# Vehicle body repairing

## Level III

**Based on November 2016, Version 2 Ethiopian Occupational Standard (EOS)**

**Module Title: -Performing Upholstery Ceiling and Interior Side Panel Repairs**

**LG Code: EIS VBR3 M12 1220 LO(1-4)LG(48-53)**

**TTLM Code: EIS VBR3 TTLM 1220v1**

**December 2020**

**Adama, Ethiopia**

Table of Contents

| LG #48 | LO #1-. Prepare for work |
|---|---|

**Instruction sheet**

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

- Determining job requirements, including method, materials and equipment.
- Reading and interpreting job specifications
- Observing Workplace Health and Safety (WHS) requirements, including personal protection needs throughout the work.
- Selecting material for removal
- Identifying and checking equipment and tooling for safe and effective operation.
- Determining procedures to minimize waste material.
- Identifying emergency procedures for maximizing energy efficiency while

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:

- Determine job requirements, including method, materials and equipment.
- Read and interpret job specifications
- Observe Workplace Health and Safety (WHS) requirements, including personal protection needs throughout the work.
- Select material for removal
- Identify and check equipment and tooling for safe and effective operation.
- Determine procedures to minimize waste material.
- Identify emergency procedures for maximizing energy efficiency while

| Learning Instructions: |
| --- |
| **1.** Read the specific objectives of this Learning Guide.<br>**2.** Follow the instructions described below.<br>**3.** Read the information written in the information Sheets<br>**4.** Accomplish the Self-checks<br>**5.** Perform Operation Sheets<br>**6.** Do the “LAP test” |

**Information Sheet 1- Determining job requirements, including method, materials and equipment.**

### 1.1 Introduction

Most job listings state the requirements needed for candidates to successfully do the job. They may include specific skills, types and amounts of work experience, personal qualities, educational credentials, professional certifications, areas of knowledge, and other qualifications. These requirements help set expectations for both employers and potential employees, and help ensure that qualified people apply for positions.

Job requirements are “must haves” that an employer is looking for in a candidate for a certain job position. Job requirements aren’t just a list of specific qualifications, education, knowledge and skills needed for a particular position. They are a great opportunity to showcase your employer
Job requirements are qualifications and skills necessary for a certain position.

### 1.2 Job Description

You will definitely encounter a job description that makes you say, “Huh?!” If the job description is un clear in certain sections, reach out to LinkedIn connections who work within the organization for more clarity on the role. If you do not have connections, you can always reach out to a listed recruiter, or even ask someone who is currently in the role if they can provide more information.

- This portion of a job description will inform your understanding of the organization as it typically clarifies the organization’s industry, culture, and values. Read closely to understand the role’s function within the organization as well. But keep in mind — you can learn a lot more about the company by going to their website and doing research.

A job specification is another notable objective of job analysis. It includes information relating to the requirements of skills and abilities to perform a specific task.

It states the minimum acceptable qualifications that an incumbent must possess to perform the assigned duty successfully. The job specification statement identifies the knowledge, skills, abilities needed to perform that task effectively.

### 1.3 Responsibilities

- The responsibilities section is where you'll find more information on the purpose of the role, as well as an overview of broad responsibilities and some specific tasks.
- There's no way to get all of these responsibilities down on paper - so you may see statements such as perform ad hoc duties as assigned. This means that you should expect to be assigned responsibilities that are related to the role but not specifically listed in the job description

### 1.4 Job requirements

Job requirements are "must haves" that an employer is looking for in a candidate for a certain job position. Job requirements aren't just a list of specific qualifications, education, knowledge and skills needed for a particular position.

#### 1.4.1 Types of Job Requirements

Job requirement are qualification and common types of job requirements include skills, experience, and education skills

Requirements can include both hard and soft skills. Hard skills are generally teachable, measurable abilities, such as the ability to do use specific software programs, analyze data, code, implement social media campaigns, and draw blood.

Soft skills usually refer to traits that are hard to quantify, such as critical thinking, active listening, creative problem-solving, and communicating effectively.

skills necessary for a certain position

- This portion of a job description will inform your understanding of the organization as it typically clarifies the organization's industry, culture, and values. Read closely to understand the role's function within the organization as well. But keep in mind — you can learn a lot more about the company by going to their website and doing research.

- Primary Responsibilities

### 1.5 Components of Job Analysis

#### 1.5.1 Steps in Job Analysis Process

The responsibilities section is where you'll find more information on the purpose of the role, as well as an overview of broad responsibilities and some specific tasks.

A job can be broken into several components and arranged into a hierarchy of the work activities.

This hierarchy is depicted in the following

- Element
- Task.
- Duty.
- Position.
- Job.
- Occupation.
- Job Family.

There are six steps in doing a job analysis process. Let's look at each of them.

The steps are shown in the following

1 Decide how we will use the information.
2. Review relevant background information.
3. Select representative positions.
4. Analyze the job.
5. Verify the job analysis information.
6. Develop a job description and job specification

**Step1** Decide how we will use the information.

The information gathered during a job analysis can be used as input for the organization's job evaluation system. The job evaluation determines the worth of a particular job to the organization

**Step2** Review relevant background information.

Job specification summarizes the personal qualities, traits, skills, and background required for getting the job done. It may be in a separate document or the same document as the job description.

There are different methods used by an organization to collect information and conduct job analysis.

**Step 3** Select representative positions.

The responsibilities section is where you'll find more information on the purpose of the role, as well as an overview of broad responsibilities and some specific tasks

**Step 4** Analyze the job

Analyze the job by collecting data on job activities, required employee behaviors, working conditions, and human traits and abilities needed to perform the job. For this step, use one or more of the job analysis methods.

**Step 5** Verify the job analysis information

Verify the job analysis information with the worker performing the job and with his immediate supervisor. This will help confirm that the information is factually complete.

**Step 6:** Develop a job description and job specification

Develop a job description and job specification. The job description is a written statement that describes the activities and responsibilities of the job as well as its important features, such as working conditions and safety hazards.

| Self-check1 | Written test |
|---|---|

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Choose the best answer (4 point)

1……. are must haves that an employer is looking for in a candidate for a certain job position.

A. Job requirements B. Job Description C. Responsibilities D. All

2.....From the given choose which list of specific qualification

A. , knowledge B. skill C. Attitude D. All

Test II: Short Answer Questions

1 .Write two types of job requirements (2points)

2. Write down all the safety requirements for prepare for work(4point)

*Note:* Satisfactory rating - 4 points Unsatisfactory - below 4 points

**Information Sheet 2- Reading and interpreting job specifications**

## 2.1 Reading and interpreting job specifications

welcome to the module “Reading, Interpreting and Applying Specifications and Manual”. This module contains training materials and activities for you to complete. The unit of competency “read, interpret and apply specifications and manuals” contains the knowledge, skills and attitudes required for an automotive servicing are required to go through a series of learning activities in order to complete each of the learning outcomes of the module.

### 2.2 List of job qualifications

The job qualifications list is one of the most important parts of the job specification or description. This list may include:

- Education level
- Work experience
- Required licenses or certificates
- Required skills

#### 2.2.1 Components of Job Specification

There are many parameters which are considered while giving the job specification for a certain profile.

1. **Educational Qualification:** This parameter gives an insight on how qualified a certain individual is. It covers their basic school education, graduation, masters degree, other certifications etc

2. **Experience:** Job specification clearly highlights the experience required in a particular domain for completing a specific job. It includes work experience which can be from a specific industry, position, duration or in a particular domain. Managerial experience in handling and managing a team can also be a job specification criteria required for a particular position.

3. **Skills & Knowledge:** This is an important parameter in job specification especially with knowledge and skill based profiles. The higher the position in a company, the more niche the skills become and more is the knowledge required to perform the job. Skills like leadership, communication management, time, team etc are mentioned.

4. **Personality traits and characteristics:** The way in which a person behaves in a particular situation, handles complex problems, generic behavior etc are all covered in the characteristics of a job description. It also covers the emotional intelligence of a person i.e how strong or weak a person is emotion all.

This list will typically be broken up into preferred and required qualifications. The most important qualifications will often be listed first, so if you meet those qualifications, be sure to emphasize them in your cover letter. If you have a qualification that's similar to one the employer listed, also try to mention it in your resume or cover letter.

An Automotive Technician is responsible for the repair and preventive maintenance of automotive equipment. Duties include performing emissions inspections, diagnostic testing of vehicles, and replacement of worn components. The Auto Mechanic can work on brakes, engines, steering, and electrical systems. An understanding of engines is essential, and prior automotive experience can be beneficial. A certification from a trade or technical school in Automotive or Engineering is desirable for this position.

Employers will also often include a list of duties required for the job. These duties can vary wildly from job-to-job, even if the job titles are the same. Similar to the qualifications, the job duties are often listed in order from most important to least important. As you read through the job duties, make a list of the one you've done in your previous jobs. Then, include some of what you listed in your cover letter.

