

CIMCOOL[®]

Technical Report

Milacron Marketing LLC | Cimcool Fluid Technology | Cincinnati, Ohio 45209

PAINT REMOVAL

Introduction

The advent of water-based chemical metalworking fluids has led to some objections to their use because they can cause paint to soften and peel off the machine. This is not true of all water-based metalworking fluids, particularly the CIMCOOL[®] metalworking fluids. Paint does come off some machine tools that are not properly painted, causing customer complaints.

Theory

The purpose of paint on a machine tool is two-fold. First it protects the metal surfaces from corrosion and, second, serves as decor to add to the appeal of the machine. For many years the standard color for a machine tool was gray and although gray still is the predominant color, many other colors are now used. Industrial engineers assigned to plant layouts sometimes use colors to make the work environment more enjoyable for employees. They also color code the departments within the plant. For example, machines in one department may be blue and in another gray or green, etc. Paint manufacturers refer to this as color harmonics.

When using color for machine tools, the paints are usually subdued shades of blue, green, or gray. However, OSHA requires that the inside of a guard be painted orange, as is the motor spindle drive sheave. All cranes are painted yellow and fire protection equipment is red.

Safety

When working with solvents and paint thinners, be sure area is well ventilated. Use appropriate safety goggles and a particle mask when using pressurized air to removed debris from surfaces. Use a respirator or mask approved for spray painting to prevent the ingestion of paint and solvent fumes. Always read the safety and operating instructions from the manufacturer before using the product.

Kinds of Paint Used

Many years ago, machine tools were coated with lacquer or enamel-type paints that were susceptible to attack by certain chemicals used in cutting fluids. Most machine tool manufacturers now use the more resistant acrylic, epoxy, and polyurethane coating.

Milacron uses paint with a 35 V.O.C. or less.

Paint Problems

Paint removal is divided into four categories:

- 1) Softening
- 2) Peeling
- 3) Chipping
- 4) Bleaching

Softening

Paint softening is a function of metalworking fluid composition, concentration, contact time, and the type and quality of the paint. Paint softens when the wrong kind of paint is used, either a lacquer or an enamel. The composition of most chemical metalworking fluids will soften and eventually cause removal of lacquer or enamel coatings. Very rich mixtures or evaporated product residues will soften enamels and lacquers.

Peeling

Peeling occurs when paint strips off in layers or sheets. This occurs principally due to improper preparation of the surface before painting or repainting. Peeling usually happens in repainted machine tools. Proper preparation of the surfaced to be painted and a proper sealer is the answer to paint peeling.

Chipping

Chipping is the result of chips or swarf abrading the surface of the coating. This is more noticeable on lathes and turning centers that make long chips. The only answer to this problem is the use of chip breakers ground into the

CIMCOOL[®] Technical Report

Milacron Marketing LLC | Cimcool Fluid Technology | Cincinnati, Ohio 45209

tool or guards on the machines to protect from long abrasive chips. Chipping is not caused by a metalworking fluid reacting with the paint surface. It is strictly a mechanical abrasion.

Bleaching

Paint bleaching in areas where it comes in contact with the metalworking fluid is common to blue and green paints, including the acrylic epoxy and polyurethane coatings. Fortunately, Milacron does not use green or blue pigmented paints unless specified by the customer.

Bleaching of green and blue paints is caused by the water phase of the metalworking fluid because water alone will cause green and blue paints to bleach and fade. The only solution to bleaching is to repaint the machine tool a color that is not affected by water-based metalworking fluids.

Corrective Action

Paint removal problems can usually be solved by repainting the machine tool properly. Since the major cost involved in painting is labor rather than materials, use a polyurethane coating for maximum durability. A suitable polyurethane enamel system would be DuPont[®] IMRON 5000, used over DuPont water-based epoxy primer 2440S, activated with 2407S. Other finishes may be acceptable, but this one in particular meets our specifications. Other than application method, the following procedure would be usually applicable regardless of the type of finish used. Note that proper surface preparation is critical to the durability of the finish, regardless of the type used.

