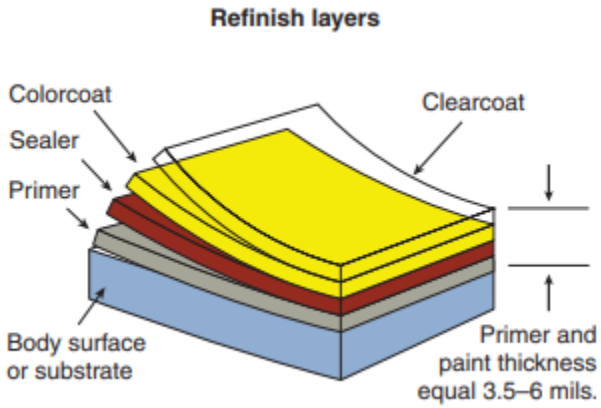
Automotive Body Repair and Paint Work

LEVEL III

Based On October , 2023, Curriculum Version I,



Module Title: Performing Under Coat Application

Module code: EIS BRP3 M07 1023

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Prepared by: Ministry of Labor and Skill

Oct , 2023

Addis Ababa, Ethiopia

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TABLE OF CONTENT

Introduction to the Module

The word “coating” is a generic term and includes “painting”. The terms “coating” and “painting” are used interchangeably throughout literature. In the most general terms, a “coating” is a protection against corrosion, where “painting” may have additional properties, such as color or ultraviolet screening pigments. The other term often used together is “lining.” In general, when describing the coating of internal surfaces of pipes or tanks, the term “lining” is also used, and to identify the coating of external surfaces the terms “coating” or “painting” are always used.

A coating's effectiveness depends on selecting coating material that correctly matches the intended service exposure for the metalwork. Today, selection is based on service exposure, results of performance and evaluation of commercially available products. The organizations that define the standards for specifying coating materials, surface preparation, application, inspection and testing are referenced bellow:

This unit describes the skills and knowledge required to Performing under Coat Application. This unit involves prepare for work, prepare equipment, prepare and apply materials, cleanup work area and maintain equipment.

This module covers the units:

- Vehicle Under Coats
- Prepare and Apply Materials
- Clean Up Work Area And Maintain Equipment

Learning Objective of the Module

- Understand Vehicle under Coats
- Prepare and Apply Materials
- Maintain Work Area & Clean Equipment

Module Instruction

For effective use this modules trainees are expected to follow the following module instruction:

1. Read the information written in each unit
2. Accomplish the Self-checks at the end of each unit
3. Perform Operation Sheets which were provided at the end of units
4. Do the “LAP test” giver at the end of each unit and
5. Read the identified reference book for Examples and exercise

Unit one: Vehicle under Coats

This unit is developed to provide you the necessary information regarding the following content coverage and topics

- Purpose of refinishing and types of paint
- selecting and inspecting Materials for refinishing
- OHS requirements

This unit will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Understand the Purpose of refinishing and types of paint
- Select and inspecting Materials for undercoat
- Apply (OHS) requirements

1.1. Purpose of refinishing and types of paint

1.1.1 Purpose of refinishing

Many customers see and appreciate only the top layers of paint. They judge the quality of the refinisher's work on the finish appearance alone. For some customers, there is little appreciation of all the work done underneath the topcoats. Customers often do not know the skill it takes to do metalwork, filler sanding and shaping, surface prep, and the application of primers, sealers, and other prime-coats. As discussed, the cleaning, filling, and sanding of the substrate are painstaking processes. A perfectly smooth surface must be readied before the topcoat can be applied. Otherwise, any surface imperfection even the smallest will show in the topcoat and could require re painting to fix the surface flaw and resulting paint problem.

