

**Automotive Body Repair and Paint Work
Level II
Based on March, 2022, Curriculum Version I,**



Module Title: Removing Old Paint from Vehicle Body

Module Code: EIS BRP2 M09 0322

Nominal duration: 50 hours

Prepared By: Ministry of Labor and Skill

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ACKNOWLEDGEMENT

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Introduction to the module

Removing Paint also referred to as paint strippers and its purpose is to remove layers of paint, or coatings from a surface whilst also cleaning the underlying surface. Using paint remover is often quicker than sanding a surface down, it enables you to get into awkward areas and doesn't create dust. It can be used for personal and trade use and is now used a lot for upcycling furniture although be aware that a lot of paint removers contain a lot of harmful chemicals and toxins.

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This module describes the skills and knowledge required to remove paint from vehicle painted surfaces using a variety of industry-approved methods and without causing damage to vehicle and components. This unit involves preparing for the task, selecting and using specialist tools, equipment and chemicals to remove paint from metal and plastic component surfaces in preparation for repairs or refinishing, and completing workplace processes and documentation.

This module covers the units:

- Prepare to remove paint from vehicle surface
- Remove paint
- Complete work processes

Learning Objective of the Module

- remove paint from vehicle surface
- Remove paint
- Complete work processes

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

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Unit One: Prepare To Remove Paint from Vehicle Surface

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

- Identifying job requirements
- Paint removal methods
- Identifying tools, equipment and chemicals

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:

- Identify job requirements
- Apply Paint removal methods
- Select tools, equipment and chemicals

1.1. Identify job requirement

Set up a work space

- Secure a location with plenty of ventilation and protection from direct sunlight, wind, and weather. The project will likely take a day or two, so you want to be sure that you're not inhaling too much paint.
- Lay plastic sheeting down on the floor or ground where you will be working. The materials you will be using are hazardous. You will want to be able to easily clean everything up and dispose of it responsibly. Plus, it will make it easier to clean up any mess.

Materials Needed

- Dual-action sander
- Dust mask
- Heavy-duty masking tape
- Sandpaper (80-grit)
- Thick plastic sheeting
- Tools to remove car parts
- Remove the parts you are going to strip from the car and lay them out on the plastic sheeting. If you are removing paint from the whole car, or most of the car, remove the parts that you don't want to get paint stripper on or carefully tape them off with masking tape.

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- Remove the parts you are going to strip from the car and lay them out on the plastic sheeting. If you are removing paint from the whole car, or most of the car, remove the parts that you don't want to get paint stripper on or carefully tape them off with masking tape.

1.2. Apply paint removal method

OPERATION SHEET-1. Paint Removal Method

Operation Title: Procedure for Removing Paint from your Vehicle

Instruction: Do not! Try to remove paint by scrubbing the vehicle's finish with a solvent or Scouring cleanser as doing so will cause damage to the finish.

Purpose: the purpose of this Operation Sheet is applying the paint removal method

Required tools and equipment:

Mechanical tools, such as

- a paint scraper
- wire brush, or painter's tool, usually work in tandem with chemical paint strippers,
- all-natural paint strippers,
- a heat gun,
- Sander, or vinegar.

Precautions:

Removing old paint can be a tough task since paint is designed to stick to the surface. So if you want to ease up the process, know the correct methods for paint removal and use specialized tools for the job.

- Don't sand or scrape old lead-based paint. ...
- Use ladders properly. ...
- Take advantage of protective gear. ...
- Don't breathe chemicals. ...
- Beware of chemicals and poisons. ...
- Avoid fire hazards. ...
- Avoid falls.

Procedure

5 Ways to Get Paint off A Car

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1. Water and Soap Remedy
2. Make Use Of Lacquer Thinner
3. Use Nail Polish Remover Option
4. Use Gasoline
5. Use a Rubbing Compound

1. Water and Soap Remedy

The first DIY hack that you should consider is using soap and water to remove paint splatter from the car. That depends on how fresh the paint it is.

The soap and water remedy works well if it is freshly sprayed paint, and it hasn't dried.

However, depending on the weather, too, this can become worse. The paint will dry faster in sunny weather and a little slower in wet weather.

