



Recycling 101

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Let's dive in!



Why recycle



Process overview



How are we currently doing?



What's recyclable

Why bother?



Economics



Almost \$8 billion in wages and \$24 billion to Minnesota's economy



In Minnesota, recycling programs collected approximately 1.781 million tons of material worth \$344 million.

Environment



A national recycling rate of 30% reduces greenhouse gas emissions

Hennepin County Environment and Energy



It takes less energy to make things from recycled materials

Environment



1 ton of recycled steel =



1 ton of mixed paper =

How are we doing?



Current management vs goal





Recycling Process Overview

What
makes
something
recyclable?



It can it be collected.



It can it be sorted.



It can it be sold.



It can be used to make
something new.

1. Collection



Types of recycling service

Residential

- Open hauling or organized collection
- City-by-city basis
- 1-4 units



Commercial

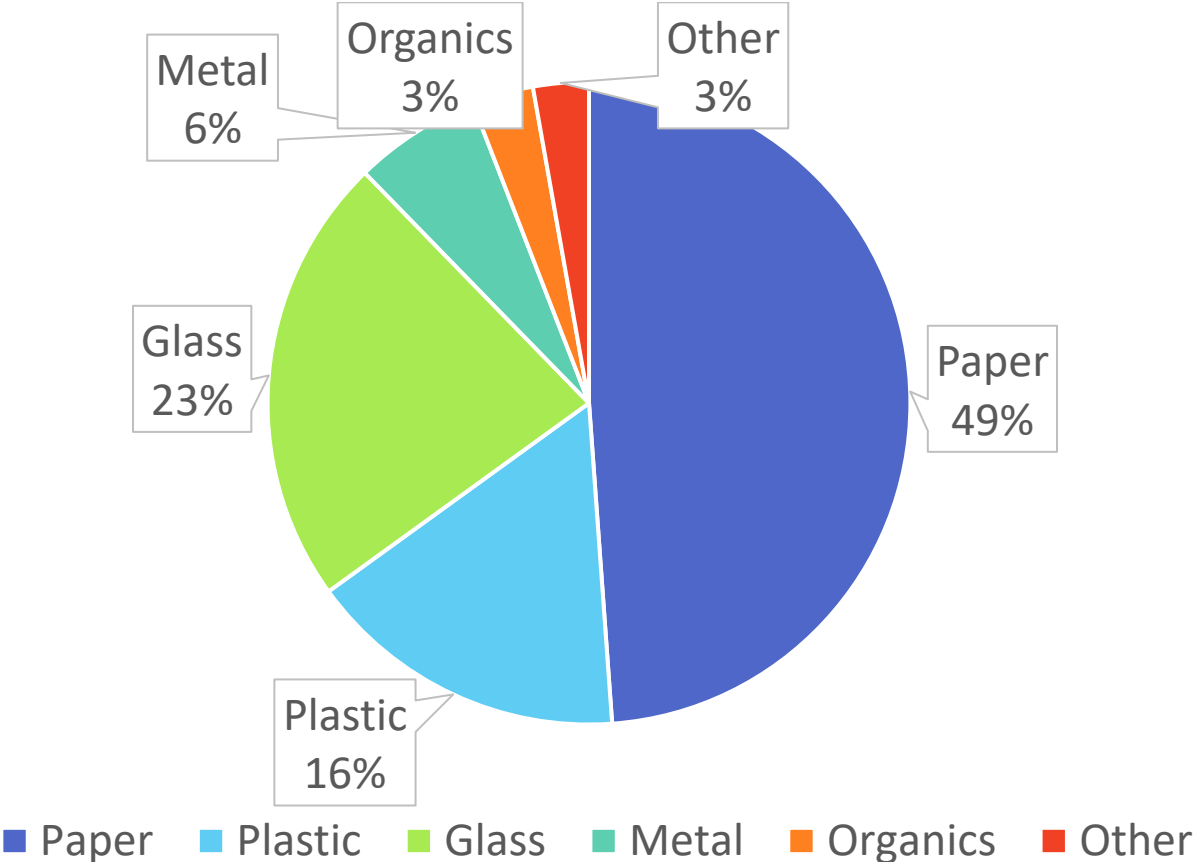
- Open hauling
- Businesses & multifamily (5+ units)