### 2.3 Use the description in your cover letter

Employers want to know that you carefully read the description and understand what the job entails. One way to show this is to use the description in your cover letter. Put some of the description into your own words, and say how your skills match what's being described. For example, if one of the job duties is managing meetings, you could discuss a particularly successful meeting you organized at your previous job. Or, if you're just coming out of college and don't have professional experience yet, you could discuss club meetings you've held, or class discussions you've led. When you use the description in your cover letter, you'll show the company that you spent time thinking about their job listing, and that you understand how your unique skillset will fit into the company.

Preparing personal protective equipment is necessary to protecting the person as related to the job performed. Select boot, hats, lotions, goggles, mask and gloves. In similar manner you need to identify the likely risks that might occur on your body or sense organs from specific activities, then once you identify the risks it is necessary to select the necessary personal protective equipment that fit the body or the sense organ involved.

### 2.4 Job Specification Example

Here is a sample job specification, which is prepared for a marketing manager in a telecom company.

**Table 1 Job specification**

| | |
|---|---|
| Education | Must be an engineer and MBA in marketing for a reputed MBA institute |
| Work experience | Must have prior work experience in marketing & sales (preferably telecom or FMCG) |
| Skills & Knowledge | Must be a good communicator and must be able to lead a team.<br>Prior experience in handling ATL-BTL activities and managing promotional events.<br>Must be able to handle social media like Facebook, Twitter and help build online brand<br>Experience in managing PR and media |

| | |
|---|---|
| | Strong analytical skills and problem solving skills<br>Must understand business, come up with innovative products and launch them |
| Personality Traits & Characteristics | 1. Must be presentable and a good orator<br>2. Should be calm in complex situations and show leadership skills in managing multiple teams<br>3. Should be emotionally strong and should give timely deliverables |

The above table is a sample of job specification. More specific details can also be put to give a better understanding about the job.

**Advantages of Job Specification**

There are several benefits of having a comprehensive job specification. Some advantages are listed below:

- Job specification highlights all the specific details required to perform the job at its best
- It gives the HR managers a threshold and a framework on the basis on which they can identify the best prospects
- Helps in screening of resumes and saves time when there are multiple applications by choosing those who are closest to the job specification
- HR managers can used job specification as a benchmark to evaluate employees and give them required trainings
- It also helps companies during performance appraisal and promotions

**Disadvantages of Job Specification**

As we know, job specification arises from the job description; it also has some related problems. Let us have a look at those limitations:

- Change in technology impacts the requirement of the company, i.e. changing of skills, qualification, experience, knowledge needed to execute the roles and responsibilities properly.
- A job specification is a lengthy process and requires complete knowledge of the job position.

## 2.4 Read and interpret Upholsterer Job Specifications

Just as the springs and cushions of a couch work together to provide a comfortable seat, the responsibilities section and the qualifications and skills section of the upholsterer job description work together to improve your choice of applicants. Jobseekers review the responsibilities section to understand the type of work you're offering, and they use the job qualifications and skills section to determine whether their level of qualification is adequate. The combination of these two segments can provide a filter that reduces the number of unqualified.

## 2.5 Duties of interpreters and translators

When writing the credentials section, discuss the most important skills that employees should have with the hiring committee or the supervisor who will be responsible for the employee. Gather examples of the skills that are crucial to the success of the job, and get a list of any qualifications that will boost the applicant's chance to secure the position. Be sure to distinguish between required qualifications and preferred. Just as unseen details influence the stability and comfort of a couch, your hard work in crafting an effective upholsterer job description affects the success of hiring personnel.

Use the following as examples of effective upholsterer job specifications:

- working familiarity with tools, such as tack pullers, chisels, mallets and stretchers
- ability to estimate costs of materials, products and services
- demonstrable understanding of templates and patterns
- training in a vocational school or apprenticeship as an upholsterer

  Creativity and communication skills are a must

### 2.5.1 Interpreters and translators typically do the following:

- Convert concepts in the source language to equivalent concepts in the target language
- compile information and technical terms into glossaries and terminology databases to be used in their oral renditions and translations
- Speak, read, and write fluently in at least two languages, one of which is usually English
- relay the style and tone of the original language
- render spoken messages accurately, quickly, and clearly

- apply their cultural knowledge to render an accurate and meaningful interpretation or translation of the original message

| Self-Check – 2 | **Written test** |
|---|---|

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: choose the best answer question

1. Which one of the following is included in specification or description? (2pts)
   a. Education level c. Required skills
   b. Work experience d. all
2. ---------- helps the candidates to answer a question or use a certain keyword in their application to make sure that they thoroughly read through the job description. (2pts)
   a. Read through the job duties c. Use the description in your cover letter
   b. Check for questions or keywords d. none

*Note:* Satisfactory rating – greater than 2 points Unsatisfactory – less than 2 points

You can ask you teacher for the copy of the correct answers.

Score = _____
Rating: _____

**Information Sheet 3- Observing Workplace Health and Safety (WHS) requirements, including personal protection needs throughout the work.**

### 3.1 Introduction

Where problems are identified with the suitability, fit and conformableness of the PPE, must work with the wearer to resolve the issue. They must do this in order to comply with the requirement to ensure the PPE is a suitable size and fit and that it is reasonably comfortable for that wearer.

Ongoing monitoring is required to make sure the PPE is being used and stored correctly

While monitoring the use of the PPE can be time consuming, the PCBU is under an obligation to do so, so far as is reasonably practicable. Monitoring also assists a PCBU to meet its duty to ensure PPE is appropriately maintained, repaired or replaced.

The level of monitoring needed will depend on the level of risk and the experience of the workers involved. Under the must put control measures in place if it is not reasonably practicable to eliminate a health and safety risk in the workplace. Control measures may include PPE as an interim or last resort or as back-up.

### 3.2 What are ways to manage problems that may arise when using PPE?

- appropriate signs are used to remind workers where it must be worn
- is periodically assessed to ensure it is and continues to be effective.

To ensure PPE continues to minimize any potential risk for the worker, PPE must be maintained, repaired or replaced and stored correctly. This includes making sure it is clean, hygienic and in good working order

Using PPE may, in some circumstances, give rise to problems that, without proper management, could become a health and safety risk.
Wearing PPE may adversely affect how well tasks can be performed—PPE can restrict vision or mobility.

It may be uncomfortable to wear and some workers may not be able to wear the recommended PPE at all due to sensitivities, such as workers who are allergic to latex cannot wear certain kinds of rubber gloves.

It may create new hazards through its use—some items might hinder the body's natural cooling mechanisms by

### 3.3 Environmental Health and Safety Responsibilities

Environmental Health and Safety (EH&S) is responsible for:

Reviewing legislation, recommending policies, and monitoring compliance with environmental and health and safety statutes and regulations and University health and safety policies and programs;

Developing institutional safety and compliance programs and assisting schools, departments, faculty, and managers with implementation providing guidance and technical assistance to supervisors and managers in the schools, departments, and other work units in identifying, evaluating, and correcting health and safety hazards;

- Developing programs for the safe use of hazardous radiological, biological, and chemical substances and lasers;
- Providing training materials, assistance, and programs in safe work practices;
- Providing guidance on effective emergency management and business continuity programs, and providing emergency response services for incidents involving hazardous materials;
- Providing fire prevention, inspection, engineering and systems maintenance services; and
- Hazardous waste management and disposal services.

While EH&S is responsible for developing and recommending relevant health and safety policies, institutional policy approval rests with other University authorities,(e.g., President, Provost, Vice Provost and Dean of Research, Faculty Senate, University Cabinet, University Committee on Health and Safety, Committee on Research, Administrative Panels for Research Oversight, etc.) depending on the content of the proposed policies.

In addition to being aware of the mechanical hazards in the work shop, it is important that you use the correct protective clothing and equipment. Wearing personal protective equipment (PPE) can prevent accidents from happening. As a worker, you are responsible for the following:
Making sure your uniform is well fitted.

Making sure sleeves are kept buttoned at the wrist, cuffs on overalls and trousers are be eliminated, and trouser legs are long enough to hang outside boots.
Wearing specific personal safety equipment such as goggles, hearing protection, gloves, and aprons when require
To ensure that you are protecting yourself, your personal protective equipment (PPE) list should include the following items.

**Clothing:-** this includes well-fitted pants and jackets with all buttons fastened. Sleeves should be close fitting because sleeves that are loose and flowing are potential fire hazards when working over open gas burners. Health regulations require that all food handlers wear hair nets or use other approved methods for keeping hair under control.

**Footwear:-** The OHS Regulation requires that approved footwear must be worn by employees in all industrial occupations. Ensure your footwear is sturdy and provides enough back support to not cause future back problems. Footwear suitable for commercial foodservice establishments must have a non-slip sole and a closed toe and closed back.

**Hand protection**:-The most common type of gloves used in food service establishments are natural rubber latex gloves, synthetic rubber gloves, and vinyl gloves. As it is impossible to distinguish between natural and synthetic rubber gloves simply by looking at them, you should read the label on the box to determine what they are made of.

**Eye protection**:-Eye protection in the form of safety goggles or masks should be worn whenever there is a chance of eye injury. Particles flying through the air can easily land in your eye and possibly do permanent damage.