1.1.2. Functions of Paint

Automobile finishes or paints perform four extremely important functions:

1) **Paint provides a "skin" to protect the body substrate** (steel, aluminum, and plastics) from the elements. Most motor vehicles are constructed primarily of steel sheet metal. If this steel were left uncovered, the reaction of oxygen and moisture in the air would cause it to rust. Painting serves to prevent rust, therefore protecting the body.
2) **Paint improves the appearance of the body**. The shape of the body is made up of several types of surfaces and lines, such as elevated surfaces, flat planes, curved surfaces, straight and curved lines, and so forth. Therefore, another objective of painting is to improve the body appearance by giving it a three dimensional color effect.
3) **Paint increases the value of the vehicle**. When comparing two vehicles of identical shape and performance capabilities, the one with the most beautiful paint finish will have a higher market value. Hence another object of painting is to increase resale value.
4) **Paint color makes vehicles of the same make and model different or distinguishable**. Painting automobiles also makes them easily distinguishable by application of certain colors or markings. Examples are police car paint schemes, yellow taxicabs, and red fire trucks. If all passenger cars were the same color, as when all Model T Fords were only painted black, cars would be dull and drab.

To achieve a high-tech finish, the typical automotive finishing system consists of several coats of two or more different materials:

- Prime coats are surface preparation coats (self-etch primers, primer-surfacer, sealer, and adhesion promoter) sprayed on the repair area first. These initial prime coats ready the body surface for the topcoats of paint.
- Topcoats, or glamour coats, are coats of color and clear paint sprayed over the prime coats (usually urehane color coat/clear coat paint) to cover the vehicle with a shiny, bright color. Refer to Figure 1.1.

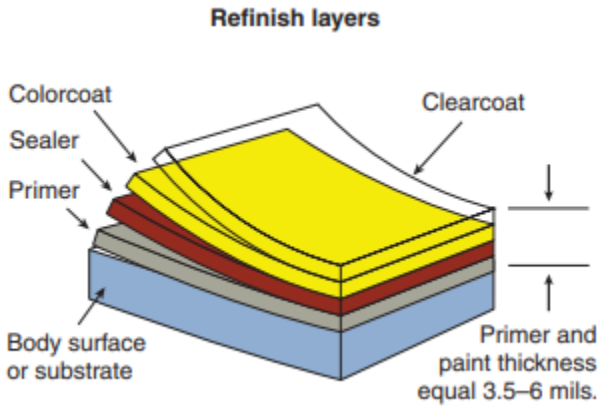

FIGURE 1.1. Note the basic layers of primer and paint used to produce a vehicle finish.

1.2. Selecting and inspecting Materials for undercoat

1.2.1. oil-based paints

Simply put: oil-based paint is just paint with natural or synthetic oil as one of its main components. It dries extremely hard, which makes it very durable and resistant to nicks and dings. It will also hold up against stains.

1.2.2. water-based paints

Water-based paint, as implied, uses water (H2O) to carry the pigment. This type of paint is like latex house paint and dries through evaporation of the water.

Some manufacturers have used water-based paints on new vehicles to help satisfy stricter emission, or air pollution, regulations on factories in some geographic areas. The aftermarket is bringing back the use of water-base materials. These new water-base materials have been refined to help reduce emissions of volatile organic compounds (VOCs) into the atmosphere.

Water-base primers have been used for years as a fix for paint lifting problems. Water-base primers serve as an excellent barrier coat when there are paint incompatibility problems. Water-base primers will not react with existing lacquer or enamel paints. If you ever run into difficulty with old paint or primer that crinkles up or lifts right after spraying, you can apply water-base primer to solve the chemical incompatibility problem. Water-base primers also dry to a hard, rock-like surface.

Water-base primers and paints generally come premixed (ready to spray) and normally they are not reduced. In an emergency, distilled water can be added to make a thinner, more liquid solution.

When using a water-base primer, do not wet sand it. Logically, the water-base material is water soluble. Dry sand it only. Water-base primers and sealers are sometimes used as a barrier coat. They help seal a paint problem, such as lifting when trying to repaint over a featheredged area.

1.2.3. Synthetic paints

Synthetic enamels dry by evaporation and oxidation. Thoroughly dry synthetic enamel is not soluble in ordinary solvents. In today's refinishing field, synthetic enamels are used primarily on commercial vehicles.

