



Removing External Coatings from Steel Drums During the Reconditioning Process

Reusable Industrial Packaging Association
Guidance Document | March 2018

Summary

Steel drum reconditioning has been practiced in the United States and around the world for more than 75 years. During that time, hundreds of millions of steel drums have been collected, cleaned and reconditioned by members of the Reusable Industrial Packaging Association for reuse in manufacturing, chemical production and related businesses. Today, the reconditioning industry continues to recondition approximately 25 million 55-gallon steel drums every year.

This report provides results from a multi-year effort undertaken by RIPA in which steel drum coatings removal practices were discussed and reviewed by members of the association's Steel Drum Product Group.

As part of this project, RIPA visited numerous reconditioning locations and examined hundreds of drums to determine the manner in which steel drum reconditioners currently remove external coating materials, such as paint, as well as labels and other markings.

RIPA staff also reviewed the history of the application regulation to determine how the rule has evolved over the years. In addition, RIPA met several times with DOT staff to discuss enforcement issues related to the rule. The goal of this effort was to establish appropriate guidance for member companies and enforcement personnel from the U.S. Department of Transportation's Office of Hazardous Materials Safety regarding the "real-world" application of 49 CFR §173.28(c)(1)(i), which requires removal of external coatings from steel drums as part of the reconditioning process.

RIPA believes this report accomplishes the stated goal by describing the applicable rule, highlighting common industry practices, and showing pictorially examples of steel drums that retain some exterior coating material, but which are known to be safe in transportation.

The pictures highlight the fact that steel drums are reconditioned in several different, but equally effective ways. And, importantly, they show that some coating material will remain on a reconditioned drum regardless of the reconditioning process that is used.

Steel Drum Reconditioning Processes

Steel drums are processed in one of two ways: Open head drums are passed through a drum reclamation furnace and exposed to extreme heat (usually about 1,400° F) until any residue in the drum is pyrolyzed; or, the drums are washed using hot water and, often, a caustic material additive to facilitate cleaning. Generally, drums that are processed in a furnace are passed through a shot blasting machine to remove much of the ash and whatever exterior coating is left on the drum. Washed drums are often passed through a

blasting machine as well, but some reconditioners use high-speed wire brushes to remove enough of the outer coating material to ensure the drum is ready to be repainted.

In either process, some exterior coating material inevitably remains on the drums, be it a “sheen” or “shadow” left over after blasting or paint that was not removed from the drum by washing and brushing.

The U.S. Regulation

49 CFR §173.28(c)(1)(i) defines the steel drum reconditioning process to include, “Cleaning to the base material of construction, with all former contents, internal and external corrosion, and any external coatings and labels removed.” (Emphasis added)

For decades, the concept of removing 100% of external coatings and labels was not part of the federal regulatory system governing steel drum reconditioning operations. In fact, early rulemakings (See HM-127) were concerned that aggressive cleaning processes could damage the integrity of the drum.

The 1987 notice of proposed rulemaking for HM-181 included only a brief mention of the reconditioning process: *“For the purposes of this subchapter, reconditioning is the repair, replacement of non-integral packaging components (such as removable gaskets, closure devices cushioning material, etc.) or leakproofness testing of non-bulk packagings, other than cylinders.”* HM-181; 52 Fed. Reg. 16694 (May 5, 1987).

The 1990 final rule, however, included the sentence: *“Cleaning to base material of construction, with all former contents, internal and external corrosion, and any coatings and labels removed.”* HM-181; 55 Fed. Reg. 52614 (December 21, 1990).

Significantly, the preamble in the final notice of proposed rulemaking did not refer to this new language and only said: *“Reconditioning is defined for metal drums with traditional reconditioning procedures.”* HM-181; 55 Fed. Reg. 52427 (December 21, 1990).

At the time, and for several decades thereafter, RIPA and DOT understood this preamble to the final rule as meaning that no new requirements were imposed, because no change in processes had been expressed in the NPRM and no additional enforcement actions were implemented.

Safety Concerns

At no time has any traditional cleaning process of a metal reconditioned drum removed 100% of the prior coating. More acidic or caustic concentrations could be used, or more intensive shot blasting could be used; however, the risk to the integrity of the drum, safety in transportation and employee safety and health is greater than the risk presented by some paint residue remaining on the exterior of the drum. (Note: There is no requirement to remove coating from the interior of the drum).