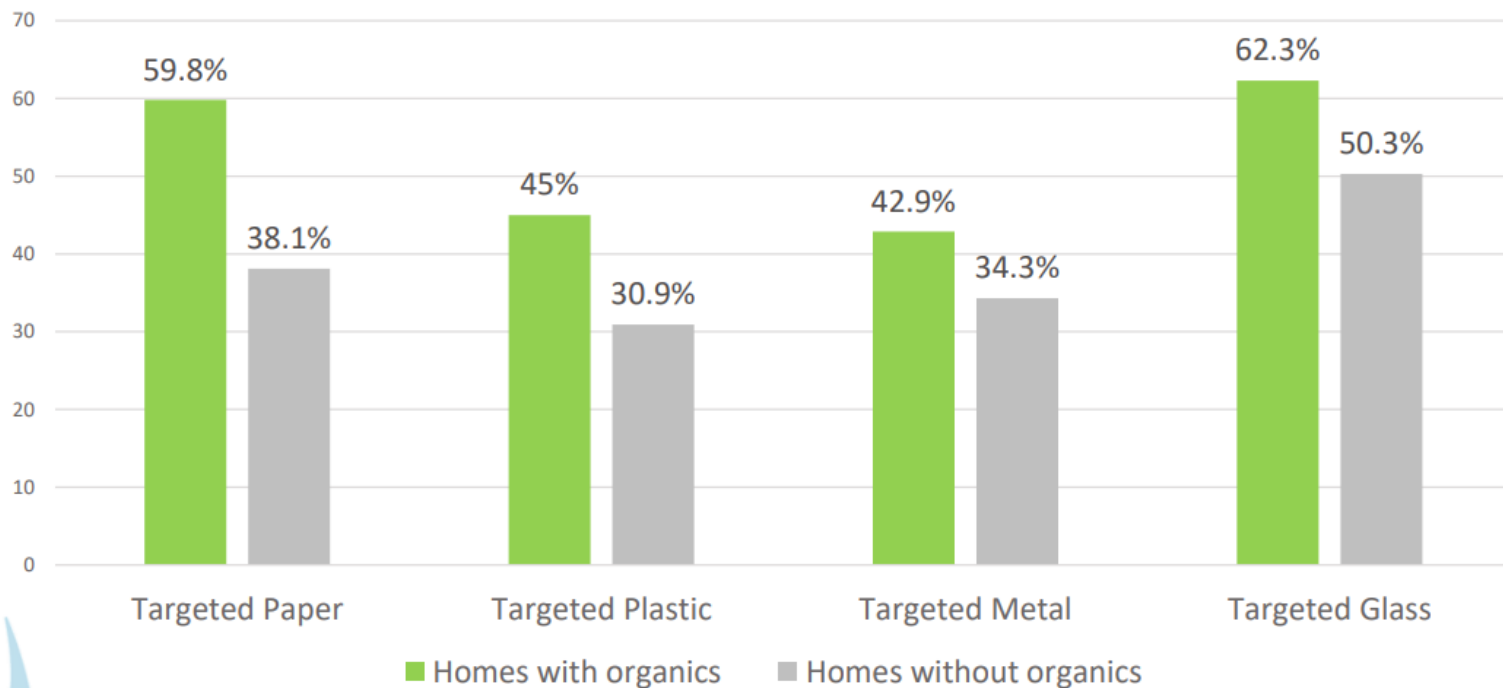
How many trucks do you need?