1.2.4. Vinyl paints,

At Painters World, we are always looking to offer the very best help & advice to make the decorating process as easy as possible. That is why we have put together this handy guide to vinyl matt paint as we are often asked questions like what is vinyl matt paint, what is the difference between matt and vinyl matt & what are the best vinyl matt emulsions? In this guide, we are going to try and give you a comprehensive guide to vinyl matt, so you know everything you need to know to get the right paint for you!

1.2.5. Undercoats

An undercoat is a coat of paint that is applied before the final layer of paint. It may also be referred to as the primer coat.

An undercoat is a layer of paint that is used to prepare a surface before the topcoat is applied. Many professional painters prefer to use a separate primer that prepares the surface for the paint. They then apply the undercoat, which may have a neutral tone. Once the undercoat has dried, the painter applies the topcoat. The undercoat evens out the surface for a smooth application of the topcoat, and it also gives the topcoat a richer, more vibrant appearance. Undercoats are used on metal and wood substrates. The undercoat provides another layer of protection so that no moisture can reach the substrate, which prevents future problems, such as

rust, mold and rot. The undercoat can also act as a barrier against damage such as dents, knocks and scratches.

1.2.6. Lacquers

Acrylic lacquer dries by evaporation of the volatile material. Since it remains more or less soluble, the new coat of acrylic lacquer will bond or unite with the old. Acrylic lacquer is considered to be a general purpose finish since it can be used as a spot repair for both acrylic lacquer and baked enamel finishes. It also can be used for panel repairs and complete paint jobs. Acrylic lacquers require some compounding or polishing.

1.2.7. Enamels

Acrylic enamel consists of a solvent blend of binder and pigment materials. This also applies to synthetic enamel which, in the past, was used extensively as a refinishing material. Acrylic enamel does not require compounding or polishing. Acrylic enamels dry in two stages: by evaporation of the solvents and by oxidation of the binder (same as synthetic enamel). Oxidation is the change in the binder that results when it combines with oxides of the air.

1.2.8. Paint thinners and paint reducers

Thinners and reducers are solvents used to thin or reduce paints to the correct viscosity for spraying. Thinners are used for lacquer and acrylic products, while reducers are used for synthetic base resins. In general, they are not interchangeable. The best results are obtained with the refinish material when it is thinned with a reducer or thinner designed specifically for the material being sprayed. Some manufacturers provide special thinner for use under conditions of different spraying temperatures.

Self-Check -1

PART ONE: CHOOSE

Choose the correct answer from the given alternative and write the answer on the space provided.

_____1. Which one of the following is painstaking processes?

A. Cleaning B. filling C. sanding D. All

_____2. Which one of the following is not a Functions of Paint?

A. Paint provides a "skin" to protect the body substrate

B. Paint improves the appearance of the body

C. Paint increases the value of the vehicle

D. Noon

_____3. It is just paint with natural or synthetic oil

A. oil-based paint B. Water-based paint C. Water-base primers D. ALL

_____4. Which one of the following is dry by evaporation and oxidation?

A. Water-based paint B. Vinyl paints, C. undercoat D. Synthetic enamels

PART TWO: TRUE /FALSE

Say true if the statement is correct and say false if the statement is incorrect

1. . A perfectly smooth surface must be readied before the topcoat can be applied
2. Any surface imperfection even the smallest will show in the topcoat and could require re painting to fix the surface flaw and resulting paint problem.
3. An undercoat is a coat of paint that is applied before the final layer of paint.
4. Acrylic lacquer dries by evaporation of the volatile material.
5. Thinners and reducers are solvents used to thin or reduce paints to the correct viscosity for spraying

Unit Two: Prepare and Apply Materials

This unit to provide you the necessary information regarding the following content coverage and topics:

- .preparation and application of materials

This guide will also assist you to attain the learning outcomes stated in the cover page.

Specifically, upon completion of this learning guide, you will be able to:

- Apply and prepare materials

2.1. Preparation and application of materials

A spray gun breaks the liquid sealer, primer, paint, and so on into a fine mist and forces it onto the surfaces of the vehicle. It is the key component in a refinishing system. A quality spray gun is a precision-engineered and -manufactured tool.