You should first run your fingers over the paint. If it comes off easily, then soap and water can work to get the paint off your car. Here are the steps below on how to get paint off a car with soap and water.

Step 1: Make a Mixture of Soap and Water

Get a clean bucket, pour warm water, and use the soap to work up a rich lather. Get a clean rag, preferably a soft, cotton material. Using a dirty cloth may make the issue harder to solve. Also, there could be dirt residues that can be abrasive and scratch your car while you are trying to get the paint off your vehicle.

Step 2: Softly Scrub

You shouldn't apply force as it won't get the paint off a car. It would be best if you start slowly and gently from the edges.

Remove it gently until it comes off totally. Don't be in a hurry to clean it off as it could make it smudgy, which can cause it to take longer to come off.

Step 3: Rinse the Rag Often

Rinse the Rag, clean a little, rinse again, and clean. That makes it easier to work with. If the paint came off with ease, it might have been another car's paint that touched yours, or it may just be freshly sprayed.

Step 4: Dry

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When all the paint is gone. Gently clean it for the last time, drying it off in the process. Check for scratches or rough-looking lines that would need repairs.

2. Make Use of Lacquer Thinner



Figure1. 1 lacquer thinner

You may discover that the paint is already too dry. That may mean that nail polish remover won't be effective.

You would need to get something stronger. A lacquer thinner is a solvent used to clean resins on wood, and it can also be used in the process on how to get paint off a car. Here are the easy steps to remove it from your car with this method.

Step 1: Get the Lacquer Thinner and A Clean

Apply a little thinner to the clean clothing, but remember to keep clean, warm water handy. Clean it in small portions. After a while, you will notice the car paint will start coming off. Use the warm water to wash it off immediately, so it doesn't erode your car paint.

When using this method, you should start with a small amount of thinner. You can increase in quantity if a minute portion is not sufficient to get the paint off a car. It is easier to manage the effects of a smaller part than that bigger one.

Step 2: Wash Of the Residue of the Lacquer Thinner Solvent

After cleaning, thoroughly wash off any remaining thinner on the body of the vehicle. Any residues can spoil your original car paint. You may then have to spend money repainting the whole car.

3. Use Nail Polish Remover Option

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If the soap and water option fails, the nail polish remover can be your savior. Get a non-acetone based nail polish remover. Acetone can scratch or make your car body rough. The things needed are nail polish remover and a clean, soft rag.

To get the paint off the car with this method, follow this guide.

- Fold a small piece of the Rag, dab it with nail polish remover and clean the area that is affected by the paint.
- Clean a little at a Time. Then fold another side of the Rag, dab it with nail polish remover, and continue cleaning. Do this till you remove all the paint scuff from a car.
- Wash off the cleaned part with water to prevent the nail polish remover from spoiling your car body paint. If in the process of cleaning the paint, you discover that your car's main paint is coming off, stop cleaning. Instead, wash off the affected part with water.

4. Use Gasoline



Figure1. 2 gasoline

Gasoline is another common DIY remedy to get paint off a car. This chemical is inexpensive and easy to get. It works almost like the nail polish remover. To remove splattered paint from your vehicle, follow this process below.

- Just dab a small side of clothing, use it to scrub the affected part gently.
- Don't exert energy on it as your car's original paint can come off with it, or it can become rough and dented.
- Keep water handy and wash it off, once you notice that the paint is coming off. When you finish cleaning, wash off the cleaned part with water and dry to prevent it from eating into your car paint.

5. Use a Rubbing Compound

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Figure1. 3 rubbing compound

The first tip to working with a rubbing compound is patience.

Apply the rubbing compound on a piece of cloth and gently scrub the affected part in circular motions. You have to be careful and do it slowly to avoid massive damage to the car's original paint.

Do not be in a hurry to get it done. You could spoil more than you intend to. Try a little portion at a time, but don't try to do all the affected areas at the same time.

When you are done getting the paint off the car, wax the car to restore its shine and protect it from further damages.

Removing old paint can be a tough task since paint is designed to stick to the surface. So if you want to ease up the process, know the correct methods for paint removal and use specialized tools for the job.