Composition of materials in recycling carts by weight, Minneapolis 2022



Capture rate of recyclable materials



2. Sorting



Materials Recovery Facility

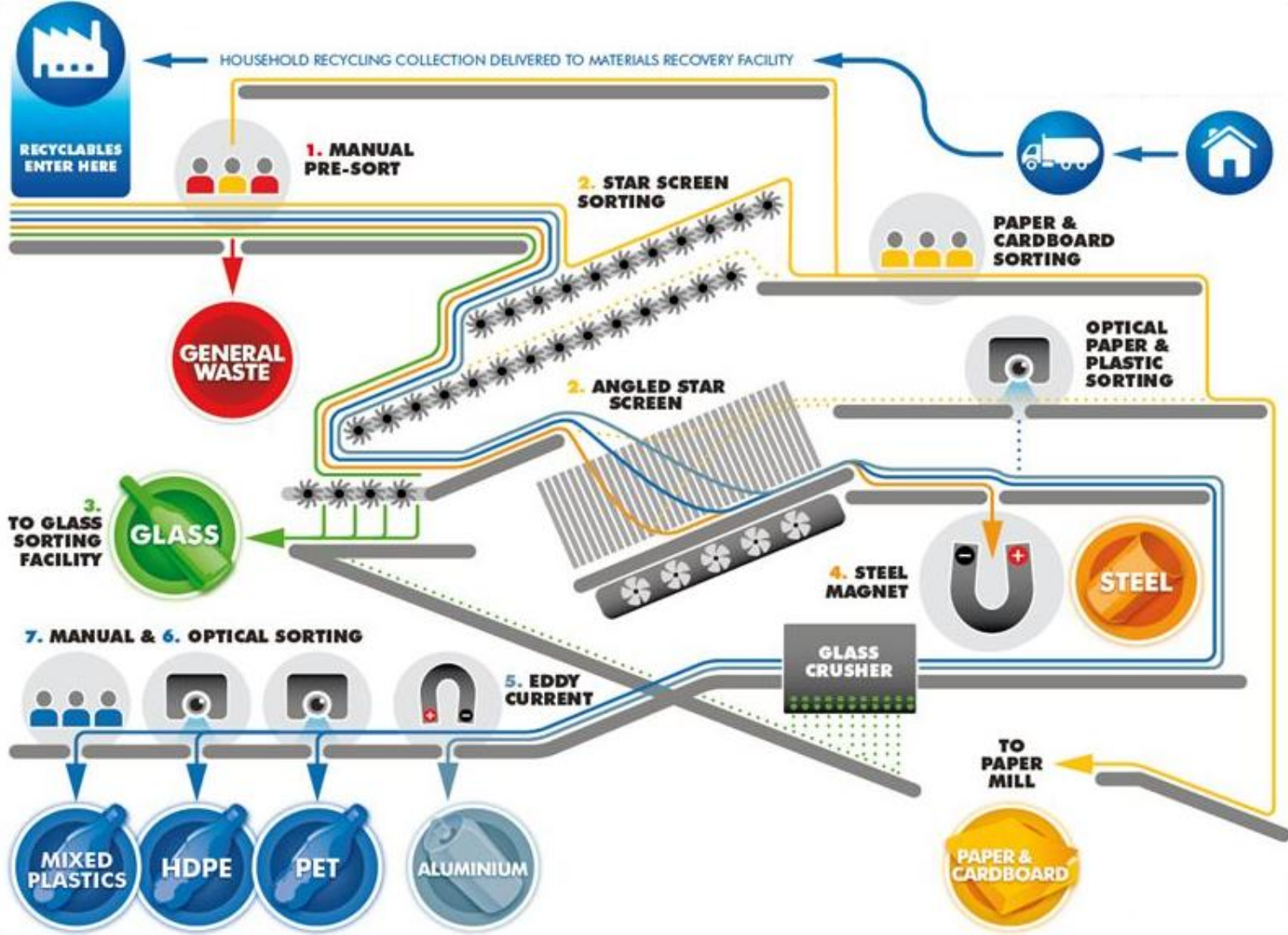




TIP FLOOR







3. Selling



Recyclable material	Percent by Weight	Value per Ton
Aluminum	1%	\$820
HDPE natural	1%	\$710
PET	4%	\$195
Tin	2%	\$100
HDPE pigmented	1%	\$85
Cardboard	20%	\$85
Aseptic packaging	<1%	\$23
Newspaper	10%	\$23
Mixed paper	32%	\$8
#3-7 plastics	1%	\$5
Mixed glass	23%	(\$15)
Residual garbage	5%	(\$63)