There are many spray gun types and sizes. Each is specifically designed to perform certain tasks. Even though all spray guns have common parts and components, each gun type or size is suited only for a defined range of jobs.

Many professional painters have two or three spray guns. Each is set up and used with a specific type of refinish material or for a specific task. One might have a tip or cap size used for only primers and sealers. Another might be set up and used for misting on color coats. A third spray gun might be adjusted for the wet application of clear coats. Having more than one spray gun allows you to preset each gun for the type of material needed for typical repairs.

Ideally, you would have separate spray guns for each type of material to be sprayed. Each would be cleaned, adjusted, and ready to use for:

- Applying primer surfacers
- Applying primer sealers
- Applying basecoats
- Applying clear coats

By having a gun adjusted for each material, you will save time. Also, your paint work will be of better quality because you will know how each gun setting applies its own material.

2.1.1. Spray Gun Techniques

Spray Gun Atomization

A thorough understanding of atomization is the key to using a spray gun correctly. Atomization breaks the liquid material into a fine mist spray of tiny, uniform droplets (Figure 2.1.). When properly applied to the vehicle's surface, these droplets flow together to create an even film thickness with a mirror-like gloss

Proper atomization is essential when working with today's basecoat/clear coat finishes because the basecoat is so thin. Basecoat/clear coat finishes will also not achieve proper hiding and coverage if they are not correctly atomized. Also, clear coats will show any surface roughness more easily if not sufficiently atomized. Atomization takes place in three basic stages (Figure 2.2):

FIGURE 2.1. A spray gun is designed to atomize liquid material into a fine mist

In the first stage, the paint siphoned from the fluid tip is immediately surrounded by air streaming from the annular ring. This turbulence begins breaking up the paint.

The second stage of atomization occurs when the paint stream is hit with jets of air from the containment holes. These air jets keep the paint stream from getting out of control and aid in paint breakup.

In the third phase of atomization, the paint is struck by jets of air from the air cap horns. These airstreams hit the paint from opposite sides, causing the paint to form into a fan-shaped spray.

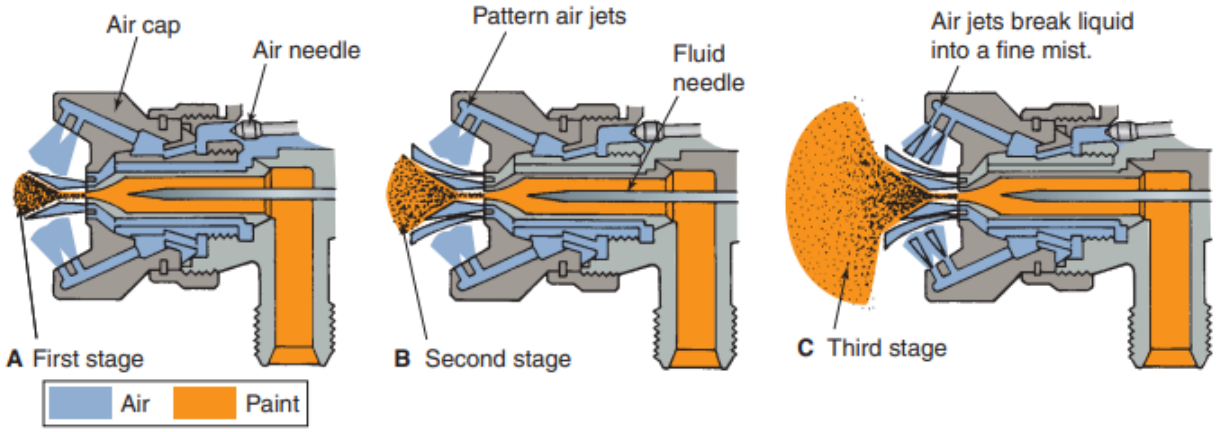

FIGURE 2.2. Study the three stages of spray gun liquid atomization.

(A) With the trigger pulled all the way back, air and paint are sprayed out of the nozzle.

