U.S. Packaging Reconditioning Industry
2021 Survey and Statistics

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RIPA
REUSABLE INDUSTRIAL PACKAGING ASSOCIATION

Background

This report on industrial container reconditioning in the U.S. presents summary data on the annual production of reconditioned steel and plastic 55-gallon drums as well as 275- and 330-gallon composite "intermediate bulk containers" (IBCs). Data reported is for calendar year 2021. This report also profiles the container reconditioning industry in terms of industry practices, processes used, equipment used, employee training, markets served, customer service and regulatory compliance. The association last conducted a similar survey for calendar year 2019.

The Reusable Industrial Packaging Association (RIPA) is a U.S.-based trade association comprised of businesses that recondition, distribute and/or manufacture industrial containers such as steel drums, plastic drums and IBCs. RIPA also includes among its members businesses that provide supplies and/or services to container reconditioners, distributors and manufacturers.

RIPA represents the vast majority of reconditioners operating in the U.S. As a condition of membership, these companies adhere to *Codes of Operating Practice* that were carefully developed by industry experts to ensure responsible practices and environmental stewardship. RIPA and its members take very seriously their role in helping shippers meet regulatory requirements, customer expectations, and their goals for sustainability.

Taken together, the 89 facilities for which data were submitted constitute a statistically significant sampling of the U.S. reconditioning industry. The data were aggregated and average production for respondents' locations (plants) was calculated. The average production was then extrapolated to the estimated total number of U.S. facilities largely or exclusively engaged in commercial reconditioning. The results are estimates for total commercial reconditioning in the U.S.

Hazmat ("UN") Packagings

More than half of all new and reconditioned industrial containers are used and reused for the shipment of regulated hazardous materials (referred to as "dangerous goods" outside the U.S.). As such, these containers must be qualified through testing to perform safely in shipping hazardous materials.

Different hazardous materials require containers with different performance capabilities. Containers can be rated to different levels of performance through qualifying tests. Markings on the container will indicate the level of performance to which the container has been certified.

In U.S. hazmat regulations, the UN Recommendations, and international transportation codes, industrial "containers" are more accurately referred to as industrial "packagings". Further, a "packaging" is a container ***unfilled***; a "package" is a container ***filled***. Finally, packagings certified for hazardous materials are often referred to as "UN" packagings (*e.g.*, a "UN drum").

Reconditioning Basics

Frequently, container reconditioning is mistakenly referred to as container "recycling". However, it is important to note that "reconditioning" is the preparation of a used container for reuse ***as*** a container; "recycling" is the conversion of a used container into raw material (e.g., scrap steel or plastic) for production of a new container or a wholly different product. Significantly, the reuse of packaging has been shown to be more environmentally beneficial than turning packaging into scrap.[1]

Reconditioners will accept only used containers that are properly emptied of their contents. This means they must be "drip dry" or otherwise emptied using an appropriate means (e.g. siphoning). For viscous materials, U.S regulations allow a minimal "heel" of material which, if exceeded, could render the whole used container a hazardous waste.

Reconditioners do not accept hazardous waste – although hazardous waste companies may send RCRA-empty drums for reconditioning. Generally, used containers with excessive residues are retrieved by and returned to the emptier as containing unused product. A written certification of empty status, signed by the emptier, is a key part of RIPA's *Codes of Operating Practice* (see www.reusablepackaging.org, "Resources", "Industry Data and Standards")

Used drums and IBCs are inspected for structural integrity, stripped of previous labels and markings, and processed through a steel drum line, a plastic drum line or an IBC line.

IBC reprocessing can range from simple washing (referred to as "routine maintenance" in the regulations), to replacing inner bottles ("repair"), to a complete re-design and re-construction ("re-manufacturing").

Steel drums are typically processed through mechanical "de-denters" and similar equipment. A sizeable number of closed-head drums are converted ("re-manufactured") into open-head (removable head) drums. This process requires equipment to roll a new "chime curl" along the top circumference. The process also requires the installation of a top head and a closing ring.

Also, steel drums are often processed through a shot blaster to strip paint and other surface adherents. Open-head drums may be processed through a drum furnace which burns off unwanted adherents.

Closed-head steel drums (as well as plastic drums) are typically processed through a series of wash lines. Wash solutions may be caustic or acidic as one or both may be part of the reconditioning process.

Most steel drums will receive a treatment (typically a solution) for rust inhibition. Drums are then typically painted per customer specifications. Additionally, interior linings or removable liners may be added according to customer needs.