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1.3. Select tools, equipment and chemicals

1.3.1 Abrasives

Abrasive blasting with a blast abrasive such as garnet, is an effective way to remove paint from a variety of surfaces though it can be messy and potentially hazardous if done improperly.

Abrasive Blasting with Garnet for Paint Removal

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Sand blasting makes use of an air compressor to propel blast abrasive grains through a nozzle at high velocity onto your chosen project surface. It has many applications, with the removal of paint being one of the most common.

Sandblasting is a relatively simple DIY project that can be completed either at home or with help from a professional sandblaster.

Sandblasting equipment can be purchased or rented at home improvement centers or equipment rental companies in most cities. However, it is also messy and potentially dangerous to do yourself, so you may want to consider hiring a professional sandblasting service rather than attempting to do it yourself if you have little to no experience. These newer abrasives can complete jobs more efficiently, using less material, and can be safer than garnet and other, less sophisticated, blast abrasives. If you are undertaking the project as part of your professional work, in addition to using the right protective equipment, consider using the latest technology. You should use advanced superoxalloy abrasives, such as those from 10X Engineered Materials. They can complete jobs more efficiently, using less material, and can be safer than garnet and other less sophisticated blast abrasives.

What Blast Abrasive to Use

Abrasive blasting can be used to remove paint from brick, metal and concrete surfaces. These materials generally fall into the category of objects that will hold up to the intense abrading that is caused by abrasive blasting. But there are some important considerations when choosing an abrasive blast media. We'll talk about some major downsides of garnet later in this article. Garnet can be used to remove paint from wood but it can very well cause pitting and scarring on the surface of the wood.

Abrasive blasting and safety

Abrasive blasting with garnet or other blast abrasives is a process that can be extremely messy. A plume of dust can emanate from the work area and coat everything around. It can be done indoors as part of renovation work, but it will create a big clean up job, so it's usually restricted to work that is on the exterior where everything can be washed down with a hose or a pressure washer. The fine dust comprised of used abrasive and little bits of paint

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created by garnet blasting is very hazardous to breathe, making a respirator a safety device that is essential. You’ll want tight goggles that fit your face.

Blast abrasive alternatives to remove paint

If you are looking for a low dust abrasive that will leave your surface smooth and free of embedded particles after the first coat of paint, then the EpiX and KinetiX line of superoxalloy blast abrasives from 10X Engineered Materials is a solid choice for you. It’s a superoxalloy that is engineered with amorphous, non-crystalline particles that resist breakage and can be reused many times.

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Currently, KinetiX and EpiX are available from abrasive distributors around the US. If you don’t see a distributor near you, contact 10X and we will work with you to get you what you need. EpiX abrasive, which is best for precision applications such as powder coating and medical applications, is also available to purchase directly from the 10X Engineered Materials website.

1.3.2 Grinders

The versatile angle grinder can replace numerous tools and make labor intensive jobs quicker and easier. Also, you can use Rapid Strip wheels with a straight grinder for removing coatings, such as paint, on metal, as well as wood and plastics.



Figure 1.4 grinder

1.3.3 Scrapers

a tool or device used for scraping, especially for removing dirt, paint, or other unwanted matter from a surface.

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Figure 1.4 scraper

LAP Test 1	Practical Demonstration
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Name: _____

Date: _____

Time started: _____

Time finished: _____

Instruction I: Given necessary templates, tools and materials you are required to perform the following tasks within 10 hours.

Task 1. Select the tools and equipment to remove the paint from the vehicle

Task 2. Write the steps to remove the paint from the vehicle

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Unit Two: Remove Paint

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

- Preparing vehicle metal and plastic components
- Removing vehicle paint

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:

- Prepare vehicle metal and plastic components
- Remove vehicle paint

2.1. Prepare vehicle metal and plastic components

Plastic components

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Plastics are quite common in the automotive industry, first starting in the 1960s. Since then, the field has expanded and includes the use of technology advanced plastics and composites, such as:

- Polypropylene
- Polyurethane
- Polyvinyl Chloride
- Polycarbonate

Therefore, it helps manufacturers build high-performance parts through cheaper costs and lighter materials. Some of the ways that manufacturing companies mold and use plastic are:

- Injection molding
- Thermoforming
- Gas assist

Under these categories, you can use vacuum forming, two-shot injection molding, and much more. For example, thermoforming uses heat that helps shape and mold customizable plastic pieces.