(B) Air jets mix with liquid paint to continue atomization.

(C) A fan of atomized paint flows out from the nozzle in tiny droplets.

SPRAY GUN PARTS

The external parts of a typical air spray gun are illustrated in Figure 24–4.

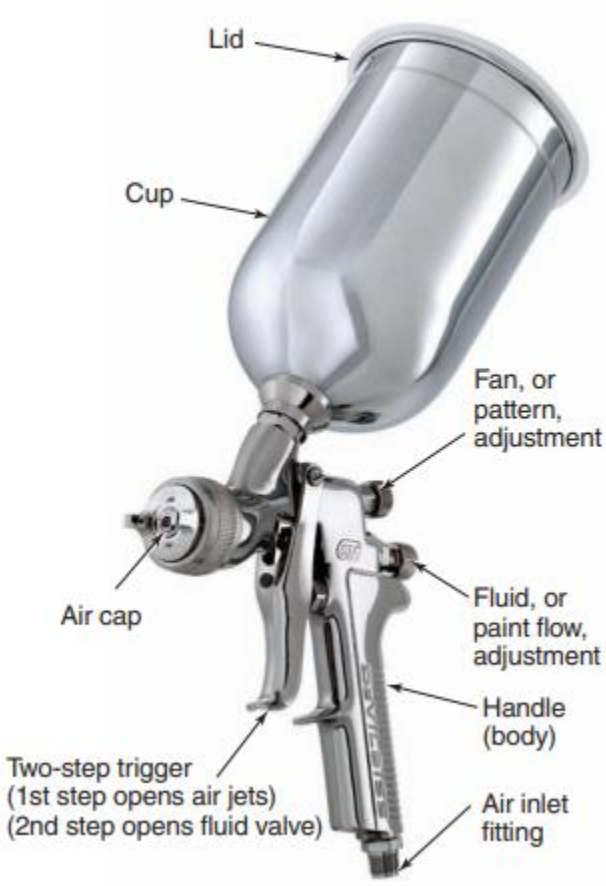

FIGURE 2.3. This is the most common type of spray gun

This is a gravity-fed spray gun, which is the most common type found in today's body shops. The major parts of a typical spray gun are shown in Figure 24–5. The air cap directs compressed air into the material stream to atomize it and form the spray pattern (Figure 24–6A). The air cap threads onto the front of the spray gun body and holds the fluid tip in place.

There are three types of orifices (holes) in an air cap: the center orifice, the side orifices or ports, and the auxiliary orifices. Each of these holes has a different function.

1) The center orifice located at the nozzle tip creates a vacuum for the discharge of the paint.
2) The side orifices in the air cap horn determine the spray pattern by means of air pressure.
3) The auxiliary orifices promote atomization of the paint.

Figure 24–6B illustrates the relationship between the auxiliary orifices and the gun's performance.

Large orifices increase the gun's ability to atomize more material for painting large objects with great speed. Fewer or smaller orifices usually require less air, produce smaller spray patterns, and deliver less material to conveniently paint smaller objects or apply coatings at lower speeds.

The pattern control valve controls airflow through the side orifice to control the shape of the paint mist. Air also flows through the two side orifices in the horns of the air cap. This air flow forms the shape of the spray pattern. When the pattern control valve is closed, the spray pattern is round. As the valve is opened, the spray becomes more oblong in shape.

The fluid needle valve and fluid tip work together to meter the amount of material leaving the gun and entering the airstream.

The fluid tip forms an internal seat for the fluid needle to shut off or allow the flow of material. The needle tip contacts the fluid tip, and it can be pulled open by trigger action to allow the material to spray out of the gun.

The spray gun fluid needle extends from the fluid tip to the trigger mechanism to control material flow. The amount of refinishing material that leaves the gun depends on the needle valve adjustment.

Fluid tips and air nozzles are available in a variety of sizes to accommodate materials of various types and viscosity. Each passes the required volume of material to the cap for different speeds of application. See Figure 24–7.

It will probably emphasize the following ideas.