All reconditioning of packagings intended for hazardous materials includes a leakproofness test in (or after) the production line (referred to as "production testing"). Generally, packagings rated for a higher performance capability are subject to a more strenuous test.

All UN packagings must be properly marked according to the regulations. The "UN marks" are intended to inform users and emergency responders of the packaging's performance capability and the identity of the person or company who certified the packaging. Other labels may be added by shippers / fillers for other purposes such as commercial branding.

Finally, reconditioners professionally clean all used packagings that have been reused and have reached the end of their useful lives. Reconditioners do not send hazardous residues or unclean hazardous packagings to scrap yards, mills or other destinations. Shipment of hazardous residues to someone other than a reconditioner requires full compliance with the Hazardous Materials Regulations. Significantly, unless the destination for used drums is a reconditioner, requirements include shipping papers and vehicle placards. (These requirements currently apply to emptied IBCs regardless of destination.)

[1] *"Life Cycle Assessment of Newly Manufactured and Reconditioned Industrial Packaging"*; (Beco) Ernst & Young, October, 2015; for Reusable Industrial Packaging Association

Survey Results, Estimates of Production

Estimates of production levels were made by extrapolating reported data in a straight-line method out to the complete population of facilities.

The results suggest some shifts have occurred, after two years, away from or towards certain packagings. Areas of growth or contraction also can be attributed, at least in part, to fluctuation in general economic activity and/or markets for secondary materials (scrap).

Results are statistically meaningful, in line with assumptions, and well within a high confidence interval.

It is apparent from these results that composite IBCs continue to grow in market share and that scrap rates for plastic drums and IBCs have been steady or somewhat higher. A declined rate of steel scrapping is likely the result of lower scrap demand.

The following pages present these and other data as reported through the survey, including data on equipment, employees, operational features and regulatory compliance.

- Data Reported by Respondents is for Calendar Year 2021
- Estimates of Total 2021 Production are extrapolated from that data
- Previous RIPA Survey was for calendar year 2019
- 89 Reconditioning Locations Reported Survey Data
- Many plants operate in all product lines: steel drums, plastic drums and IBCs
- Several plants are exclusive to one or two product lines *(e.g., plastic drums and IBCs only)*

Total Estimated Number of U.S. Facilities with a:

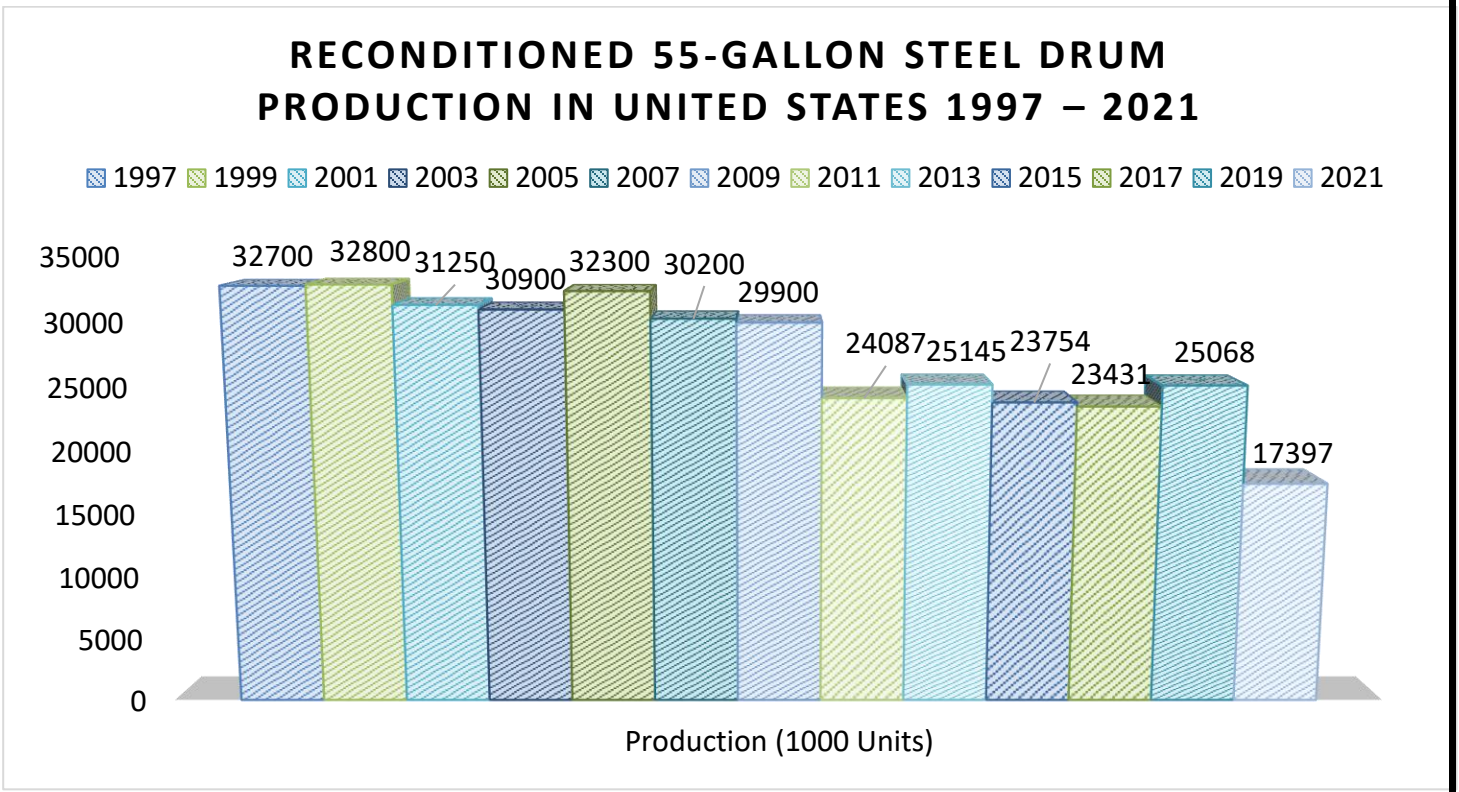
Steel Drum Line	94
Plastic Drum Line	90
IBC Line	105

