situations.

Materials accepted may be modified by mutual agreement between local governments, homeowner associations, and recyclables collectors (“buyer” of MRF separating, cleaning and marketing services) and Material Recovery Facilities (“Provider” of MRF services). For local purposes, parties to a local Residential recycling transaction may specify particular variations, additions or deletions, as are suited for their specific programs and for their individual convenience. Whatever is decided should be mutually agreed to and so stipulated in writing.

- The parties should use their own due diligence to insure that materials collected in Curbside Residential Single Stream or Dual Stream programs, and sold from MRFs after processing, consist of properly packaged materials suitable for recycling. Failure to maintain quality in residential recycling, and lack of diligence, are the chief reasons for problems arising from such programs.
- Arbitrary deductions, valuations, cancellations and/or rejections in MRF transactions are counter to acceptable good trade practices.
- Buyers will supply the agreed-upon quality of Curbside residential single stream or dual stream material into a MRF and shall not be responsible for the use of that material thereafter when sold for recycling if material is accepted by the seller of MRF services, unless such materials contain hazardous waste.

<p>Paper/Acceptable Fiber (Acceptable)</p>	<p>Paper (not preferred or may be prohibited) with examples (not inclusive)</p>
<ul style="list-style-type: none"> • All full-sheet office paper, white paper • Colored paper • Newspaper (plastic bags and strings removed) • Magazines (all types), catalogs (all types) • Phonebooks (all types) • Junk mail • Paperboard • Tissue boxes and tissue/towel rolls • Paper office folders • Paper towel and toilet paper rolls 	<ul style="list-style-type: none"> • Shredded Paper • Napkins • Tissue paper • Wall paper • Paper towels • Wax paper • Wrapping paper • Any paper which has the potential to be contaminated with bodily fluid
<p>Cardboard (OCC) Acceptable</p>	<p>Cardboard (not preferred or may be prohibited) with examples (not inclusive)</p>
<ul style="list-style-type: none"> • Paper Boxes- Packing boxes, corrugated liners, boxboard (i.e. shoeboxes, gift boxes, cereal boxes), • Brown or Kraft paper bags, brown wrapping paper, corrugated packing material. 	<ul style="list-style-type: none"> • Cardboard lined with plastic (i.e. bubble wrap boxes) • Waxed/waterproof cardboard. • Boxes containing food (i.e. contaminated boxes containing pizza, excessive oil, or cheese), excessive liquids, or other materials. Acceptable delivery boxes shall not contain any of these.
<p>Cartons</p>	<p>Non Acceptable (Some Examples)</p>
<ul style="list-style-type: none"> • Food and Beverage Cartons- such as milk, juice, aseptics and broth (must be empty, clean and dry) 	<ul style="list-style-type: none"> • Containers with moisture, other materials, or food residue still present, straws, etc.
<p>Plastics Acceptable</p>	<p>Plastics (not preferred or may be prohibited) with examples</p>

<ul style="list-style-type: none"> Plastics #1, #2, and #5 Bottles, jugs, jars, and containers; i.e. soda bottles, laundry detergent jugs, water bottles, milk jugs, and other household containers consisting of polyethylene terephthalate, high density polyethylene, and polypropylene Rigid Plastics- clean polyethylene plastics- toys, storage containers, file boxes, etc. (must be free of any other material) 	<ul style="list-style-type: none"> Film and film bags not specified in design of the recycling program. Shopping, Grocery, Retail bags and small Plastic “Baggies”. Plastic tableware- (#3, #4, #6, & #7 plastics, and in many cases #1, #2, and #5 plastics). Expanded polystyrene containers (EPS). Compound or layered multi-resin plastic receptacles.
<p>Metals Acceptable</p>	<p>Metals (not preferred or prohibited) with examples</p>
<ul style="list-style-type: none"> Aluminum and tin beverage and product containers (Food, beverage, and other containers’ materials must be completely empty of contents clean and dry) 	<ul style="list-style-type: none"> Metal containers with paper or plastic attached. Paint cans. Aerosol cans with liquids, propellants or pressure still in the can are prohibited. Metal containers with hazardous materials still in them are prohibited.
<p>Glass Acceptable</p>	<p>Glass (not preferred or prohibited) with examples</p>
<ul style="list-style-type: none"> Bottles and Jars only (materials must be dry and clean) with minimum breakage 	<ul style="list-style-type: none"> All glass types not listed in the “Glass Acceptable Section”, (window pane glass, leaded crystal, borosilicate glass, clear ceramic products, etc.).