- Spray at the lowest possible air pressure.
- Maintain a consistent distance.
- Keep the gun perpendicular to the work.
- Overlap each pass by 50 percent.
- Trigger the gun at the end of each pass.
- Maintain the gun properly.

2.1.2. Drying Techniques

There are various drying methods used in the automotive industry, including air-drying, force-drying, and infrared drying.

Air-Drying

Air-drying is the most common and traditional method of drying automotive paint. It involves allowing the paint to dry naturally through exposure to air. Air-drying is a slower process, and it can take up to several days to complete.

Force-Drying

Force-drying involves the use of specialized equipment to force dry the paint. This method is faster than air-drying and requires the use of a drying booth, where heated air is circulated around the painted surface.

Infrared Drying

Infrared drying is a newer method that uses infrared radiation to dry the paint. This method is faster than force-drying and can dry the paint in minutes.

2.1.3. Paint Mixing

Automotive paint can be broken down into four basic categories: *acrylic lacquer, acrylic enamel, urethane, and acrylic urethane.* Each type requires a slightly different recipe and mixing method, so here's a breakdown of all four methods.

Mixing Acrylic Lacquer (Ratio 1:1 Paint/Thinner)

- Inspect the pre-marked mixing container for dust and debris. Wipe it out, if necessary.
- Find the 1:1 ratio markers on the container; pour in the paint.
- Using a stirrer, mix the paint to blend the pigments fully.
- Using the 1:1 ratio markers as a guide, pour in the thinner.
- Mix the paint and thinner together for minutes, until the consistency is uniform.

Mixing Acrylic Enamel

- Acrylic enamels are separated into two categories: single-stage, which dries to a glossy finish, and two-stage, which includes a base layer of pigmented paint and a separate clear coat. The clear coat adds a glossy finish and extra protection.

Acrylic Enamel Single Stage (Ratio 8:1:1 Paint/Thinner/Hardener)

- Inspect the pre-marked mixing container for any dust and debris. Wipe it out, if necessary.
- Read the paint's instructions on when to add each ingredient since some require the hardener to be added at a specific time.
- After you find the 8:1:1 ratio markers, pour in the paint.
- Using a stirrer, mix the paint to blend the pigments fully.
- Using the 8:1:1 ratio markers, pour in the thinner.
- Mix the paint and thinner.
- At the indicated time, add the hardener, filling the container to the right 8:1:1 level.
- Stir the mixture together until its consistency is uniform.

Acrylic Enamel Two Stage (Base Coat Ratio 1:1 Paint/Thinner, Clear Coat Ratio 4:1 Paint/Hardener)

- Base Coat
- Inspect the pre-marked mixing container for any dust and debris.
- After you find the 1:1 ratio markers, pour in the paint.
- Using a stirrer, mix the paint to blend the pigments fully.
- Using the 1:1 ratio markers, pour in the thinner.
- Mix the paint and thinner.

Clear Coat

- In a second pre-marked container, inspect for any dust and debris.
- After you find the 4:1 ratio markers, pour in the clear coat.
- Stir the clear coat to make sure consistency is correct.
- Using the 4:1 ratio markers, add the hardener at the indicated time.
- Stir it until the hardener is blended evenly.

Urethane

Urethane is tricky to mix and apply, as ambient temperatures will determine which type of urethane activator is needed (fast, medium, or slow). Other factors that affect urethane application are humidity, airflow, and desired paint thickness, which may require you to use paint thinner, making this a job for someone with advanced knowledge of mixing paint.

Mixing Urethane Multi-Stage (Base Coat Ratio 4:1 Paint/Activator, Clear Coat Ratio 4:1 Paint/Hardener)

Base Coat

- Inspect the pre-marked mixing container for any dust and debris.
- Find the 4:1 ratio marker and pour in the paint.
- Using a stirrer, mix the paint to blend the pigments fully.
- Using the 4:1 ratio marker, pour in the correct activator (fast: below 70 degrees; medium: 70 to 80 degrees; and slow: above 80 degrees).