The cleaning and surface preparation processes cited above, i.e., caustic washing, brushing and shot blasting, have been used by North American and international reconditioning companies for 60 years or longer. Their purpose is solely to prepare the outer surface of drums for paint reapplication and aesthetic appearance. The degree of coating removal is predicated on the type of process used, the intended market for the finished drum and customer demands. Reconditioners and their customers do not view either of these coatings removal processes as a safety issue.

This view is buttressed various industry standards developed by metal coatings and affiliated industries. Following is an example of one such standard.

Standard SP-14 / NACE 8: Industrial Blast Cleaning

“This joint standard covers the requirements for industrial blast cleaning of unpainted or painted steel surfaces by the use of abrasives. These requirements include the end condition of the surface and materials and procedures necessary to achieve and verify the end condition. An industrial blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dust, and dirt. Traces of tightly adherent mill scale, rust, and coating residues are permitted to remain on 10% of each unit area of the surface (see Section 2.6) if they are evenly distributed. (Emphasis added.) The traces of mill scale, rust, and coating shall be considered tightly adherent if they cannot be lifted with a dull putty knife. Shadows, streaks, and discolorations caused by stains of rust, stains of mill scale, and stains of previously applied coating may be present on the remainder of the surface.”

In short, the traditional processes of surface preparation used by the RIPA membership optimally prepare a drum surface for new paint without risking damage to the integrity of the drum. New paint provides protection against prospective weathering, rust or corrosion in transportation. Residues of paint or staining on drums remaining after reconditioning do not present a safety risk.

In addition, Transport Canada has adopted a regulatory approach in its TDG Regulations, CGSB-43.126-2008, “Reconditioning, Remanufacturing and Repair of Drums for the Transportation of Dangerous Goods,” that recognizes the fact that the reconditioning processes discussed above are adequate to ensure transportation safety without removing all exterior coatings or adhesive materials. Specifically, two TDG provisions address the issue of coating removal in the reconditioning process. Section 6.2 reads in relevant part:

“f. Clean the exterior of the steel drum with an abrasive material or suitable chemical to substantially remove paint, rust, durable labels and adhesives.”

Section 6.2.3 reads:

“c. have all external paint, durable labels and adhesives substantially removed....”

Additionally, Section 6.2.5 of the cited CGSB standard, “Reconditioning Success Criteria” summarizes neatly both the purpose and general intent of Canadian reconditioning rules,

“A steel drum successfully passes the reconditioning process if all required steps specified in par. 6.2 have been completed and have revealed no defect that before the next inspection is due and under normal conditions of transport, including handling, may reasonably be expected to cause a condition or release of dangerous goods that could endanger public safety.”

RIPA believes this “reasonableness standard” of successful reconditioning in the Canadian regulations represents the proper stance for enforcement of the U.S. regulation.

Exterior Steel Drum Coating Removal

Today, the issue of exterior cleaning of metal drums surfaces has been questioned by DOT. To address these concerns, RIPA has asked the Agency to adopt an amendment to 49 CFR §173.28(c)(1)(i) that allows some flexibility in interpretation, much like what is done in Canada. We have asked DOT to adopt the following:

“...[E]xterior coatings and labels on steel drums should be sufficiently removed to expose metal deterioration which could adversely affect transportation safety.”

To assist in the enforcement of a rule that would be somewhat subjective in nature, RIPA has developed a visual guide that shows appropriate and reasonable amounts of exterior material that may remain on reconditioned drums by process (i.e. shot blasting or brushing).

Reusable Industrial Packaging Association

Examples of “Appropriate and Reasonable” Steel Surface Preparation in Reconditioning vs. “Needs Further Processing”

“*Appropriate and reasonable amounts*” is the standard described in this guidance for residual coatings or other adherents left after shot blasting and/or brushing. More specifically, the regulatory language proposed is: “...[E]xterior coatings and labels on steel drums should be sufficiently removed to expose metal deterioration which could adversely affect transportation safety.”

Appropriate and reasonable
(shot blasted drums)



Appropriate and reasonable
(shot blasted drums)



Appropriate and reasonable (cont')
(brushed drums)



Needs Further Processing
(see flaking)