**estimates include members & non-members of RIPA*

Reconditioned and Remanufactured

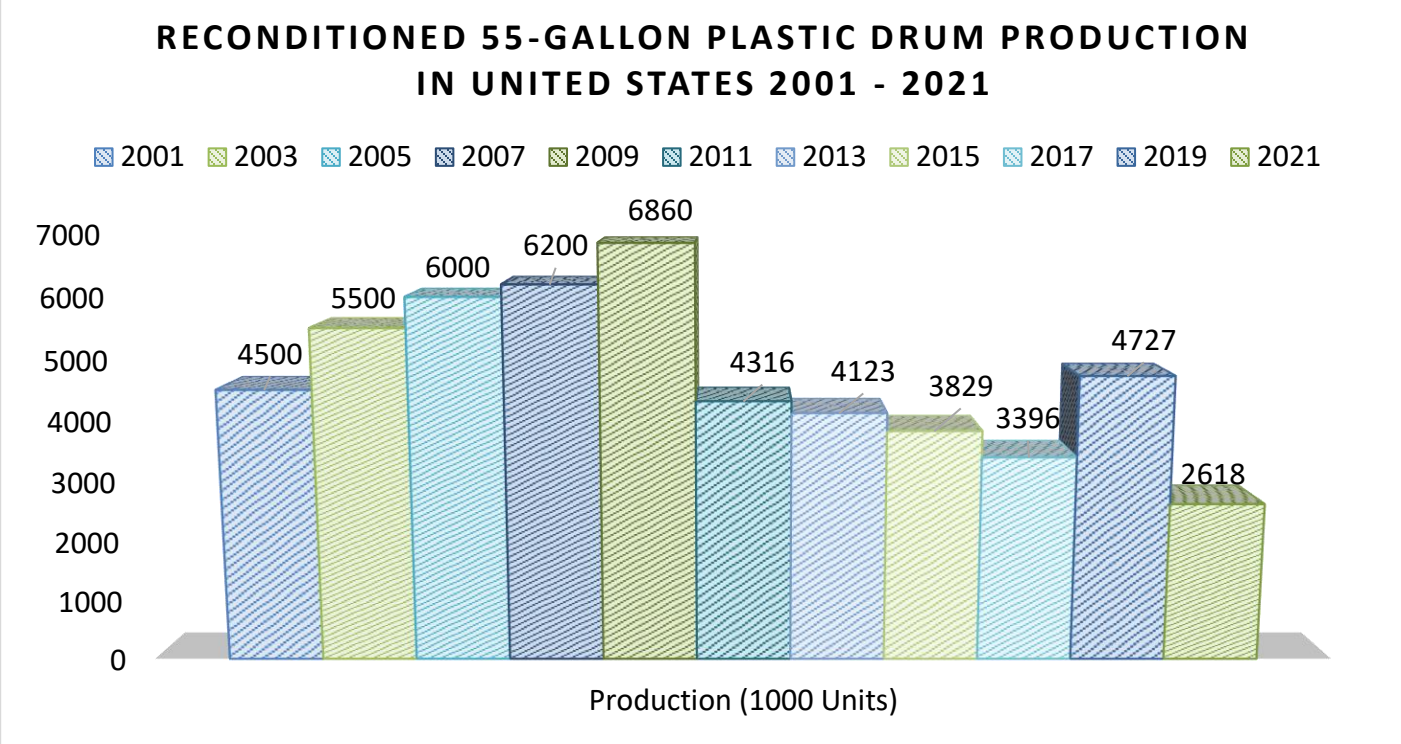
55-Gallon Steel Drums in 2021

Tight Head	4,520,347
Open Head	12,877,022
Total Steel Recon	17,397,369