Regional Markets

Glass



Anchor Glass Container
Corporation



Strategic Materials

Paper/OCC



WestRock



Rock-Tenn Recycling

Metal



Bay Side Recycling Corporation



Beltrami Recycling Inc

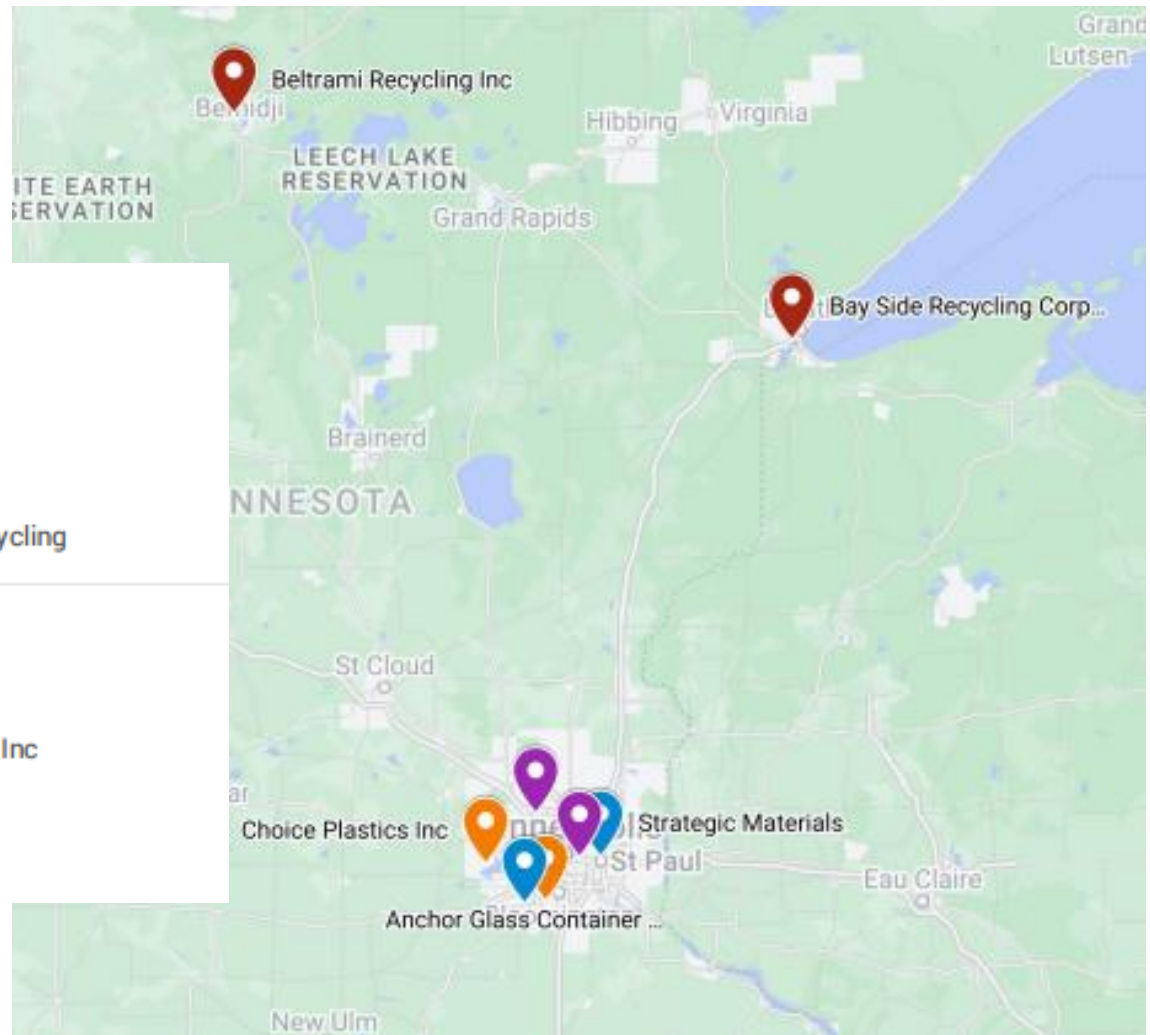
Plastics



Choice Plastics Inc



Rohn Industries



4.
Something
New







Common issues

- Confusion
- **Inconsistent messaging**



What
makes
something
recyclable?



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It can it be sorted.



It can it be sold.