- Stir the paint and activator to combine.
- Repeat the process, allowing for drying times, if further base coats are required.

Clear Coat

- In a second pre-marked container, inspect for any dust and debris.
- After you find the 4:1 ratio markers, pour in the clear coat.
- Stir the clear coat to make sure consistency is correct.
- Using the 4:1 ratio markers, add the hardener at the indicated time.
- Stir until consistent throughout.

Acrylic Urethane

Like urethane, ambient temperatures will affect what type of urethane activator needs to be used (fast, medium, or slow), and humidity, airflow, and total wanted paint thickness can require additional steps and considerations. This isn't recommended for weekend warriors.

Mixing Acrylic Urethane (Base Coat Ratio 4:1 Paint/Activator, Clear Coat Ratio 4:1 Paint/Hardener)

Base Coat

- Inspect the pre-marked mixing container for any dust and debris.
- Find the 4:1 ratio marker and pour in the paint.
- Using a stirrer, mix the paint to blend the pigments fully.
- Using the 4:1 ratio marker, pour in the correct activator (fast: below 70 degrees; medium: 80 to 70 degrees; and slow: above 80 degrees).
- Stir the paint and activator to combine.
- Repeat the process if further base coats are required, allowing for drying times.

Clear Coat

- In a second pre-marked container, inspect for any dust and debris.
- After you find the 4:1 ratio markers, pour in the clear coat.
- Stir the clear coat to make sure consistency is correct.

- Using the 4:1 ratio markers, add the hardener at the indicated time.
- Stir until both liquids have mixed thoroughly

2.1.5. Paint Straining

Every time you fill your spray gun, you should use a paint strainer over the cup. The paint strainer is a paper funnel brushed, rolled, or sprayed. With a fine mesh opening in the bottom that traps debris and keeps it out of the spray gun. It is a major mistake to pour any paint material into your spray gun without straining out debris. Place the paint strainer in the spray gun cup or use a strainer holding tool, as shown in *Figure 2.4.*

FIGURE 2.4. Always filter or strain anything you pour into your spray gun cup

A paint strainer or funnel holding tool is desirable because it helps keep paint from dripping onto the sides of the spray gun cup.

2.1.7. Paint Matching

Color matching is often the first step that a body shop undertakes when dealing with the repair of a vehicle due to the lengthy nature of the process. A car will have a base color that's listed on its initial spec sheet, but that paint will fade over time as the result of environmental influences, which means that simply selecting the same base color will likely not generate a perfect match.2 When that's the case, auto shops repairing a paint job have one of three options:

- **Accept a slight mismatch**: If the area to be fixed is not particularly noticeable, a customer may be willing to tolerate a small mismatch in paint color. Accepting the mismatch is the least desirable option to the customer, however, as the repairs will be apparent.
- **Repaint the entire vehicle**: In cases where a mismatch would be very noticeable, the body shop may instead choose to repaint the whole vehicle. The issue here is that repainting the whole vehicle is expensive and customers—or, more likely, insurance companies—may not be willing to pay this cost.
- **Create a custom color**: Creating a custom color to perfectly match the paint can be a challenge but tends to be the most cost-effective and aesthetically pleasing option for repair. However, this step can also be time-consuming, requiring extensive trial and error to ensure a precise result if relying solely on visual color assessment.

2.1.8. Buffing and Polishing

Buffing and polishing are two common finishing processes used in the manufacturing industry. They both involve smoothing the surface of a workpiece to improve its aesthetics as well as its physical properties. Unbeknownst to many people, however, buffing and polishing aren't the same. Each finishing process has its own unique characteristics. So, what's the difference between buffing and polishing exactly?

What Is Buffing?

Buffing is defined as a finishing process that involves the use of a loose abrasive on a wheel. To polish a workpiece, a manufacturing company may use a wheel that's covered with an abrasive disc. The loose abrasive on the disc essentially removes superficial material and imperfections, thereby creating a smoother surface.

What is Polishing?