PROHIBITIVES: Unacceptable in any quantity. Subject to Immediate Rejection due to Health, Safety or Product Suitability Concerns:

- E-waste and Electronics – such as Cell phones, iPad, iPods, any Computers, TV’s, wires, Controllers, Printers, Printer rolls, and other materials
- Radioactive Materials of any kind.
- Hazardous Materials – such as Oil, Paint, Antifreezes, Powders, free or attached Asbestos or Asbestos-containing products, and Fertilizers.
- Corrosives – such as Batteries, containers with Acid or Base Residue.
- Compressed Gas Cylinders and other containers holding or formerly containing Flammable, Pressurized or Combustible Materials such as fire extinguishers, Process vessels, bulk Storage Tanks, (see restrictions on aerosol containers above).
- Lead and other Heavy Metals.
- Other Hazardous Wastes – such as Pesticides, Poisons, used Oil filters, Mercury-containing materials such as Switches and Thermometers, Biohazards, Fluorescents Lights, Tube toss.
- Refrigerants – such as Freon/Puron/Substitutes, Compressors, Air Conditioners, Refrigerators, Freezers.
- PCBs – such as Capacitors, Transformers, Ballast.
- Explosives – such as Firearms, Ammunition, Shells, Fireworks, used Gasoline Cans.
- Medical Waste – such as Needles, Syringes, Biohazard-labeled Containers, etc.
- Biological waste of any kind- such as Animal carcasses, Infestations, Skins, Leather, Bones, Organs.
- Other Hazardous Materials which may harm human health or cause property/workplace damage.
- Any Materials containing human liquids or wastes- such as Diapers, Tissue, etc.

- Green wastes- Plant, Wood, Leaves, Fruits, Vegetables and other Vegetative matter.
- Inert construction materials- such as Rock, Dirt, Asphalts, Concrete, Debris, Roofing, Dry Wall, etc.
- Gross contaminants which reduce product value significantly or completely.
- Bulk and Gross Materials Not Recyclable through a MRF: such as Tires, Fiberglass, Wood, Asbestos, Appliances, Furniture, Ceramics, Rags, Air Bags, common Light Bulbs, Crystal, Plate & Mirror Glass, other Solid Wastes.
- Free Flowing Liquids of any kind.

3 Additional Materials

The goals of municipalities for establishing and maintaining curbside programs vary throughout the country. For various reasons such as mandates, policies, plant capabilities, customs, local markets (i.e. access to ocean export), and other factors, additional compatible materials may be collected in addition to the above materials for separation at material recovery facilities. The following chart offers ISRI’s current guidance, which shall be updated from time to time as markets and conditions change, on the current pros and cons for each material for the majority of curbside programs in the U.S. ISRI reserves the right to change any opinion below as it receives feedback from its members and others in the industry. The opinions expressed do not necessarily apply to all circumstances and programs, but are guidelines in today’s market. Notwithstanding the below, to be acceptable to material recovery facilities, all such materials, if accepted in a mixed recyclable curbside recycling program, should be subject to the same standards as the ISRI Inbound curbside material “Standards” above, in terms of Source-separation, Handling, Moisture, Health Size Suitability, Material Market Suitability, and Quality. A material is not recyclable unless there is a secondary non-landfill use or market for its consumption. Use of ISRI Scrap Circular specifications is recommended as a guide.

Material	Pros	Cons
#1 - #7 mixed plastics	<ul style="list-style-type: none"> • Markets do form regionally, locally, or export for mixed plastic bales. • Markets also fluctuate and can disappear with oil/resin prices changes. • Allows curbside programs to be permissive. 	<ul style="list-style-type: none"> • Only stable domestic markets are for #1, #2, and #5 plastics. • #1 - #7 mixed plastic bales are sometimes not marketable from some locations. • Generally, bales are made from all plastic materials entering the MRF, not just bottles (i.e., plastic tableware, straws, etc.) which may make them more difficult to sort for re-use. • Must assure brokered #1- #7 mixed bales, especially exports, do not go through secondary processing utilizing child or unfair labor practices, or causes any environmental damage (i.e. open burning of residuals). • Yield from these bales may be limited after all costs of shipping and sorting are applied to #'s #1, #2, and #5 plastics.
#3 - #7 Plastics	<ul style="list-style-type: none"> • Markets do form regionally, locally, or export for mixed plastic bales. • Allows curbside programs to be permissive. 	<ul style="list-style-type: none"> • Most volatile material baled in a MRF. While this grade is often sold as bales for secondary processing, usual materials recovered are #1, #2, and #5

		<p>plastics not recovered at the MRF. Some polystyrene resins are also being recovered.</p> <ul style="list-style-type: none"> • #3- #7 mixed plastic bales are not often marketable in down markets. • Generally, bales are made from all plastic materials entering the MRF, not just bottles (i.e., plastic tableware, straws, etc.) which may make them more difficult to sort for re-use, especially after baling. • Sellers must assure brokered #3- #7 mixed bales, especially exports, do not go through secondary processing utilizing child or unfair labor practices or causes any environmental damage (i.e. open burning of residuals). • Yield from these bales may be very limited after all costs of sorting and shipping are applied. • Generally, bales are made after the separation of #1, #2, and #5 bottles from all plastic materials entering the MRF, not just remaining bottles (i.e., plastic tableware, straws, etc.) which may make them more difficult to sort for re-use.
<p>#6 Polystyrene and Expanded Polystyrene (PS)</p>	<ul style="list-style-type: none"> • Some states and local govt.'s target this material. • New extruding technologies and processes, like air-classification to optical sorter, to PS extruder may offer better recovery than in the past at MRFs. 	<ul style="list-style-type: none"> • Outside of rare pilot program instances, markets are scarce to non-existent for MRF-derived #6; • The lightweight properties of EPS take long period of storage time to get to truckload quantities • Test programs have high degree of failure so far.