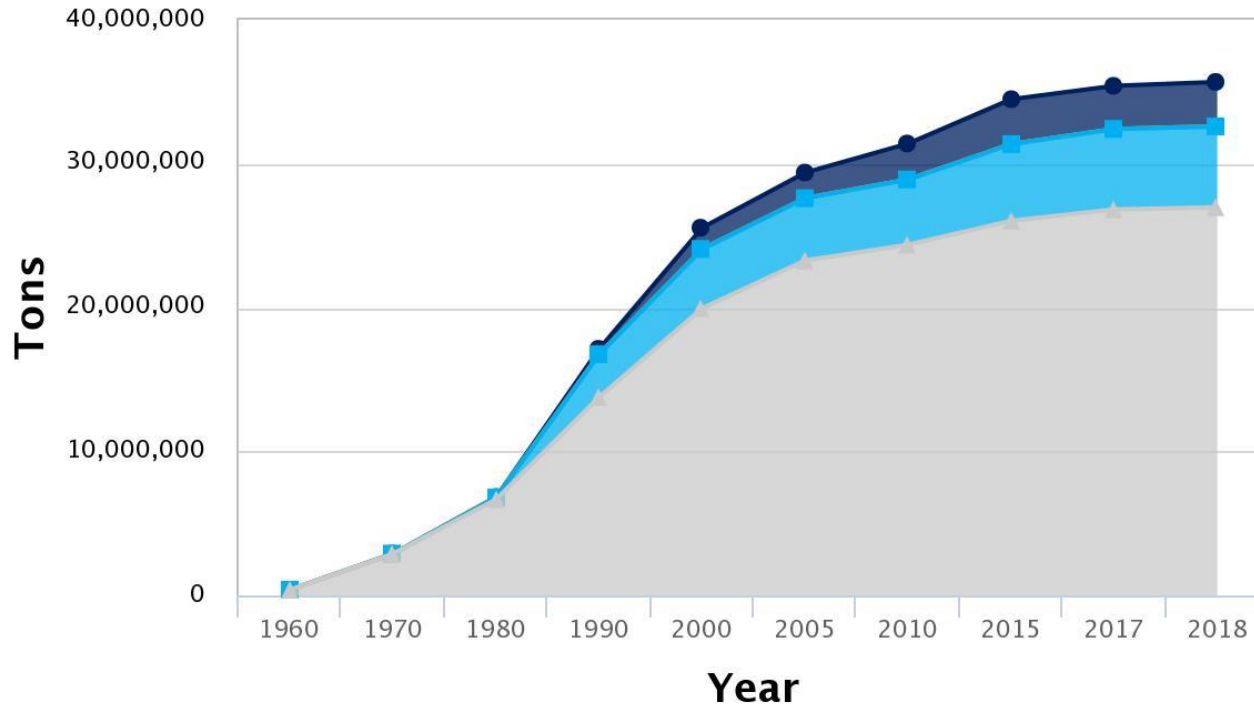
It can be used to make
something new.

Questions?

Deep Dive: Plastics



Plastics Waste Management: 1960–2018



2018

3 million tons
recycled

5.6 million tons
incinerated

Almost 28
million tons
landfilled

Click on legend items below to customize items displayed in the chart

Recycled **Composted** **Combustion with Energy Recovery** **Landfilled**

Why is plastic recycling so tricky?



Resin codes

- 1-7 in United States

Figure 2: Main Plastic Resin Types and Their Applications in Packaging

 PET	  	Water and soft drink bottles, salad domes, biscuit trays, salad dressing and peanut butter containers
 HDPE	  	Milk bottles, freezer bags, dip tubs, crinkly shopping bags, ice cream containers, juice bottles, shampoo, chemical and detergent bottles
 PVC	 	Cosmetic containers, commercial cling wrap
 LDPE	 	Squeeze bottles, cling wrap, shrink wrap, rubbish bags
 PP	 	Microwave dishes, ice cream tubs, potato chip bags, and dip tubs
 PS	 	CD cases, water station cups, plastic cutlery, imitation "crystal glassware", video cases
 EPS	  	Foamed polystyrene hot drink cups, hamburger take-away clamshells, foamed meat trays, protective packaging for fragile items
 OTHERS	 	Water cooler bottles, flexible films, multi-material packaging

