

Safer Alternatives to Methylene Chloride Paint Strippers for Furniture Stripping

September 12, 2017



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Institute for Research and Technical Assistance

- ◉ Small nonprofit technical organization established in 1989
- ◉ Identifies, develops, tests and demonstrates safer alternatives in consumer product and industrial applications
- ◉ Projects have led to reduction in use of hazardous substances in California by more than 100 tons per day

Background on Paint Stripping

- Furniture stripping companies strip items for consumers
 - › Some large strippers use equipment and buy stripper from suppliers
 - › Smaller strippers purchase and use consumer product strippers from hardware and paint supply stores
 - › IRTA estimated 80 facilities in California have equipment, 500 facilities do not



Background on Stripping Cont'd

- ◎ Consumers strip wood and metal items



Characteristics of Currently Used Paint Strippers

- Most effective paint strippers contain methylene chloride (METH) as active ingredient
 - > Generally contain other components like methanol, rinse agents, thickeners and waxes, depending on application
 - > METH is a carcinogen
- N-methyl pyrrolidone (NMP) marketed as “green” alternative but formulations are not very effective
 - > Chemical is a reproductive and developmental toxin

Motivation for Investigating Alternatives

- ◎ IRTA worked on various projects over last 25 years to find alternatives in furniture stripping
 - › Focused first on low METH content strippers and high air flow ventilation equipment
- ◎ Later worked on safer alternatives for furniture stripping and consumer product strippers
 - › Had to solve both problems to include all furniture stripping
- ◎ Also worked on safer alternatives for various industrial applications over many year period
 - › Aircraft stripping, metal stripping, boat hull stripping

Furniture Stripper and Consumer Product Stripper Alternatives

- ◎ Project sponsored by Cal/EPA's DTSC
- ◎ Worked with Benco Sales, a paint stripper supplier
- ◎ Focused on alternatives to methylene chloride and NMP
- ◎ Project aim
 - › Identify, develop, test, demonstrate safer alternatives for furniture stripping and consumer product strippers used by furniture strippers, contractors and consumers

Testing With Furniture Strippers Using Equipment

- ◉ Worked with two stripping companies in Southern California
- ◉ Formulated different alternative strippers and compared their stripping effectiveness to baseline stripper
- ◉ B7 containing methylene chloride and methanol is baseline stripper
- ◉ Three alternative strippers based on benzyl alcohol were tested

Testing in Equipment Cont'd

- Stripping procedure in equipment
 - › Use flow tray which is sloped tank with drain at lower end
 - › Apply stripper using pump to items in flow tray
 - › Wait for a period and pump more stripper on items to completely remove paint
 - › Take items to water wash booth and rinse residue of coating and stripper
 - › Let items dry prior to painting



Testing in Equipment Cont'd

- Stripped a variety of different items at Sunset Strip in flow tray
 - Chest of drawers with lacquer coating, mirror frame with shellac coating, door with shellac coating, chair with enamel coating



Testing in Equipment Cont'd

- Stripped several items at Strip Joint in flow tray
 - Mahogany drawer with lacquer coating, dental cabinet drawer with multiple layers of latex coating, mahogany door with several enamel coatings, oak drawer and door with varnish coating



Results of Testing in Equipment

- The baseline stripper stripped all items except the dental cabinet drawer with the latex coating
- Two of the alternative benzyl alcohol stripping formulations performed reasonably well
- One formulation performed best and it also stripped the latex coating
- About half as much of the alternative strippers were required but double the amount of hazardous waste was generated

Annualized Cost Comparison for Furniture Stripping in Equipment

	METH Stripper	Benzyl Alcohol Stripper
Capital Cost	-	\$217
Stripper Cost	\$4,790	\$4,250
Rinse Agent Cost	\$55	\$124
Disposal Cost	\$300	\$350
Total Cost	\$5,145	\$4,941

Furniture Stripping Without Equipment (Hand Stripping)

- ◉ Meant to represent majority of furniture stripping companies who purchase consumer product strippers
- ◉ Used baseline stripper called B4 as control
 - › Contains methylene chloride and methanol
- ◉ Formulated and tested four alternative strippers
 - › Two strippers contained benzyl alcohol and acetone
 - › Two strippers contained benzyl alcohol and no acetone

Hand Stripping Cont'd

- ◉ Variety of items stripped at Sunset Strip
 - > Bed rail with shellac coating, chair with two coats of enamel, bookcase shelf with lacquer coating



Hand Stripping Cont'd

- ◎ Several items stripped at Strip Joint
 - › Panel with lacquer coating, dental drawer with three coats of latex, panel with five coats of enamel, mirror frame with varnish coating



Results of Hand Stripping at Furniture Stripping Companies

- General results indicated that B4 was the most effective stripper
- One of the alternative benzyl alcohol strippers was almost as good as the B4 stripper

Conclusions

- There are demonstrated safer alternatives to methylene chloride and NMP strippers
- Two benzyl alcohol formulations worked well for equipment and hand stripping
 - › B94 for flow tray stripping, B95 for hand stripping
 - › Are available from Benco Sales and eChem in California
- Requires change in equipment to use benzyl alcohol strippers but costs are comparable to using METH strippers
- Must regulate methylene chloride and NMP in concert or NMP will be choice
 - › Experience of furniture strippers is that NMP strippers do not work effectively

Materials

- ◎ IRTA website can be accessed at www.irta.us
- ◎ Report presented here is last report listed on website
 - › “Methylene Chloride Consumer Product Paint Strippers: Low-VOC, Low Toxicity Alternatives”
- ◎ Have several other reports on various applications and other tests conducted with furniture strippers

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