Automotive Plastic Parts vs. Metal

Automotive metal parts are what you would typically think of when you picture a new car, such as:

- Aluminum
- Carbon steel
- Cast iron
- Stainless steel
- Titanium
- Tungsten Carbide

Metal is a raw material that many vehicle manufacturers use for engines and transmissions. Meanwhile, steel is primarily the most common raw metal material in the auto industry. Above all, experts have suggested that it takes around 900 kilograms of steel per vehicle.

Steel helps create the car’s body shape, mufflers, exhaust pipes, and more. While metal is largely thought of as an exterior material component, some are used for wiring and AC

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systems. Although metal has its uses in the auto industry, plastic is fast becoming the automotive parts solution. Therefore, with some of these benefits:

- Better customization
- Non-permeable
- Recyclable
- Longevity

One of the limitations of using plastic in many industries over metal is its lack of strength. However, advances in technology have evened the playing field. Most plastic production today has equal strength-to-weight ratios and stiffness.

2.2. Remove vehicle paint

Safety for Remove vehicle paint

1. “Pistonz” Corded Earplug ;- Corded, push-to-fit earplugs are stylish hearing protection that feature soft foam tips with a silver metallic look and a convenient thumb-grip stem. No-roll foam makes insertion easy; simply push the earplug into the ear canal and twist to adjust the fit.



Figure 2.1.-earplug

2. “PELTOR” Behind-the-Head Earmuffs; - Features low-profile ear cups that fit well with most helmets, eyewear and other safety equipment. Ultra light with soft, comfortable cushions.

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Figure 2.2 “PELTOR” Behind-the-Head Earmuffs

3. Particulate Welding Respirator; -Designed to help provide comfortable, reliable protection for applications such as welding, soldering, cutting, grinding and sanding.



Figure 2.3 Particulate Welding Respirator

4. “Half Face piece Respirator Pack out” Particulate Filters: - Designed for the technician who is working in applications where a respirator is required to help protect against potential exposure to grinding dust and welding fumes. The replaceable filter contains a layer of activated charcoal affording a nuisance level of relief from organic vapors in applications such as undercoating and welding fume when the potential of ozone exposure exists. Low maintenance respirator design allows the filters to be replaced and the face piece to be maintained and reused.



Figure 2.4 “Half Face piece Respirator Pack out” Particulate Filters

5. Headgear/Face shield: -A combination headgear and face shield safety system. Includes ratchet headgear and polycarbonate face shield. Adjustable ratchet

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suspension. Molded face shield provides impact protection from small particles. Requires protective eyewear, sold separately.



Figure 2.5 Headgear/Face shield

6. Protective Eyewear: -Lightweight, unisex protective eyewear combines versatility and value with high wraparound coverage, polycarbonate construction and a hard coat, scratch-resistant lens for a comfortable, contoured fit. Meets the requirements of for limited impact.



Figure 2.6. Protective Eyewear

Health precautions

You are likely to get a localized rash up your arms and hands if you handle the mat with no precautions. If you are allergic, do not continue. Get someone else to do the job as the allergy can cause severe swelling, rashes and can be extremely painful. Cover up your arms when cutting or handling mat and use washing-up gloves of necessary.

If, like me, you cannot stand gloves then always use a barrier cream which is available from Boots, most chemists, resin shops, etc. Resins normally give people no problems, apart from the smell which may upset you. Always give yourself good ventilation when doing a job since the heavy vapor given off (styrene) can cause headaches and even unconsciousness if you are exposed to it for too long. If you ever feel drowsiness coming on get out immediately into the fresh air.

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Figure 2.7. Health precautions

The warning signs for resins are an itchy nose and running eyes. When you reach this stage stop and recover. When grinding, cutting or sawing a laminate you must always wear a mask and goggles and always grind outside, never in a garage etc., as very fine pure glass particles are thrown everywhere and once they are inhaled the body doesn't get rid of them. Silicosis can result (and this is similar to asbestosis). For the one-off job a simple face mask is enough provided you keep your mouth shut, because your nose is an extremely good filter. When doing long periods of grinding in an enclosed area then a full face mask must be used.