Scrapped Drums	2,156,126
Total U.S. Steel	19,553,495



Reconditioned 55-Gallon Plastic Drums in 2021

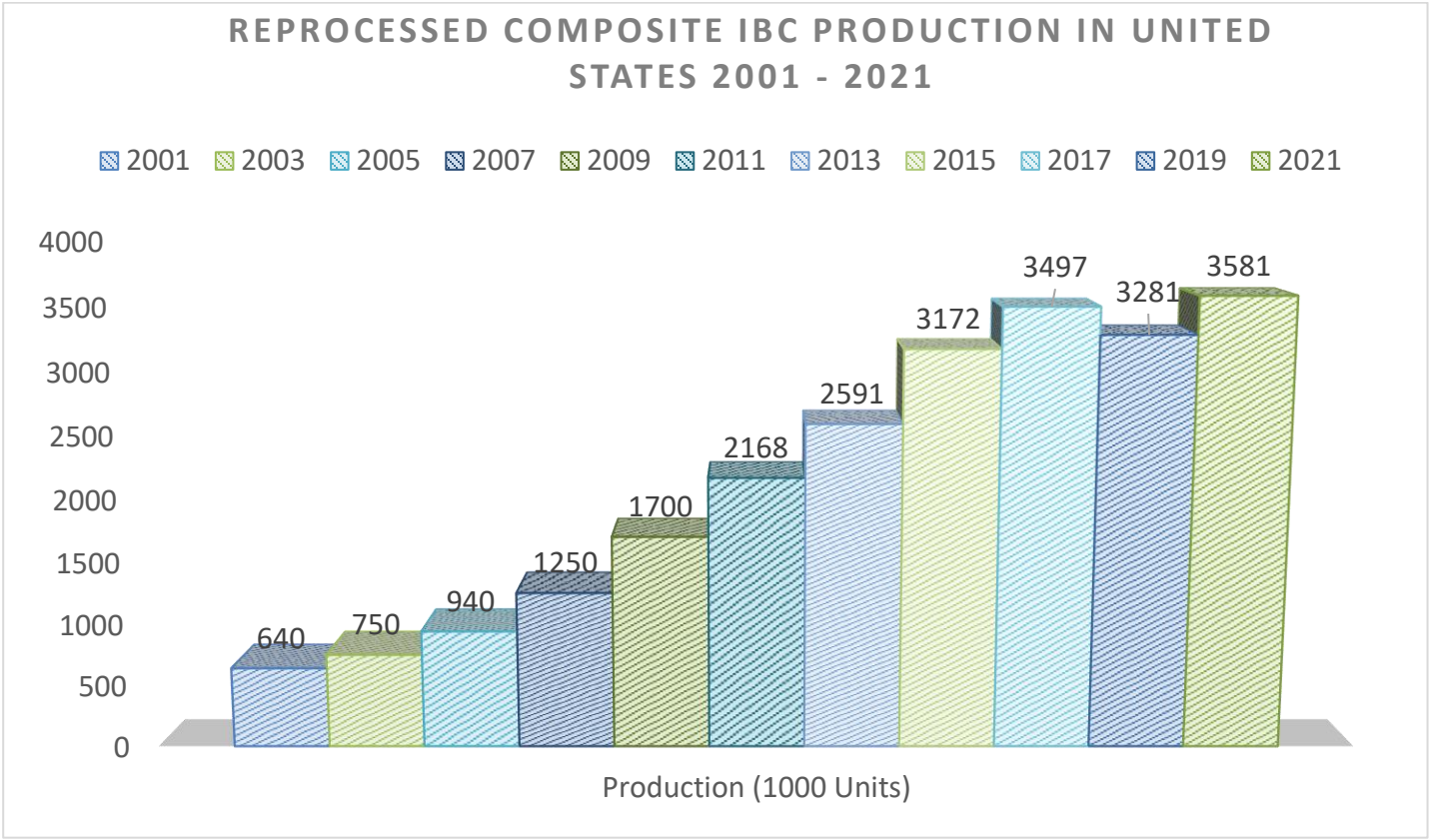
Total Recon	2,618,000
Scrapped	1,823,500
Total Plastic	4,441,500