Thousands of types of plastics

材料术语	缩写语	代号
聚对二甲苯乙二醇 <i>poly(ethylene terephthalate)</i>	PET	01
高密度聚乙烯 <i>polyethylene, high density</i>	PE-HD	02
聚乙炔 <i>poly(vinyl chloride)</i>	PVC	03
低密度聚乙烯 <i>polyethylene, low density</i>	PE-LD	04
聚丙烯 <i>polypropylene</i>	PP	05
聚苯乙烯 <i>polystyrene</i>	PS	06
丙烯腈-丁二烯塑料 <i>acrylonitrile-butadiene plastic</i>	AB	07
丙烯腈-丁二烯-丙烯酸酯塑料 <i>acrylonitrile-butadiene-acrylate plastic</i>	ABAC	08
丙烯腈-丁二烯-苯乙烯塑料 <i>acrylonitrile-butadiene-styrene plastic</i>	ABS	09
丙烯腈-氯化聚乙烯-苯乙烯塑料 <i>acrylonitrile-chlorinated polyethylene styrene</i>	ACS	10
丙烯腈-乙炔-丙烯酸-丁二烯-苯乙烯塑料 <i>acrylonitrile-ethylene-propylene-diene-styrene plastic</i>	AEPDS	11
丙烯腈-甲基丙烯酸甲酯塑料 <i>acrylonitrile-methyl methacrylate plastic</i>	AMMA	12
丙烯腈-苯乙烯-丙烯酸酯塑料 <i>acrylonitrile-styrene-acrylate plastic</i>	ASA	13
乙炔二醇素 <i>cellulose acetate</i>	CA	14
乙炔丁二醇素 <i>cellulose acetate butyrate</i>	CAB	15
乙炔丙二醇素 <i>cellulose acetate propionate</i>	CAP	16
甲炔二醇素 <i>cellulose formaldehyde</i>	CEF	17
甲炔-丙烯酸酯 <i>crystal-formaldehyde resin</i>	CF	18
聚羧基丙烯酸酯 <i>carboxymethyl cellulose</i>	CMC	19
羧基丙烯酸酯 <i>cellulose acetate</i>	CN	20
聚对苯二甲酸 <i>cycloolefin copolymer</i>	COC	21
丙炔二醇素 <i>cellulose propionate</i>	CP	22
三乙酸纤维素 <i>cellulose triacetate</i>	CITA	23
乙炔-丙烯酸酯 <i>ethylene-propylene plastic</i>	E/P	24
乙炔-丙烯酸酯 <i>ethylene-acrylic acid plastic</i>	EAA	25
乙炔-丙烯酸丁酯塑料 <i>ethylene-butyl acrylate plastic</i>	EBAK	26
乙炔醇素 <i>ethyl cellulose</i>	EC	27
乙炔-丙烯酸乙酯塑料 <i>ethylene-ethyl acrylate plastic</i>	EBAK	28
乙炔-甲基丙烯酸塑料 <i>ethylene-methacrylic acid plastic</i>	EMA	29