If any **hardener** gets on your skin wash it off immediately as it will bleach your skin and, if it is in your eyes, wash them for at least 10 minutes. If resins are on your skin, wipe them off immediately with a cloth dampened with acetone (you're not supposed to do this because prolonged contact with acetone may give rise to dermatitis, since it bleaches out the natural skin oils), then wash in warm soapy water and finally rub a skin cream over the affected part (Nivea is very good). If any is swallowed, drink quantities of water and induce vomiting — seek medical aid immediately.

If any **hardener spills** on the ground or clothing, wash it away with plenty of water. With resins cover with earth or sand and, when soaked in, dispose of safely; wipe the residue off the ground with acetone.

Safety during work

Fire is a major hazard. All resins, hardeners, and acetone are extremely inflammable. All have low flash points, i.e. temperatures at which they may ignite; resin is 25-30 deg. C. So do not use naked lights and do not smoke while doing a job or even when you've finished because the styrene vapor given off during curing is highly volatile. Once cured, though, it takes a lot of heat to make GRP burn.

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Fire can also be started by throwing away your unused liquid resin in the dustbin because the heat of reaction when it is setting is enough to set alight any paper. Always place the tin in a safe place and wait until it has ‘gone off and is stone cold before you dispose of it. If a fire starts, a CO2 or dry powder extinguisher will cover all possibilities. Always keep an extinguisher handy. Water will not work on resins. All resins that you buy are known as pre-accelerated resins and all you do is add hardener. However, without trying to confuse the issue, un-accelerated resins are available for operatives to add their own accelerator (cobalt naphthalene) to give predetermined set times. If anyone offers you un-accelerated resin do not use it. Buy the correct accelerated type. Accelerator is always added first to the resin, then the hardener. Never mix accelerator and hardener together because they form an explosive mixture.

Un-accelerated resins are usually not available over the counter and, unless specifically asked for, all resins sold are already pre-accelerated so don’t worry. Working with GRP is common sense. Treat all chemicals with the respect they deserve and, if you’re allergic, STOP.

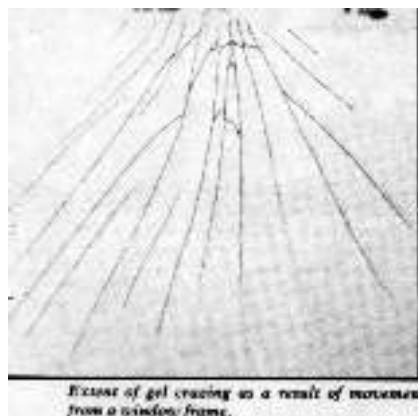


Figure 2.8. GRP paintwork

Every GRP car on the road today has a gel crack on it or at least a blemish in the GRP paintwork. Even the best prepared car at a concours event, or a brand new car even, will have a mark somewhere if you look close enough! Gel cracks are really GRP’s answer to metal rust and, like rust, most of them should never appear. So, apart from the obvious accident damage (about which more later) how do gel cracks appear, and why, and what can be done to prevent them from happening in the first place?

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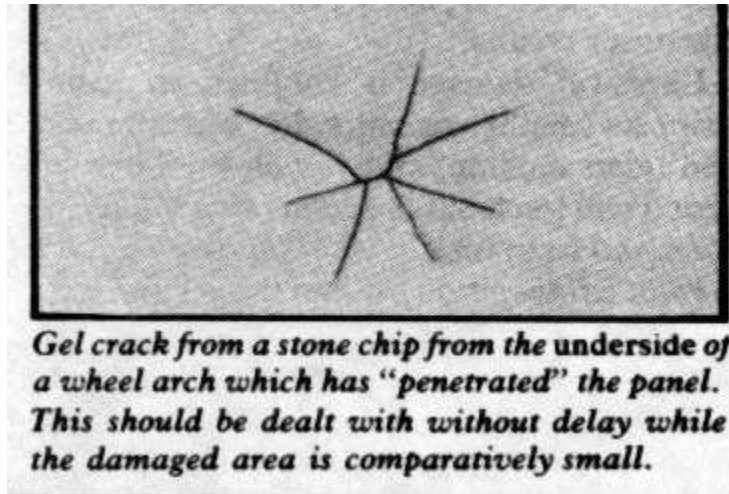