Surface Preparation

Before starting the Surface Preparation phase, be sure to use safety glasses or goggles.

It is necessary to remove both water and oil soluble contaminants from machine surfaces before painting. It would be advisable to clean with CIMCLEAN 30 before painting and necessary to do so on all surfaces to be painted. Stepwise, surface preparation should proceed as follows:

- 1) Disconnect power to machine.
- 2) Remove all guards and accessories from machine.
- 2) Wash all surfaces to be painted with CIMCLEAN 30 mix at a concentration of 1:100 by spray or brush application.
- 3) Rinse CIMCLEAN 30 mix from all surfaces.
- 4) With air, blow off all residual water.

6) Using impermeable gloves, apply a suitable solvent degreaser (per paint supplier's recommendation) by brush or spray to remove any residual oil, grease, and surface soils.

7) With air, blow off solvent from surfaces and recesses such as tapped holes, crevices, etc.

8) Remove any ink or crayon marks with high cut lacquer thinner.

9) Mask all areas not to be painted.

10) Sand all filled surfaces with 80 grit sandpaper to eliminate damaged spots.

11) With air, blow off all sanding dust.

12) Activate four parts of DuPont primer 2440S with one part of DuPont 2407S converter.

13) Check viscosity of mixture using #3 Zahn cup at 76 degrees F. Viscosity should be 15 - 19 seconds.

14) Spray machine and parts in a well ventilated area.

15) Inspect machine and parts for surface imperfections that require additional filling.

16) Using overcoat tack-free Bondo, with cream hardener, fill surface defects with glazing knife or rubber squeegee. Fill extensive surface damage using several applications and allow 30 minutes drying time between applications.

17) Sand all surfaces to be painted with 120 grit paper using orbital and manual sanding.

18) With air, blow off all sanding dust in a well ventilated area.

19) Wipe all surfaces with a cloth dampened with solvent degreaser to remove residual sanding dust.

Sealer Coat

1) Activate DuPont primer as follows:

DuPont primer 2440S 4 parts
DuPont Activator 2407S 1 part

2) Seal machine surfaces using pressure or suction cup spray application.

3) Allow 30 minutes drying time.

4) Scuff sand all sealed surfaces using 280 or 320 grit "no load" paper.

CIMCOOL[®] Technical Report

Milacron Marketing LLC | Cimcool Fluid Technology | Cincinnati, Ohio 45209

Finish Coat

1) Activate DuPont IMRON 5000 as follows:

| | |
|---------------------------|---------|
| IMRON 5000 paint | 3 parts |
| IMRON 5000 activator 193S | 1 part |

2) Apply first coat by pressure or airless area and allow to dry for 60 minutes.

3) Apply second coat and allow to dry for 60 minutes.

Machine Clean-up

Remove all masking materials and use high cut lacquer thinner to remove paint from machined surfaces. This must be conducted in a well ventilated area.

Should the customer want to use a paint of a different brand he should use the same surface preparation, but contact his paint supplier for assistance.

Repainting of Machines- Urethane Painting Procedure

1) Thoroughly clean parts and remove any loose or old paint (scrape and sand) before painting.

2) To insure good adhesion of finishes, prime all surfaces to be painted with DuPont primer sealer 2440S. 2-part primer sealer must be mixed properly.

Mix 4 parts of 2440S to 1 part of 2407S. Do Not Reduce.

IMPORTANT - POT LIFE 4 HOURS. Allow 2440S to dry 45 minutes to 1 hour, depending on the humidity before applying top coat and scuff sand with 280 grit "no load" sandpaper if required.

3) Finish Coat - all finish coats are two (2) component finishes and must be mixed properly.

Mix 3 parts paint to 1 part activator 193S.

Spray using either suction cup or pressure spray equipment.
IMPORTANT - POT LIFE IS 2 to 4 HOURS.

Mix only the amount needed and clean up spray equipment as soon as job is complete. ■