Polishing, on the other hand, is a finishing process that involves the use of an abrasive that's secured — typically with glue or other adhesives — to the wheel. As a result, polishing is

considered a more aggressive finishing process when compared to buffing. It's able to remove more superficial material from the surface of a workpiece, allowing for a brighter and more polished finish.

Buffing and Polishing Abrasives

Both buffing and polishing require the use of an abrasive. There are low-grit, medium-grit and high-grit abrasives. Low-grit abrasives may consist of just 60 to 80, whereas medium-grit abrasives may range from 100 to 200. The grit of an abrasive reflects its smoothness. Low-grit abrasives are particularly rough because they contain fewer grit particles than medium- and high-grit abrasives. Therefore, buffing and polishing processes often begin with the use of a low-grit abrasive, after which higher-grit abrasives are used.

It's important for manufacturing companies to use the right type of abrasive when performing buffing and polishing. If the wrong abrasive is used — an abrasive with either too little or too much grit — the workpiece could sustain damage.

The Differences between Buffing and Polishing

The primary difference between buffing and polishing is that the former involves the use of a loose abrasive on the wheel, whereas the latter involves the use of an abrasive that's secured to the wheel. In other words, the grit-based abrasive used in polishing isn't glued onto the wheel. It's loosely attached, allowing for quick and easy removal and replacement.

Aside from this subtle nuance, another difference between buffing and polishing lies in the grit of the abrasive. Although there are exceptions, buffing is typically performed with a low- or medium-grit abrasive, whereas polishing is performed with a high-grit abrasive.

Self-Check -2

PART ONE: CHOOSE

Choose the correct answer from the given alternative and write the answer on the space provided.

_____1. It is a finishing process that involves the use of an abrasive that's secured — typically with glue or other adhesives — to the wheel.

A. Buffing B. filling C. Polishing D. repainting

_____**2.** It is a finishing process that involves the use of a loose abrasive on a wheel.

A. Buffing B. filling C. Polishing D. repainting

PART TWO: SHORT ANSWER

Write the short answer on the space provided

Write the four basic categories of automotive paint

_____
_____
_____
_____

2. Write the drying methods used in the automotive industry

_____
_____
_____
_____

3. Write the three types of orifices (holes) in an air cap

_____
_____
_____
_____

Unit Three: Clean Up Work Area And Maintain Equipment

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Remove waste and scrap
- Tag Unserviceable equipment

This guide will also assist you to attain the learning outcomes stated in the cover page.

Specifically, upon completion of this learning guide, you will be able to:

- Removing waste and scrap
- Tagging Unserviceable equipment

3.1. Removing waste and scrap

THE 5 STEPS OF THE SCRAP METAL RECYCLING PROCESS

If you're newer to scrap metal recycling, you may be wondering what goes into the process. It can be broken down into five steps: collection, separation & preparation, melting & purification, solidifying & manufacturing. Read on to learn more about each step.

1: Collection

The first step in scrap metal recycling is collecting items that contain metals. These can be found almost anywhere, including construction sites, industrial facilities, warehouses, landfills, and even at home!

2: Separation & Preparation

The items are then sorted at a metal recycling facility by type of material and packaged for transportation. This is typically done by shredding, shearing, and compacting.

3: Melting & Purification

After separation, the scrap metal is melted down and purified by steel mills. This is done in order to remove any impurities from the scrap.

4: Solidification

The metal is cooled and formed into different shapes for future use.

5: Manufacturing

The new metal is now ready for order. It can be taken to manufacturers, where it is made into new products.

Large businesses with in-house programs and scrap yards often employ 3rd party technical services to get their towering pile of waste in order. They either send their scrap metal to the service provider or get a technician to their site to conduct PMI tests. These tests use tailored identification methods to sort different types of scrap fast.

3.2. Tagging Unserviceable equipment

A yellow and black notification tag informing that the equipment item shall not be used until cleared for safe operation by a Competent Person.

Figure 3.1.taggging picture

Self-Check -3

PART ONE: **SHORT ANSWER**

Write the short answer on the space provided

1. Write the five steps of the scrap metal recycling process

_____

_____

_____

_____

_____

_____

_____

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