**Hearing protection:-**Approved hearing protection must be worn when high-level noise conditions exist. These conditions are not common in commercial kitchens but may be present in food manufacturing operations

| Self-Check – 3 | **Written test** |
|---|---|

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: choose the best Answer Questions

1……..includes well-fitted pants and jackets with all buttons fastened?(3points)

A. Clothing
B. Eye protection
C. Footwear
D. Hand protection

2……. minimize any potential risk for the worker, must be maintained, repaired or Replaced and stored correctly (3points)

A. WHS
B. PPE
C. A & B
D. None

*Note:* Satisfactory rating – greater than 2 points Unsatisfactory – less than 2 points

You can ask you teacher for the copy of the correct answers.

Score = _____
Rating: _____

**Information Sheet 4- Selecting material for removal**

## 4.2 Selecting material for removal

As you shop for an upholstery fabric, let your practical needs lead, advice Mitchell Gold and Bob Williams, cofounders of the home-furnishings company that shares their names. “First, consider how you live and who will use the piece current unavailable. We don't know when or if this item will be back in stock.

- Auto trim removal tool made of strong plastic, will not brake or bent easily.
- Versatile tool set that pays for itself with just one use; saves time and frustration
- Easily remove Trim, Molding, Door panels and Dashboards without causing any damage
- Works on interior and exterior trim, wide edge remover, narrow edge remover, pull-type remover, hand
- Professional-grade kit of 13 incredibly useful tools for removing auto body trim and molding
-

### 4.2 Material selection

There are four basic steps to be followed while selecting materials for specific purposes/ requirements:

1) Translation: express design requirements as constraints and objectives
2) Screening: eliminate materials that cannot do the job
3) Ranking: find materials that best do the job
4) Supporting Info: handbooks, expert systems, web, etc.

**Step 1 Translation**

An engineering component has boundary condition for Materials Selection

**I. Function:** to carry load, transmit heat, contain a pressure, etc..

(What does the component do?)

**II. Objectives**: as cheap as possible, light, safe, strong, etc…

(What is to be Maximized or Minimized?)

**III. Constraints**: subject to constraints such as carry load without failure, certain dimensions are fixed; cost is within limits etc…

- What non-negotiable conditions are to be met? (Rigid)
- What negotiable but desirable conditions? (Soft)

**IV**. **Free Variables**: materials choice, cross-section area, thickness, and length are free

Which design variables are free? (Variables which can be changed)

**Step 2:** Screening: Is a method to evaluate large range of materials by the help of material Bar charts, material Property Charts (density vs. Young's Modulus…), screen on constraints, rank on objectives etc.

**Step 3 : Ranking**: What if multiple materials remain after screening?

- Rank on Objectives
- Objectives define performance metrics

**Step 4 Selection**: select then verify with any supporting materials.

Generally two concepts are used in the selection procedure:


**Figure 1 Figure 2: Tougher Trim Removal Tools**

Adopted impact resistant nylon fiber material. Made of toughened nylon fiber, has the strength to pry up panels and pop open panel retaining pins lossless car modification.

38pcs prying tools can meet all your needs, time and effort-saving for most interior and exterior car modification.

Repair needs. made of nylon material, with lightweight, tough and durable features. Compact and portable removal tools fit for daily use.

**4.3 Installing Or Removing Stereo System**.

Door Panels, Moldings, Window Trims, Clips, Or Any Plastic Piece In Your Car Without Damaging The Car Like Metal Tools.

To prolong the lifetime, keep it in a cool place and avoid direct sunlight

Package Include:

1. Trim Removal Tools
2. Trim Clip Removal Pliers
3. Car Foil Small Scraper Tool
4. up holster fastener remover
5. Precision hook pick
6. Stainless steel stereo removal tools
7. stainless steel Auto Terminal Removal Key Tool


**Figure 3: Trim Removal Tools**

| Self-check 4 | Written test |
|---|---|

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Explain the following Question

1 .Write four basic steps to be followed while selecting materials for specific(4points)

3. Write at list three lifetime, keep it in a cool place and avoid direct sunlight(4points))

*Note:* Satisfactory rating – greater than 4 points Unsatisfactory – less than 4 points

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

*Note:* Satisfactory rating - 4 points Unsatisfactory - below 4points

**Information Sheet 5 Identifying and checking equipment and tooling for safe and effective operation**

## 5.1 Identifying and checking equipment and tooling

All tools, equipment, and vehicles must be properly maintained so that workers are not endangered. Construction regulations require inspections of vehicles, tools, machines, and equipment before use.

Preventive maintenance is the systematic care and protection of tools, equipment, machines, and vehicles in order to keep them in a safe, usable condition that limits downtime and extends productivity. We must always be aware that maintenance tasks themselves are potentially hazardous and can result in injury. The successful maintenance program is:

- well organized and scheduled
- controls hazards
- defines operational procedures
- Trains key personnel.

The degree of detail to include in your company's program regarding equipment maintenance will depend on the kinds of tools/equipment used. Some construction equipment (e.g., cranes) have very specific inspection and maintenance requirements. Mobile heavy equipment (dozers, loaders, scrapers, etc.) may have different maintenance requirements. Passenger vehicles (company trucks, cars, and vans) may require only basic maintenance. Power tools should be maintained in good working order. This may be limited to ensuring that blades/bits are replaced when needed and that guards or other safety devices are operable and any damaged electrical cords/plugs are repaired or replaced. Damaged or defective equipment/tools should be tagged and removed from service.

Most manufacturers can provide maintenance schedules for their equipment. Large companies with a fleet of vehicles/equipment typically have a comprehensive maintenance program due to the capital investment and/or leasing agreements. Smaller companies may lease equipment and maintenance services may be included in the leasing agreement.

**5.3 General requirements for equipment maintenance include:**

- Obtaining a copy of the maintenance schedule recommended by the manufacturer.
- Ensuring that maintenance is performed as required.
- Ensuring that the person(s) performing the maintenance are competent (e.g. licensed mechanic).
- Retaining records of maintenance/service conducted.
- Specifying who is responsible for overseeing equipment maintenance and where the records are kept.
- Setting up a system for removal and tagging of damaged or defective tools and equipment.

This guide is an introduction to managing the risks associated with use of machinery and equipment in the workplace. Relevant persons can use this guide to:

• identify machinery and equipment hazards in the workplace.

• eliminate or reduce the risk of those hazards causing harm.

The guide will also be useful to anyone else who is interested in machinery and equipment safety, such as workers and Workplace Health and Safety Representatives (WHSRs). Workplace Health and Safety Queensland (WHSQ) also has additional information and guidance supporting topics introduced in this document

**Key principles of machinery and equipment safety**

- Mechanical hazards Machinery and equipment have moving parts. The action of moving parts may have sufficient force in motion to cause injury to people. When assessing machinery and equipment for possible mechanical hazards, consider
- machinery and equipment with moving parts that can be reached by people
- machinery and equipment that can eject objects (parts, components, products or waste items) that may strike a person with sufficient force to cause harm
- machinery and equipment with moving parts that can reach people, such as booms or mechanical appendages (arms)
- Mobile machinery and equipment, such as forklifts, pallet jacks, earthmoving equipment, operated in areas where people may gain access. Common mechanical hazards and

associated risks for machinery and equipment are shown below. Hazard Risk Rotating shafts, bullies, sprockets and gears Entanglement Hard surfaces moving together Crushing Scissor or shear action Severing Sharp edge – moving or stationary Cutting or puncturing Cable or hose connections Slips, trips and falls (e.g. oil leaks)

People who install or dismantle machinery and equipment could:

- work in isolation
- work on machinery and equipment at height, or over machinery and equipment to connect services, such as electricity, air or water
- work in low light, or with bright directional light
- access machinery and equipment from the top, sides or underneath
- work with or near cranes, forklifts or rigging to lift machinery and equipment
- work in confined spaces
- use power tools, welders, extension leads, which present
- electrical hazards if damaged or wet. People operating machinery and equipment could:
- be required to place their hands close to the mechanism of the machinery and equipment that does the work, and may be injured if caught or trapped by moving parts
- be exposed to constant harmful noise, radiated energy or fumes being emitted from the machinery and equipment being operated, or are close to
- in advertently bump or knock poorly placed control levers or buttons
- be required to make adjustments to the mechanism of machinery and equipment while the machine is in motion • be required to clear away scrap

| Self-check 5 | Written test |
|---|---|

Name…… ID…… Date……

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Choose the best answer (4 point)

1……. is the systematic care and protection of tools, equipment, machines, and vehicles.(3points)

A. Preventive maintenance C. General maintenance

B. operational C. Responsibilities D. All

2…….Power tools should be maintained in good working order

A .Power tools B Hand tool C.A&B D. None

*Note:* Satisfactory rating - 10 points Unsatisfactory - below 10 points

Test II short Answer Question

1. Write the successful maintenance program (2points)
2. Write at list three General requirements for equipment maintenance (3points)

**Information sheet 6 Determining procedures to minimize waste material.**

## 6.1 Waste management and disposal

Waste management is the collection, transport, processing or disposal, managing, monitoring and regulation of waste materials. The term usually relates to materials produced by human activity, and the process is generally undertaken to reduce their effect on health, the environment or aesthetics. Waste management is a distinct practice from resource recovery which focuses on delaying the rate of consumption of natural resources. The management of wastes treats all materials as a single class, whether solid, liquid, gaseous or radioactive substances, and tried to reduce the harmful environmental impacts of each through different methods. Waste types may include
solid (non-hazardous)

## 6.2 Waste Minimization

Waste Minimization is reduction in the quantity of hazardous wastes achieved through a conscientious application of innovative or alternative procedures. Simple adjustments to a process producing wastes (e.g. a teaching lab experiment, a vehicle cleaning operation, etc.) may be the only requirement to achieve some results. However, looking at the broader picture in the University environment, it is often difficult to recognize waste reductions due to the complex and changing growth patterns within the campus community. Reductions are often offset by increased staff and student growth and/or building construction.