Figure 2.8. Crack from a stone chip

Starting at the beginning, causes are from the mold itself. If the mold has been constructed from GRP (be it epoxy or polyester resin) and has an in-built crack in it or any other blemishes, then the pattern of the crack will be transferred to the molding and will show as ‘crack indentation’. This is fairly common on, dare I say it, low budget kit cars and on cheap replacement wings, bonnets etc. for Morris Minors and the like. At least with the replacement parts the offending mark can be flatted off with wet and dry paper and then the whole panel primed and painted but, with self-colored panels (where the color is in the gel coat layer), then the blemish is there for all to see and if it is on, say, a flat bonnet area it will stick out like a sore thumb, much to the detriment of your pristine car - The only recourse is to paint out the fault and get the manufacturer to rectify the mold and make another one. (The classic example, as reported to me when I admonished one poor kit car manufacturer about the shocking state of a door panel was ‘Oh, they’re all like that’!).

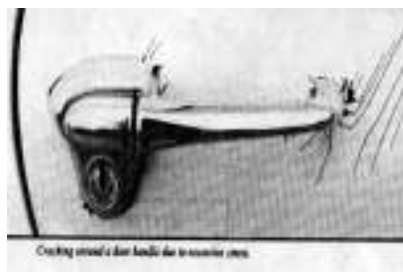


Figure 2.8. GRP paintwork

From the mold itself we move on to the next stage where the molding is released from the mold. If, for any reason, the molding has not fully cured (ie. it is still green), or has stuck fast

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because the release agent failed to release and too much force is applied, stress lines and cracks will appear and will show up as white lines. Then, if left unchecked, they immediately show through the paint that is applied subsequently. The remedy here is to make sure all the release agent is evenly applied — especially into any awkward corners — and that the molding has fully cured before attempting to release it. It may also be that the mold design itself has been constructed in the wrong way to allow an easy release from the molding i.e. Too sharp a radius on corners, overhanging angles, double curvatures, etc. If necessary a re-design must be done to prevent inherent cracks in the molding.

Self-Check – 2	Written Test
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Name: _____ **Date:** _____

INSTRUCTION ONE: -SHORT ANSWER (2pts each)

Write the short answer on the space provided,your hand writing should be clear and readable

1. -----Designed to help provide comfortable, reliable protection for applications such as welding, soldering, cutting, grinding and sanding.
2. -----Lightweight, unisex protective eyewear
3. Automotive metal parts are
 - a) -----
 - b) -----
 - c) -----
 - d) -----
 - e) -----

Unit Three: Complete Work Processes

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

- Conducting final inspection
- Clearing work area and materials
- Completing documentation

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:

- Inspect final works
- Clean work area and materials
- Document final works

3.1. Conducting final inspection

Use Proper Lighting

The first method for learning how to inspect a car paint job involves lighting. It should come as no surprise that it's harder to see in the dark. When examining the paintwork of a car, it's important to use the right kind of lighting. This means avoiding poorly lit garages and checking the car at night.

Direct Sunlight

If you're in the market for a new, or used car, avoid seeing it in the dark. This is a guaranteed recipe for disaster. Looking at a car in direct sunlight will help you see all kinds of scratches and surface imperfections. If you work a regular job it can be challenging finding time for anything. But don't make the mistake of rushing to look at a car when it's dark out.

Paint Inspection Lights

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You may not always have the ability to examine a car on a sunny day. If this is the case, a paint inspection light can be a valuable tool. This artificial light will reveal paint swirls and scratches that indoor garage lighting will miss. The good news is that these lights don't cost much, and they will prove that a decent looking car can actually have many paint flaws.

Check the Paint Thickness

Another way to inspect a vehicle's paint is by using a paint thickness gauge. This tool measures the amount of paint and clear coat on the surface of the car. You don't need to worry about this when buying a new car, but it can help when looking at an older model. Respraying a car can cost thousands of dollars, so it's good to have a thick layer of paint. Before polishing a car during the paint correction stage, it's important to know how thick the paint is. A paint thickness gauge will tell you how much of the clear coat can be safely removed before polishing the vehicle. The amount of paint on most cars is roughly equal to a sheet of paper, which is why it's critical to use a tool like this for precision and accuracy.