<p>Flexible Packaging</p>	<ul style="list-style-type: none"> • Material over 1% of inbound flow at some MRFs. • May be recovered for energy value as a pellet. • May be recovered in bag-in-bag programs. • New technologies and processes are emerging for both sorting and emulsifying to separate polymers. 	<ul style="list-style-type: none"> • Not acceptable as a recyclable grade because of laminate properties and bounded chemistry of different layers presently. Only use is conversion. • Contaminates paper. • High food waste content. • Do not include in programs without tackling these issues.
<p>Mixed household film (bagged in bag)</p>	<ul style="list-style-type: none"> • A number of programs throughout the U.S. have added this commodity where residents stuff a plastic bag with household film (“bag in bag”) • Can be used as pelletized or RDF fuel 	<ul style="list-style-type: none"> • Markets can be negative or prohibitive to non-existent with oil/resin fluctuations. • In most cases, cannot be exported. • Contamination can often be high. • Do not include in programs without tackling these issues.
<p>Mixed household film in mixed recyclables (‘pick-line film’)</p>	<ul style="list-style-type: none"> • Required by some programs and contracts • Can be used as pelletized or RDF fuel • Bags can store recyclables in some collection programs, i.e. New York City 	<ul style="list-style-type: none"> • Markets are marginal at best and can be non-existent for long periods. • Take back programs at grocery stores allow full recycling. • In most cases, cannot be exported. • Contamination is inherently high. • Residents often put good recyclables in bags causing belt to stop or loss of recyclables to occur. • Causes major screen wrapping, downtime and maintenance in material recovery centers. Contaminates paper. • Do not include in programs without tackling these issues.
<p>Clean, dry double-polycoat food packages</p>	<ul style="list-style-type: none"> • May be acceptable in limited quantities in mixed paper grades 	<ul style="list-style-type: none"> • Often contains high moisture and contaminating materials, i.e. ink, plastic caps, straws, etc. • Some mills will reject if quantities are too high in mixed residential grades.
<p>Thermoform food or bakery containers (delicatessen, fresh food) clear- i.e. ‘clamshells’</p>	<ul style="list-style-type: none"> • Some markets limit the amount of #1, #2, and #5 thermoforms allowed. Check with local markets for limits or restrictions. 	<ul style="list-style-type: none"> • Some programs may not take them or be able to market them with PET bottles • Optical sorters cannot distinguish thermoform from bottle PET, HDPE, and PP, making QC difficult. • Downgrades for premium plastics occur in some markets • Some thermoform polystyrene containers cannot be distinguished manually from other thermoforms and

		can contaminate bales.
Thermoform PET food or bakery containers (clear top, black bottom)	Some markets limit the amount of #1, #2, and #5 thermoforms allowed. Check with local markets for limits or restrictions.	<ul style="list-style-type: none"> • Some programs may not take them or be able to market them together with PET bottles • In MRFs where hand-sorting occurs, sorters cannot distinguish PP from PS or polyethylenes • Some optical sorters cannot distinguish black bottom thermoform • Downgrades for premium plastics occur in some markets
Aluminum Foil	<ul style="list-style-type: none"> • Is acceptable in some export bales and very limited quantities in UBC. • Some programs on MRF residual recover Al foil 	<ul style="list-style-type: none"> • Hard to generate in a clean form from residential sources. • Many restrictive export countries will not take foil which has been used with food and could reject bales. • Foil disintegrates and flakes with age. If in small pieces, foil flashes in an aluminum furnace. • Foil can contain high moisture food/household oil waste, which can explode when introduced into a furnace. • Domestic markets can be less tolerant than export • Before accepting check with market.
Shredded Paper <1" diameter loose	<ul style="list-style-type: none"> • Is acceptable in some of curbside programs • Can be captured with some later technology MRFs through light fraction separation and optical sorting. • May be acceptable in Kraft bags in some mixed paper producing MRFs. 	<ul style="list-style-type: none"> • Does not get captured because of size recognition limitations at some MRFs and leaves MRFs as residue or in fines products like glass. • Holds moisture and raises content of moisture in paper bales and in glass. • Size of fiber strands makes it less recyclable.