Waste minimization often results in cost minimization. However, it is not uncommon to devise techniques to minimize costs without a corresponding reduction in waste quantities. For example, proper segregation of wastes will reduce disposal fees but only because these quantities are reassigned to more appropriate waste streams for cost effective disposal/treatment off site. While this is not technically waste minimization, it is still a beneficial process.

Significant reduction of the waste generated in health-care establishments and research facilities may be encouraged by the implementation of certain policies and practices, including the following: • Source reduction: measures such as purchasing restrictions to ensure the selection of methods or supplies that are less wasteful or generate less hazardous waste. • Recyclable products: use of materials that may be recycled, either on-site or off-site. • Good management and control practices: apply particularly to the purchase and use of chemicals and pharmaceuticals

## 6.3 Waste minimization revolves around three R's as follows:

**Reduce**

This calls for using resources that are just enough to cater to your needs, for instance, building a smaller house. This is an effective way of conserving resources as it also lowers the costs. This can be achieved through attaining accuracy when ordering to ensure that there is no waste or no material is sitting on the site for long periods that it is damage

**Reuse**

Here, you will do well to reuse existing materials and buildings, effectively reducing the need for resources while lowering waste volumes and saving money. A huge percentage of resources are incorporated in the construction of homes owing to the mixed materials that are used, yet the end destination for most of them is landfill.

Thus, renovating a house is a much better option than bringing it down to put up another one because a negligible fraction of the old house may be reused /recycled.

**Recycle**

Using leftover resources or those resources that have reached the end of their life minimizes the need for new materials as well as lowers the volume that ends up in landfills. Thus, it is advisable to use materials that are recyclable as this creates a market for the resources that are recycled while also raising the price that recyclers pay for resources that are recovered even as the recycling viability increases.

**Procedures to minimize waste material**.

- Substitute alcohol thermometers for mercury thermometers. Contact EH&S for information on the no cost exchange program.
- Borrow a chemical from a colleague to conduct an investigative research trial. Contact EH&S to find out what other labs on campus might have the chemicals you need to borrow.
- Test your ideas on the smallest scale practical to minimize disposal costs.
- Keep your wastes segregated by compatibility and type; avoid cross contamination as much as possible.
- Avoid mixing hazardous and non-hazardous wastes; avoid contaminating glassware.
- Rotate chemical stock to keep chemicals from becoming outdated.
- Order smallest container of material necessary for use.
- Review experimental protocol to assure that chemical usage is minimized.
- Take care when weighing and transferring chemicals in order to minimize spills and additional wastes generated during spill cleanup.
- Neutralize hazardous by-products as the final step of an experiment (Contact EH&S 459-4840 to write a bench top neutralization procedure as required by regulations).
- Practice good housekeeping.
- Distill and reuse solvents.

Start your waste minimization thought process by following the proper campus hazardous waste procedures

- Keep an up-to-date chemical inventory in the Chemical Inventory System (CIS).
- Review your inventory periodically to remove unwanted or unusable chemical stocks.
- Manage peroxide formers and dispose of them by their expiration date.
- Only purchase gas cylinders from manufactures who will accept the return of the partially used or empty cylinders.

- Ensure proper identification is on all chemical containers.
- Attach a properly completed hazardous waste tag to each chemical waste container.
- Submit the container for pickup through the WASTe Program.
- Contact the Hazardous Waste Manager (459-3086) if you have any specific questions or need help with your project.

## 6.2 Determining procedures to minimize waste material

### 6.2.1 Functional Elements of a Waste Management System:

The activities involved in the solid waste management have grouped into six functional elements:

1. Waste generation.
2. On-site handling, storage and processing.
3. Collection.
4- Transfer and transport.
5- Processing and recovery.
6- Disposal.

The factors that influence generation rate of municipal wastes include: geographic location, season of the year, collection frequency, use of kitchen waste grinders, characteristics pf populace, extent of salvaging and recycling, public attitude and legislation.

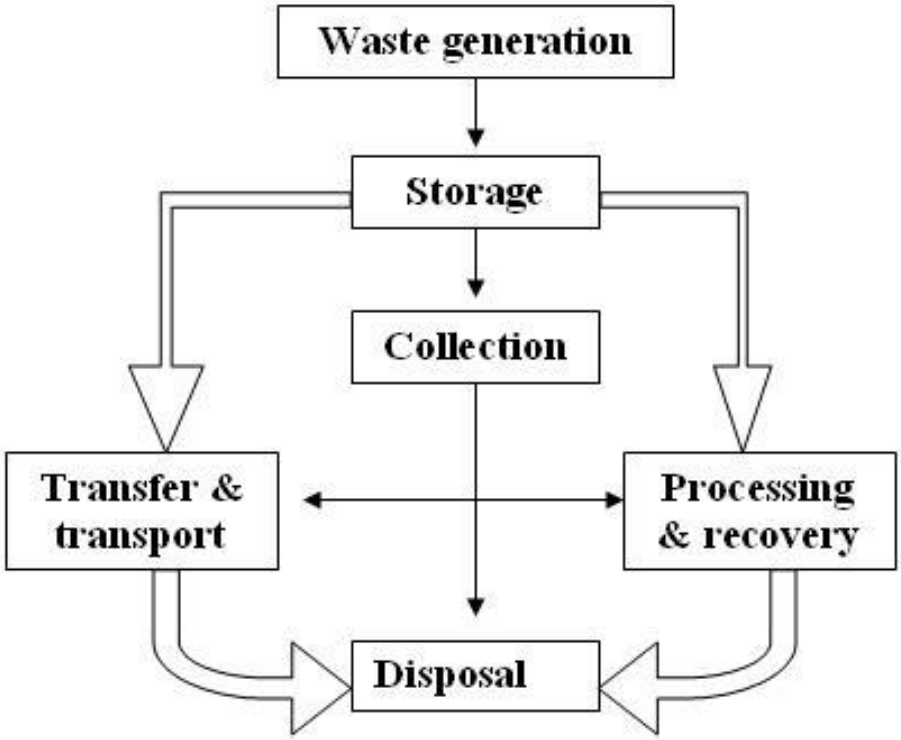



**Fig3 waste generation**

| Self-check 6 | Written test |
|---|---|

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Short Answer Questions

(4 point)

1 . write at list three element of west management system(4 points)

**2.** write three R' s waste minimization (4points)

*Note:* Satisfactory rating - 10 points Unsatisfactory - below 10 points

**Information sheet 7 Identifying e*mergency procedures* for maximizing energy efficiency while completing the job.**

Energy technologies convert energy sources into energy services, such as lighting, mobility, and heat. During any energy conversion, some energy is lost. The energy efficiency of a technology improves when it loses less energy during the conversion. Several technologies and design features are available to improve the efficiency of energy use in the buildings and transportation sectors.

There are a range of energy-efficient devices, appliances, and other equipment available for many electricity end-uses that provide the same service using less energy, either through improvements in efficiency of appliances (such as stoves, air conditioners, and refrigerators), or through the use of technologies that consume less fuel (such as hybrid or electric vehicles relative to gasoline cars). Other measures can also be taken to reduce energy consumption, such as improving the insulation of buildings.

**Energy efficiency**:- refers to using less energy to provide an energy service. For example, energy-efficient LED light bulbs are able to produce the same amount of light as incandescent light bulbs by using 75 to 80 percent less electricity. Since energy production typically creates pollution and greenhouse gases, improving the energy efficiency of certain technologies has the potential to significantly reduce energy consumption and consequently reduce emissions from the energy sector.

Investing in energy efficiency is often described as being a “win-win”: by reducing the amount of energy used, efficiency measures can reduce energy consumption (and, consequently, impacts from energy use) and save customers money. Energy-efficient devices can cost more upfront (such as LED light bulbs relative to incandescent bulbs), but they often generate net savings for energy consumers in the long run.

The efficiency is the energy output, divided by the energy input, and expressed as a percentage. A perfect process would have an efficiency of 100%. $W_{out}$ = the work or energy produced by a process. Units are Joules (J).

Energy conversion efficiency (η) is the ratio between the useful output of an energy conversion machine and the input, in energy terms. The input, as well as the useful output may be chemical, electric power, mechanical work, light (radiation), or heat.