Plastic Bag Method

The plastic bag method, or "baggie test" is another way to inspect your car's paint. This method uses your sense of touch to figure out what level of paint correction the car needs. All you need to do is run your hand over the paint surface with a plastic bag over your hand. The thin plastic material works by heightening your sensitivity when touching the car.

If you feel small bumps during this test, it means there are surface contaminants that will need to be removed with detailing clay. This type of dirt is embedded in the car paint and will not come off with a regular wash. If your car fails the plastic bag test, it will need to be decontaminated with detailing clay, before the polishing stage.

3.2. Clearing work area and materials

Cleaning up is not just a measure of respect for the workspace, it also removes hazards. Cleaning is so important because when we clean an area, we are also doing some inspection or checking of machinery, equipment, and work conditions. An operator cleaning a machine can find many mal-functions. When a machine is covered with oil, soot, and dust, it is difficult to identify any problems that may be developing. While cleaning the machine, however, one can easily spot oil leakage, a crack developing on the cover, or loose nuts and bolts. Once these problems are recognized, they are easily fixed. It is said that most machines breakdowns begin with vibration (due to lose nuts and bolts), with introduction of

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foreign particles such as dust (due to the crack on the cover, for instance), or with inadequate oiling and greasing. For this reason cleaning is useful to make discoveries while cleaning machines.

Kinds of Cleaning Solvents

Solutions are homogeneous mixture of two or more components. They can be gaseous, liquid or solid. When we speak of a solution, we usually think of a solid dissolved in water. While water is the most common solvent, other liquids are frequently employed as solvents for certain substances for example wax maybe dissolved in gasoline. The dissolved material in a solution is termed as solute (e.g. wax) while the dissolving medium is called solvent (e.g. gasoline). However, the term can be interchanged depending on which substance is of greater amount.

Solvent is a component of a solution that dissolves solute and is usually present in large proportion or amount. It can be classified as polar or non-polar. Polar solvents are solvents which dissolve/are soluble in water; while non polar solvents are solvents which do not dissolve/are insoluble in water.

Solvents usually used for cleaning in automotive shops are: water, gasoline, kerosene, thinner and detergent soap.

The table below shows the kinds of cleaning solvents based on their solubility in water.

Properties of Cleaning Solvents

A useful generalization much quoted is that “Like dissolves like”. More specifically, high solubility occurs when the molecules of the solute are similar in structure and electrical properties to the molecules of the solvent. When there is a similarity of electrical properties; e.g. high dipole element between solute and solvent, the solute-solvent attractions are particularly strong. When there is dissimilarity, solute-solvent attractions are weak. For this reason, a polar substance such as H₂O usually is a good solvent for a polar substance such as detergent soap but a poor solvent for a non-polar substance such as gasoline.

Uses of Cleaning Solvents

Cleaning Solvents	Uses
1. Gasoline	It is used to wash oil/greasy tools/equipment.
2. Diesoline	It is used to wash oil engine, transmission and other parts of the vehicle.

3. Kerosene	It is used to remove dust, grease oil, paint, etc.
4. Thinner	It is used to remove spilled paint on the floor, walls and tools.
5. Soap and water	It is used to wash/clean upholstered furniture such as seats, tables, cabinets, etc.

Occupational Health and Safety Practices in Handling Cleaning Solvents

A great percentage of eye injury and cuts results from a disregard for the simplest of rules in handling cleaning solvents. You should never use compressed air to clean your clothes, hands or body. The pressure could cause the cleaning solvents and dirt particles to penetrate your skin, resulting in infection and /or blood poisoning. Do not use compressed air to clean an object immediately after it has been removed from a hot cleaning tank. First, rinse the cleaning solvents away with water. Do not use carbon tetrachloride as a cleaning solution. The fumes, when inhaled can cause serious internal injury and possibly result in death. When steam-cleaning, place the object to be cleaned on a pallet and wear a face shield and rubber gloves for protection against loose debris.