Reprocessed Composite IBCs in 2021

275- & 330-gallons *(combined)*

Washed IBCs	1,164,702
Re-Bottled *and* "Cross Bottled"	2,416,289
Total Reprocessed	3,580,991
Scrapped Bottles	1,981,573



HIGHLIGHTS, FINDINGS

- For steel drum reconditioning, the data show an output of 17 million drums – a decline of nearly 30% due at least in part to supply chain and pandemic issues. A similar decline was observed in the recessionary years of 2009-11 when steel drum reconditioning was approximately 20% lower.

- The number of scrapped steel drums rose from 1.7 million in 2019 to an estimated 2.2 million units in 2021.

- The number of plastic drums reconditioned fell to 2.6 million units. The number of scrapped plastic drums declined slightly to 1.8 million.

- The number of composite IBCs reprocessed rose to 3.6 million, the majority of which were 275-gallon capacity. The number of scrapped IBC bottles is reported as 1.9 million.

- Approximately 61% of steel drums are used for hazmat, 68% of plastic drums, 20% of fiber drums, and 64% of IBCs. These numbers have changed very little over the last several years.

Major Uses of Packagings

Steel Drums and IBCs	Oils and Lubricants
Steel Drums and IBCs	Paints and Coatings
Steel Drums	Solvents
Steel Drums and Plastic Drums	RCRA Hazardous Waste
Plastic Drums and IBCs	Detergents
Plastic Drums and IBCs	Acids / Bases

Use of Reconditioning Methods

Caustic Wash	80%
Acid Flush	10%
Chaining	40%
Shot Blasting	50%
Drum Furnace	35%

Operate Furnace(s)?

By Separate Survey, U.S. Total Number: 26 *(34 in 2017)*

Test furnace ash? 20% Yes

How often? Yearly, Twice Yearly

Monitor stack emissions for*: Opacity, Temperature, NOx, SOx, CO, PM, VOCs, Metals, Chlorinated Compounds*

Wastewater Treatment

Facilities with treatment	60%
Average gal per day	3,500
Sewer discharge	60% Yes
Discharge water tested	85% Yes

Pollutants tested: *Heavy Metals, COD, BOD, pH, Total Suspended Solids, Oil/Grease, Volatile Organics, Ammonia, Phosphorus*

Operate Paint Booth(s)? 60% Yes

Avg Number of Booths	1-2
HAP-free	20%
Low VOC	50%
Solvent-based	30%
VOC Emissions Permit(s)?	70%
Thermal equipment for VOCs?	35%

Incoming Containers

Use Empty Certification Forms?	90%	Yes
Return “Heavy” Containers?	90%	
Use RIPA rejection stickers?	75%	

Hazmat Training

Use RIPA Hazmat Employee Training Module?	85%	Yes
Useful to the Company in Spanish?	60%	

Customer Audits 2021

Avg # of Customer Audits	5

Regulatory Audits 2021

Federal DOT	8	State DOT	0
Federal EPA	1	State EPA	4
Federal OSHA	0	State OSHA	3

OSHA Reportable Injuries? 65% Yes

Average Number Injuries 5
Injury Types: *Chemical Burns, Sprains, Cuts, Contusions, Broken Finger, Back Strain*

Transportation *(average for sites reporting)*

Tractors	6
Trailers	320
Drivers	8
Hazmat endorsement?	2
Lease tractors?	50%

Production of Reconditioned *(and remanufactured)* 55-Gallon Steel Drums *(1000 units)*

RIPA Survey Years	
2000	31,900
2004	31,400
2007	30,200
2009	29,900
2011	24,087
2013	25,145
2015	23,754
2017	23,431
2019	25,068
2021	17,397

Production of Reconditioned 55-Gallon Plastic Drums *(1000 units)*

RIPA Survey Years	
2000	4,500
2004	5,700
2007	6,200
2009	6,860
2011	4,316
2013	4,123
2015	3,829
2017	3,396
2019	4,727
2021	2,618

Production of Reprocessed Composite IBCs *(1000 units)*

RIPA Survey Years	
2004	830
2007	1,250
2009	1,700
2011	2,168
2013	2,591
2015	3,172
2017	3,497
2019	3,281
2021	3,580