To make your manufacturing facility more energy efficient and less expensive to run, here are ways to reduce industrial energy costs on your production floor.

- Develop an Energy Management Team....
- Conduct an Energy Audit. ...
- Strategically Schedule Machinery Use. ...
- Schedule Shut-Downs and Start-Ups. ...
- Optimize Air Compressors.
- Ways to conserve energy
- Adjust your day-to-day behaviors. ...
- Replace your light bulbs. ...
- Use smart power strips. ...
- Install a programmable or smart thermostat. ...
- Purchase energy efficient appliances. ...
- Reduce your water heating expenses. ...
- Install energy efficient windows. ...
- Upgrade your HVAC system

Risk assessment should be performed by competent persons with suitable experience and training in the work activities of paint spraying. The persons should have adequate understanding of the chemicals and processes of paint spraying being assessed as well as a good knowledge of the required safe practices. They may also consult specialists for expert advice if needed.

Employers should ensure that a risk assessment is conducted on all paint spraying works pertinent to potential exposure to the hazardous substances and processes.

When considering the potential health effects, exposure to airborne

hazardous substances should be kept below the relevant Occupational Exposure Limits (OELs) stipulated in the Code of Practice on Control of Air Impurities (Chemical Substances) in the Workplace issued by the Labor Department. The values of the OELs refer to the airborne concentrations of individual chemicals below which no adverse health effects would impose on nearly all workers upon exposures by the route of inhalation. Air monitoring may be needed for this purpose.

As OELs do not represent ‘no effect’ levels at which every employee can be guaranteed protection, employers should also consider how to:

- Ensure exposure standards are not exceeded under any circumstances;
- Keep the level of exposure as low as reasonably practicable; and

.

| Self-Check – 7 | **Written test** |
|---|---|

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Give short answer

1……..refers to using less energy to provide an energy service.

2…….. is the ratio between the useful output of an energy conversion machine and the input, in energy terms

*Note:* Satisfactory rating – greater than 2 points Unsatisfactory – less than 2 points

| LG #49 | LO # 2. Remove seats, interior trim components and fittings |
|---|---|

**Instruction sheet**

- This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:
  - Using Protective clothing and equipment appropriate to replacement activities.
  - Removing Seats and fittings using approved methods, tooling and equipment.
  - Carrying out removal activities in according to industry regulations/guidelines, WHS requirements, legislation and enterprise procedures/policies.
  - Accessing and interpreting Information from manufacturer/component supplier specifications.
  - Selecting adhesives according to material type and adhesive produce/manufacturer/component supplier recommendations.
  - Carrying out activities according to industry regulations/guidelines, WHS requirements, legislation and enterprise procedures/policies.

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:

- use Protective clothing and equipment appropriate to replacement activities.
- .Remove Seats and fittings using approved methods, tooling and equipment.
- Carrying out removal activities
- .Access and interpreted Information from manufacturer/component supplier specifications.
- Select adhesives according to material type and adhesive

produce/manufacturer/component supplier recommendations.

- Carry out activities according to industry regulations/guidelines, WHS requirements, legislation and enterprise procedures/policies.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

**Information sheet 1 Using Protective clothing and equipment appropriate to replacement activities.**

## 1 .Introduction

Making the workplace safe includes providing instructions, procedures, training and supervision to encouragepeopleworksafelyandresponsibly..

Even where engineering controls and safe systems of work have been applied, some hazards might remain. These include injuries to:

- the lungs, e.g. from breathing in contaminated air;
- the head and feet, e.g. from falling materials;
- the eyes, e.g. from flying particles or splashes of corrosive liquids;
- the skin, e.g. from contact with corrosive materials;
- the body, e.g. from extremes of heat or cold.

### 1.2 WHAT IS PERSONAL PROTECTIVE EQUIPMENT (PPE)?

PPE means personal protective equipment or equipment you use to guarantee your (own) safety.

Use PPE always and anywhere where necessary. Observe the instructions for use, maintain them well and check regularly if they still offer sufficient protection. But when do you use what type of protection?

These 7 tips will help you on your way

**1.2.1 Wearing protection**:- a helmet offers protection and can prevent head injuries. Select a sturdy helmet that is adapted to the working conditions. These days you can find many elegant designs and you can choose extra options such as an adjustable interior harness and comfortable sweatbands.

**1.2.2 Eye protection**:- are the most complex and fragile parts of our body. Each day, more than 600 people worldwide sustain eye injuries during their work. Thanks to a good pair of safety glasses, these injuries could be prevented. Do you come into contact with bright light or infrared radiation? Then welding goggles or a shield offer the ideal protection!

**1.2.3 HEARING PROTECTION** Do you work in an environment with high sound levels? In that case it is very important to consider hearing protection. Earplugs are very comfortable, but earmuffs are convenient on the work floor as you can quickly put these on or take them off.

**1.2.4 MAINTAIN A GOOD RESPIRATION** Wearing a mask at work is no luxury, definitely not when coming into contact with hazardous materials. 15% of the employees within the EU inhale vapors., smoke, powder or dusk while performing their job. Dust masks offer protection against fine dust and other dangerous particles. If the materials are truly toxic, use a full-face mask. This adheres tightly to the face, to protect the nose and mouth against harmful pollution

**1.2.5 PROTECT YOUR HANDS WITH THE RIGHT GLOVES** Hands and fingers are often injured, so it is vital to protect them properly. Depending on the sector you work in, you can choose from gloves for different applications:

- protection against vibrations
- protection against cuts by sharp materials
- protection against cold or heat
- protection against bacteriological risks
- protection against splashes from diluted chemicals.

**1.2.6 PROTECTION FOR THE FEET** even your feet need solid protection. Safety shoes (type Sb, S1, S2 or S3) and boots (type S4 or S5) are the ideal solution to protect the feet against heavy weights. An antiskid sole is useful when working in a damp environment, definitely if you know that 16,2% of all industrial accidents are caused by tripping or sliding. On slippery surfaces, such as snow and ice, shoe claws are recommended. Special socks can provide extra comfort.

**1.2.7. WEAR THE CORRECT WORK CLOTHING**

Preventing accidents is crucial in a crowded workshop. That is why a good visibility at work is a must: a high-visibility jacket and pants made of a strong fabric can help prevent accidents. Just like the hand protection, there are versions for different applications.

## 1.3 ELECTRICAL SAFETY

Electric shock or electrocution can be associated with electrostatic spray painting. Spray painting in general can involve electrical equipment which, if not properly earthed or not regularly maintained, can result in electric shock.

Static electricity charges can be generated in any spray painting process where two differently charged materials come into contact or are brushed together. A static electrical charge can be enough to ignite flammable materials.

Electrical installations and the use of electrical equipment are a hazard in spray painting areas, paint mixing and storage areas. Where such installations or equipment are necessary, special equipment and wiring precautions should be used to prevent a potential fire or explosion. An immediate hazard is created where electrical equipment that is damaged or equipment designed for “domestic use” is operated in these areas. Electrical installations must comply with AS 3000 (known as the SAA Wiring Rules) which outlines the standards for wiring. Installations should be designed to be intrinsically safe for use in explosive atmospheres.

### 1.3.1 Extinguishing fires

One of the major safety concerns associated with spray application is the combustible and flammable vapors, mists, and residues that may be created.

It is important to ensure that all potential sources of ignition have been removed prior to spraying flammable and combustible products. Potential sources of ignition include:

- Open flames (work space heating units)
- Cutting and welding torches
- Gas fired heaters
- Electrical outlets and lighting
- Non-explosion proof equipment such as radios, lamps, heaters and motors
- Static electricity
- Smoking

The correct type of fire extinguishers must be readily available at the work site.

Gasoline is used so much in the shop that people forget it is very dangerous if not handled properly. A spark or lighted match in a closed place filled with gasoline vapor can cause an explosion. Even the spark from a light switch can set off an explosion. So you must always be careful with gasoline. Here are some tips.

- There will be gasoline vapors around, if gasoline is spilled or a fuel line is leaking.
- You should keep the shop doors open or keep the ventilating system going.
- Wipe up the spilled gasoline eat once, and put the rags outside to dry.
- Never smoke or light a cigarette around gasoline.
- When you work on a leaky fuel line, carburetor, or fuel pump, catch the leaking gasoline in a container or with rags.
- Put the soaked rags outside to dry.
- Fix the leak as quickly as possible. And don't make sparks around the car, for example, by connecting a trouble light to the battery.
- Gasoline should be stored in an approved safety container.
- Never store gasoline in a glass container. They could break and could cause an explosion and fire. Oily rags can also be a source of fire. They can catch fire without a spark or flame. Oily rags and waste should be put into a special safety container where they can do no harm

**Figure**. 4 **Gasoline and all flammable liquids should** always store in an approved safety containers.

**Figure 5** Recommended container for Gasoline or flammable liquids

**Fire Extinguishers**

Note the location of the fire extinguishers in the shop. Make sure you know how to use them. The quicker you begin to fight a fire, the easier it is to control. But you have to use the right kind of fire extinguisher, and use it correctly. The chart explains this. Talk over any questions with your instructor.