材料术语	缩写语	代号
环氧-丙炔树脂或塑料 <i>epoxide-propyne resin or plastic</i>	EP	30
乙炔-四氢乙炔塑料 <i>ethylene-tetrafluoroethylene plastic</i>	ETFE	31
乙炔-乙炔-丙烯酸酯塑料 <i>ethylene-vinyl acetate plastic</i>	EVAC	32
乙炔-乙炔-醇塑料 <i>ethylene-vinyl alcohol plastic</i>	EVOH	33
全氟(乙炔-丙炔)塑料 <i>perfluoro(ethylene-propyne) plastic</i>	PEP	34
吡喃-甲炔树脂 <i>furan-formaldehyde resin</i>	FF	35
液体聚合体 <i>liquid-vinyl polymer</i>	LCP	36
甲基丙烯酸甲酯-丙烯酸酯塑料 <i>methyl methacrylate-acrylate plastic</i>	MAAS	37
甲基丙烯酸甲酯-丙烯酸酯-丙烯酸酯塑料 <i>methyl methacrylate-acrylate-styrene plastic</i>	MASS	38
甲基丙烯酸甲酯-丙烯酸酯-丙烯酸酯塑料 <i>methyl methacrylate-acrylate-styrene plastic</i>	MC	39
三聚氰胺-丙烯酸酯 <i>melamine-formaldehyde resin</i>	MP	40
三聚氰胺-丙烯酸酯 <i>melamine-formaldehyde resin</i>	MP	41
三聚氰胺-丙烯酸酯 <i>melamine-formaldehyde resin</i>	MAN	42
三聚氰胺-丙烯酸酯 <i>melamine-formaldehyde resin</i>	PA	43
三聚氰胺-丙烯酸酯 <i>melamine-formaldehyde resin</i>	PA	44
三聚氰胺-丙烯酸酯 <i>melamine-formaldehyde resin</i>	PA	45
三聚氰胺-丙烯酸酯 <i>melamine-formaldehyde resin</i>	PA	46
三聚氰胺-丙烯酸酯 <i>melamine-formaldehyde resin</i>	PA	47
三聚氰胺-丙烯酸酯 <i>melamine-formaldehyde resin</i>	PA	48
三聚氰胺-丙烯酸酯 <i>melamine-formaldehyde resin</i>	PA	49
三聚氰胺-丙烯酸酯 <i>melamine-formaldehyde resin</i>	PA	50
三聚氰胺-丙烯酸酯 <i>melamine-formaldehyde resin</i>	PA	51
三聚氰胺-丙烯酸酯 <i>melamine-formaldehyde resin</i>	PA	52
三聚氰胺-丙烯酸酯 <i>melamine-formaldehyde resin</i>	PA	53
三聚氰胺-丙烯酸酯 <i>melamine-formaldehyde resin</i>	PA	54
三聚氰胺-丙烯酸酯 <i>melamine-formaldehyde resin</i>	PA	55
三聚氰胺-丙烯酸酯 <i>melamine-formaldehyde resin</i>	PA	56
三聚氰胺-丙烯酸酯 <i>melamine-formaldehyde resin</i>	PA	57
三聚氰胺-丙烯酸酯 <i>melamine-formaldehyde resin</i>	PA	58
三聚氰胺-丙烯酸酯 <i>melamine-formaldehyde resin</i>	PA	59
三聚氰胺-丙烯酸酯 <i>melamine-formaldehyde resin</i>	PA	60
三聚氰胺-丙烯酸酯 <i>melamine-formaldehyde resin</i>	PA	61

材料术语	缩写语	代号
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PMS	97
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	POM	98
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	POM	99
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PPO	100
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PPE	101
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PP-E	102
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PP-HI	103
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PPOX	104
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PPS	105
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PPSU	106
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PS-E	107
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PS-HI	108
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PSU	109
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PTFE	110
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PTMAT	111
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PTT	112
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PUR	113
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PVAC	114
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PVAL	115
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PVB	116
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PVC	117
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PVC-U	118
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PVDC	119
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PVDF	120
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PVF	121
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PVFM	122
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PVK	123
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PVP	124
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	SAN	125
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	SB	126
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	SE	127
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	SMAH	128
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	SMAS	129
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	UP	130
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	UP	131

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聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PPO	100
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PPE	101
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PP-E	102
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PP-HI	103
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聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PVC	117
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PVC-U	118
聚-甲基丙烯酸酯 <i>poly-methylacrylate</i>	PVDC	119
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Plastic recycling: what's accepted?

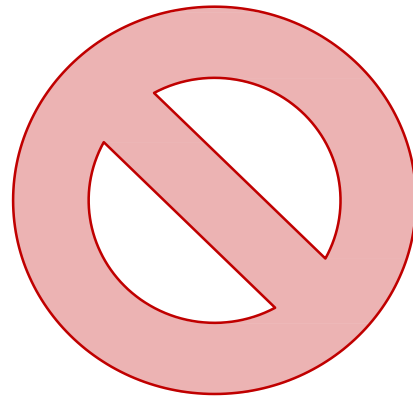


#1, #2, #5

Recycling prep



Plastic recycling: what's NOT accepted?



Plastic prevention



Legislation



Manufacturing
and
businesses



Personal
consumption

Questions/Break