If a job or cleaning task requires the use of gloves, use the appropriate gloves. Do not for instance use welding gloves when removing an object from a hot tank, or rubber gloves when welding. If you have cut, nicked, or burned yourself, or something has got into your eyes, report immediately to the first-aid person. Keep all inflammable cleaning solvents in closed tin containers and whenever possible, store them in a separate area.

Clean up procedures

- Clean up every time whenever you leave an area, including sweeping the floor.
- Clean and return all tools to where you got them.
- Use compressed air sparingly; never aim it at another person or use it to clean hair
- Shut off and unplug machines when cleaning, repairing, or oiling.
- Never use a rag near moving machinery.
- Use a brush, hook, or a special tool to remove chips, shavings, scraps etc. from the work area. Never use the hands.
- Keep fingers clear of the point of operation of machines by using special tools or devices, such as, push sticks, hooks, pliers, etc.
- Keep the floor around machines clean, dry, and free from trip hazards. Do not allow chips to accumulate.

- Mop up spills immediately and put a chair or cone over them if they are wet enough to cause someone to slip.

Inspection of work tools/equipment

The purpose of inspection is to identify whether work tool/equipment's and working area can be operated, adjusted and maintained safely. Not all work area, tools/equipment needs formal inspection to ensure safety and in many cases a quick visual check before use will be sufficient. However inspection is necessary for any work area, tools/ equipment's where significant risks to health and safety may arise from incorrect installation, reinstallation, deterioration or any other circumstances. The need for inspection and inspection frequencies should be determined through risk assessment.

Importance of inspection

As an essential part of a health and safety program, workplaces should be inspected. Inspections are important as they allow you to:

- listen to the concerns of workers and supervisors
- gain further understanding of jobs and tasks
- identify existing and potential hazards
- determine underlying causes of hazards
- monitor hazard controls (personal protective equipment, engineering controls, policies, procedures)
- recommend corrective action

Inspection Procedures

1. When conducting inspections, follow these basic procedures:

- Draw attention to the presence of any immediate danger--other items can await the final report.
- Shut down and "lock out" any hazardous items that cannot be brought to a safe operating standard until repaired.
- Do not operate equipment. Ask the operator for a demonstration. If the operator of any piece of equipment does not know what dangers may be present, this is cause for concern. Never ignore any item because you do not have knowledge to make an accurate judgment of safety.
- Look up, down, around and inside. Be methodical and thorough. Do not spoil the inspection with a "once-over-lightly" approach.

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- Clearly describe each hazard and its exact location in your rough notes. Allow "on-the-spot" recording of all findings before they are forgotten. Record what you have or have not examined in case the inspection is interrupted.
- Ask questions, but do not unnecessarily disrupt work activities. This may interfere with efficient assessment of the job function and may also create a potentially hazardous situation.
- Consider the static (stop position) and dynamic (in motion) conditions of the item you are inspecting. If a machine is shut down, consider postponing the inspection until it is functioning again.
- Discuss as a group, "Can any problem, hazard or accident generate from this situation when looking at the equipment, the process or the environment?" Determine what corrections or controls are appropriate.
- Do not try to detect all hazards simply by relying on your senses or by looking at them during the inspection. You may have to monitor equipment to measure the levels of exposure to chemicals, noise, radiation or biological agents

3.3. Completing Documentation

Proper documentation provides evidence of what has transpired as well as provides information for researching discrepancies. Supporting documentation may come in paper or electronic form. In recent years, more often, official supporting documentation has moved from paper based to electronic forms.

Documentation should be:

- Immediate. Managers should take notes right after an incident occurs. ...
- Accurate and believable. ...
- Agreed upon.

Characteristics of good documentation

- All relevant information must be recorded.
- All paper records must be legible, signed and dated.
- Records must be contemporaneous, accurate and kept up to date.
- Records must be written in plain English avoiding jargon.

Self-Check -3	Written Test
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INSTRUCTION ONE: -SHORT ANSWER (2pts each)

Write the short answer on the space provided,

1. Write the Characteristics of good documentation
 - A. -----
 - B-----
 - C. -----
 - D. -----

2. Write the Importance of inspection
 - A. -----
 - B-----
 - C. -----
 - D. -----