**Fire protection**

Every auto body and paint shop requires fire extinguishers. Since fires are classified as classes there are different types of extinguishers specially designed for a particular class of fire.

Classes of fires . Fires are classified according to the type of fuel energizing the fire. Knowledge of the classes of fires is important since the type of fuel involved will determine the method of extinguishing the fire. Each class of fire requires a specialized action.

**Class-A Fires**

These fires result from the combustions of carbonaceous materials such as wood textiles and papers for class A Fires extinguishers containing water, which will cool and quench the burning material, are suitable. Dry chemical Extinguishers may also be used since they provide a fire vet ardent blanket to prevent reflates.

**Class-B Fires**

These fires result from materials that become gaseous when heated such as oil, grease and paints. For class B fires, carbon dioxide extinguishers are Excellent. Dry chemical Extinguishers are also useful in these fires.

**Class-C Fires**

Live electrical equipment is the cause of class C fires for class C fires use Ethics a carbon dioxide extinguisher (carbon dioxide is nonconductive) or a dry chemical extinguisher. Dry chemical extinguisher. Dry chemical extinguishers are called tri-class extinguishers since they can be used on class A, B and C fires.

**Class-D fires**

The specialized classification includes fires from comestible metals, such as magnesium, titanium, Zirconium and potassium. It should be noted that the same fire might involve more than one class as soon as the fire spreads to other materials. Also once electricity is disconnected, a class C fire becomes another class of fire.

For class D fire special extinguishing powders may be applied by a scoop or shovel.

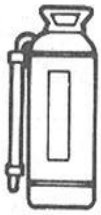
Electric shock or electrocution can be associated with electrostatic spray painting. Spray painting in general can involve electrical equipment which, if not properly earthed or not regularly maintained, can result in electric shock.

Static electricity charges can be generated in any spray painting process where two differently charged materials come into contact or are brushed together. A static electrical charge can be enough to ignite flammable materials.

Electrical installations and the use of electrical equipment are a hazard in spray painting areas, paint mixing and storage areas. Where such installations or equipment are necessary, special equipment and wiring precautions should be used to prevent a potential fire or explosion. An immediate hazard is created where electrical equipment that is damaged or equipment designed for “domestic use” is operated in these areas. Electrical installations must comply with AS 3000 (known as the SAA Wiring Rules) which outlines the standards for wiring. Installations should be designed to be intrinsically safe for use in explosive atmospheres.

Airless paint spraying using high fluid pressures can produce static electricity that may cause a spark. Therefore, the airless spray gun and any conductive article that is being sprayed, including containers into which the flow from the gun is directed, should be electrically earthed.

## Table 2. class of fires

| FIRES | EXTINGUISHERS TYPE | USE | OPERATION |
|---|---|---|---|
| **A**<br>CLASS *A* FIRES ORDINARY COMBUSTIBLE MATERIALS SUCH AS WOOD, PAPER, TEXTILES AND SO FORTH. REQUIRES. . .COOLING-QUENCHING |  <br>**FOAM**<br>SOLUTION OF ALUMINUM SULPHATE AND BICARBONATE OF SODA | OK FOR **A B**<br>NOT FOR **C** | *FOAM*: DON'T PLAY STREAM INTO THE BURNING LIQUID. ALLOW FOAM TO FALL LIGHTLY ON FIRE<br>  |
| **B**<br>CLASS *B* FIRES FLAMMABLE LIQUIDS, GREASES, GASOLINE, OILS, PAINTS AND SO FORTH. REQUIRES. . .BLANKETING OR SMOTHERING |  <br>**CARBON DIOXIDE**<br>CARBON DIOXIDE GAS UNDER PRESSURE | NOT FOR **A**<br>OK FOR **B C** | *CARBON DIOXIDE*: DIRECT DISCHARGE AS CLOSE TO FIRE AS POSSIBLE. FIRST AT EDGE OF FLAMES AND GRADUALLY FORWARD AND UPWARD<br>  |
| **C**<br>CLASS *C* FIRES ELECTRICAL EQUIPMENT, MOTORS, SWITCHES AND SO FORTH. REQUIRES. . .A NONCONDUCTING AGENT |  <br>**DRY CHEMICAL** | MULTI-PURPOSE TYPE: OK FOR **A B C**<br>ORDINARY BC TYPE: NOT FOR **A**; OK FOR **B C** | *DRY CHEMICAL*: DIRECT STREAM AT BASE OF FLAMES. USE RAPID LEFT-TO-RIGHT MOTION TOWARD FLAMES<br>  |
| |  <br>**SODA-ACID**<br>BICARBONATE OF SODA SOLUTION AND SULPHURIC ACID | OK FOR **A**<br>NOT FOR **B C** | *SODA-ACID*: DIRECT STREAM AT BASE OF FLAME<br>  |

### 1.4 What should employers do?

If PPE is still needed after implementing other controls (and there will be circumstances when it is, e.g. head protection on most construction sites), they must provide this for their workers free of charge.

- They must choose the equipment carefully (see selection details below) and ensure workers are trained to use it properly, and know how to detect and report any faults.

  Hazards: Inhalation of dust and particles, head and eye injuries from projectiles, foot and hand injuries from contact with moving parts, electrical shock due to improper grounding, and fire from sparks Although other exposures exist, they are not controlled by personal protective equipment; therefore, they are not indicated in this manual

| Self-check 1 | Written test |
|---|---|

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Choose the best answer for the following question

1. ……fires result from materials that become gaseous when heated such as oil, grease and paints called ---------- (2 pts)

   A. Class-B Fires B. Class-C Fires C. Class-A Fires D. Class-D fires

2…… Every auto body and paint shop requires fire extinguishers.

   A. Fire protection B. fire extinguishers C *Class Of fires*

*Note:* Satisfactory rating - 10 points Unsatisfactory - below 10 points

**Information sheet 2 Removing Seats and fittings using approved methods, tooling and equipment.**

## 1. Introduction

New cars, replacement seat covers can usually be purchased from a dealership, directly from the manufacturer, or from the aftermarket, although must contend with a complicated array of clips, screws, and electronics to install them. Older cars without complicated mechanisms are easier to reupholster, as long as replacement covers are available. If made-to-measure replacements aren't available, or if you want a wilder pattern, you're looking at sewing your own upholstery.

Organizing your tools and gear so everything is easily reachable will save precious minutes waiting for your handy-dandy child or four-legged helper to bring you the sandpaper or blowtorch. (You don't need a blowtorch for this job.

### Tool List

- Screwdriver
- Socket wrench set
- Handheld pry tool
- Scissors or seam ripper
- Sewing machine
- Staple hook
- Marker

### Parts List

- Replacement seat covers
- Replacement seat material
- Car upholstery-specific thread
- Large sheet of white paper for creating a pattern guide

Basically, any trim on a vehicle either  beauty files the vehicle, adds strength to an area, or provides comfort. Many pieces of trim are bright moldings on either the outside or the inside of the car. Trim also includes dull (no gloss or shine) metal parts and many parts made of cloth, vinyl, rubber, or plastic. These may be attached to either the exterior or the interior of an auto or truck body.

Repairing and replacing trim is an important part of auto body work. During most body repairs, at least some exterior trim work will be necessary. Interior trim work may be necessary to get at damaged panels from the backside or for repairs to the trim itself. Because trim work largely affects the appearance of a repair, it must be done correctly for complete customer satisfaction on even the smallest repairs.

include side moldings, rocker panel moldings, grilles, and window trim pieces. Most of these parts are replaceable items because it is not practical to repair them; the cost of a new molding is less than the time it would take to repair it.


**Figure 4  pro car Removal Tool**

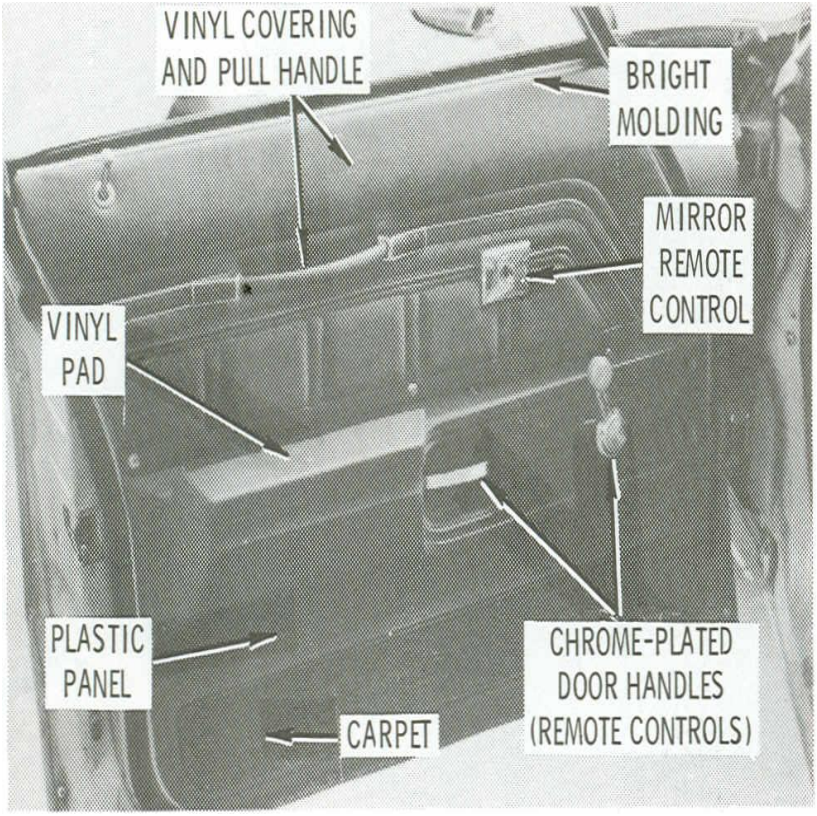



**Figure 5 different part of interior trim**

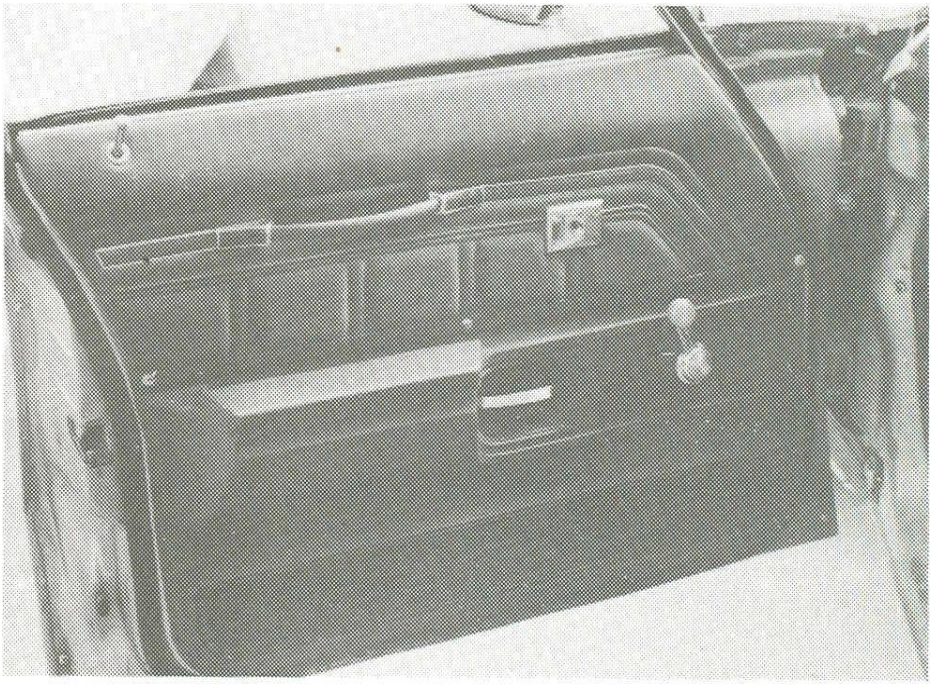


**Figure 6 interior trim**

The interior trim includes all the cloth, plastic, vinyl, carpet, and small rubber and metal parts used to make up the complete interior of the vehicle. Also included is the headliner, which is the plastic, vinyl, or cloth-covering on the inside of the roof panel. The quarter and door trim panels are usually made of either fiberboard or pacifistic. They are covered with vinyl, plastic, carpeting, or a combination of the three. A moisture cover underneath the trim panel protects it from any water that enters the door at the lower edge of the window.

Floor coverings in an automotive interior may be either fabric, carpet or rubber mat These coverings, like headliners, are not normally replaced in an auto body shop. This type of work is usually done in an upholstery shop. However, th~ floor covering may need to be removed, or moved back out of the way, for auto body repairs.

**2.2 INTERIOR TRIM**

The interior trim includes all the cloth, plastic, vinyl, carpet, and small rubber and metal parts used to make up the complete interior of the vehicle. Also included is the headliner, which is the plastic, vinyl, or cloth-covering on the inside of the roof panel. The quarter and door trim panels are usually made of either fiberboard or pacifistic. They are covered with vinyl, plastic, carpeting, or a combination of the three. A moisture cover underneath the trim panel protects it from any water that enters the door at the lower edge of the window

Floor coverings in an automotive interior may be either fabric, carpet or rubber mat These coverings, like headliners, are not normally replaced in an auto body shop. This type of work is usually done in an upholstery shop. However, th~ floor covering may need to be removed, or moved back out of the way, for auto body repairs. This might be necessary, for example, to work on the metal floor in

Successful auto body shops must pay close attention to the interior as well as the exterior, of a car being repaired. A clean, neat interior leaves the customer with a good impression of the shop's work. Careful attention to both the exterior and the interior shows that the shop does good work and is concerned about the entire automobile. Exterior repairs and sheet metal work will be more highly thought of if the interior is neat and clean.

**Trim Panels**

The upholstered panels attached to the inside of the doors or quarter panels are known as trim panels. These are normally made of fiberboard and covered with vinyl, plastic, or carpet. Sometimes, an interior trim panel may be damaged during a collision or may be accidentally cut. If work is to be done inside the door or panel, the trim panel must be removed and replaced.

Removing and Replacing Trim Panels. Most interior trim panels are held in place in the same basic manner.

- For this reason, the general instructions below may be followed to remove and replace them. (In some cases, special fastening methods or accessories may be used on a given model. In these cases, refer to a body shop manual when removing and replacing.)
- Unscrew the door lock knob.
- Remove the handles from the door lock and window regulator remote controls. These are held in place by screws or horseshoe-shaped clips. Use a screwdriver or an Allen wrench to remove the screws, depending on head design. Use a clip puller to remove clips from behind handles
- Remove any screws holding the trim panel in place. These may include arm rest retaining screws and any screws along the bottom of the trim panel

- Remove any accessories attached to the trim panel. A common example is an outside rear view mirror control Remove the screws holding the control in place, and pull it out slightly, to free it from the trim panel.
- Use an upholstery tool to pry the trim panel clips out of the inner door panel holes. These clips are located along the edges of the trim panel.
- Remove the trim panel by pulling up and guiding the panel over the door lock shaft. Guide the rear view mirror control and any other accessories through their respective holes.
- To install a new trim panel or reinstall an old one, reverse the procedure. Be sure that the trim panel clips are properly "started" in their holes before pushing them into the door panel.

Replacing a Plastic Regulator Bracket. Many door glass regulators move up and down with a plastic regulator bracket. These brackets sometimes break. The following steps are used to replace the plastic bracket

1. Remove the trim from the door panel .
2. Pull the trim panel away from the door inner
   panel. Leave the electrical wires connected.
3. Use a % in. drive socket set to remove the bolts
   that hold the regulator bracket, .
4. Take the broken bracket out through the access opening in the inner door panel
5. Place the new bracket in the door
   and replace all the screws, nuts, and bolts.
6. Replace the. door panel trim.

Removing Inside Quarter-panel Trim. The inside quarter panel trim, is removed much like the door trim. The rear seat and back cushion should

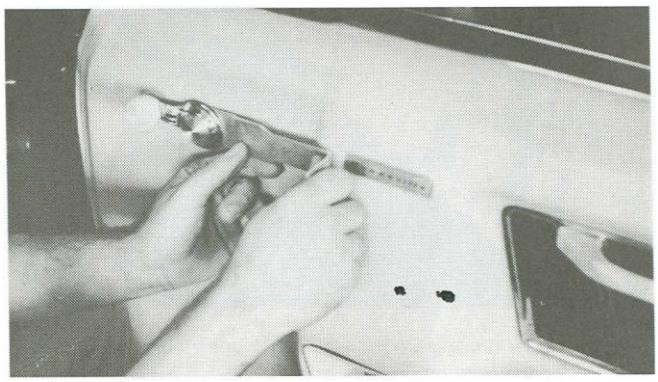


**Figure 7: Removing Inside Quarter-panel Trim**

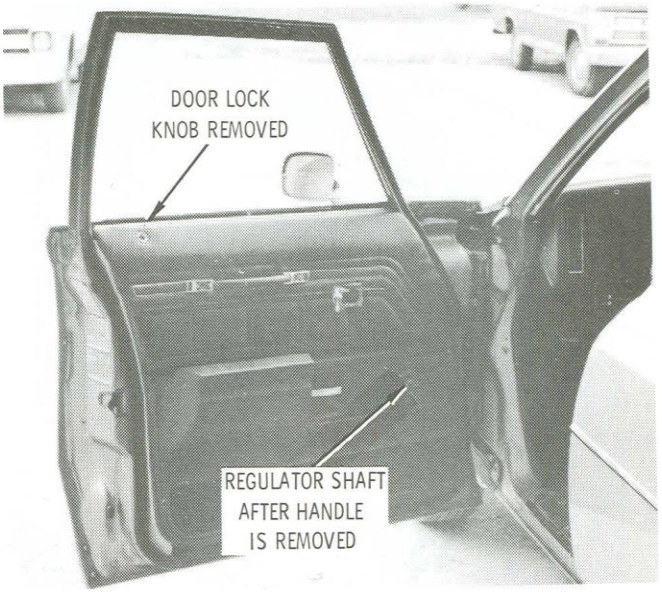
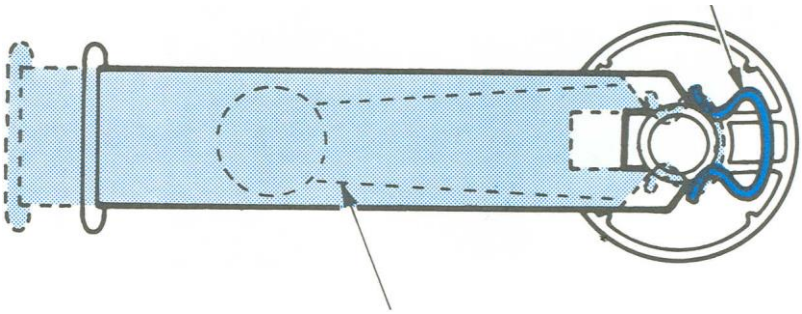



**Figure 8 Removing door lock knob**



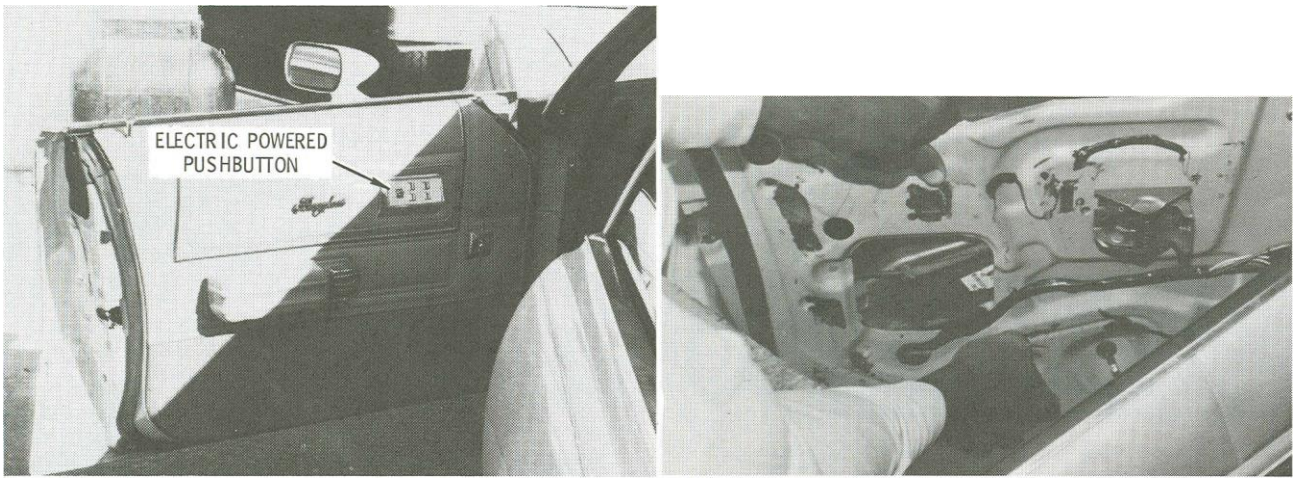
ends of clip puller

**Figure 9 End of clip puller**

The ends of the clip puller force the spring clip off the shaft of the window regulator handle.

Important because whenever it rains or the car is washed, water passes through the inside of the door. Water enters at the bottom of the glass opening, runs down the inside of the door itself, and finally drains out the bottom of the door through the drain holes. If the moisture cover is not in place, water will stain and damage the door trim panel.

When replacing a moisture cover, be sure to put the bottom edge of the cover into the slot at the bottom of the inner door panel. If any water hits the moisture



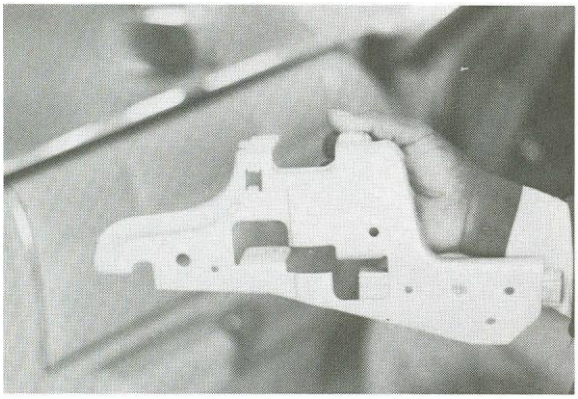
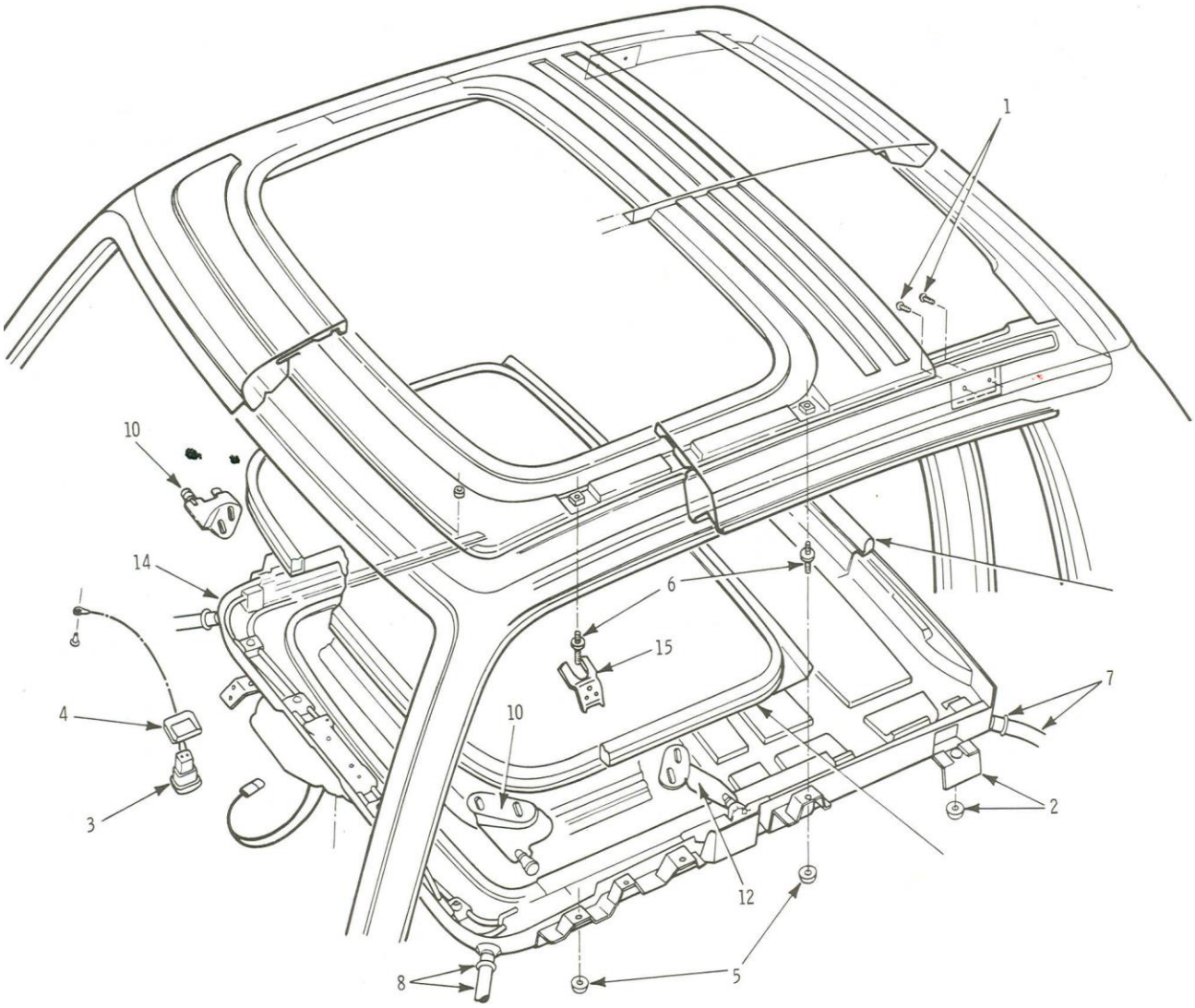



**Figure 10 Electrical power push button**




1 side Roof Rail Support clap

2.Roof Rail to Housing support and Attaching Nut

3- Switch

4- Headlining at Switch

5 housing to roof attaching nut

6- Roof to Housing Screw

7RearDrainHose and attaching

8.front drain roof& attaching clamp

9.Housing weather strip

10.sliding panel front spout

11.side panel housing

**Figure 11 major body panel part**

| Self-check 2 | Written test |
|---|---|

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Choose the best answer for the following question

1. …….fires result from materials that become gaseous when heated such as oil, grease and paints called ---------- (2 pts)

   A. Class-B Fires B. Class-C Fires C. Class-A Fires D. Class-D fires

2…… Every auto body and paint shop requires fire extinguishers.

   A. Fire protection B. fire extinguishers C *Class Of fires*

*Note:* Satisfactory rating - 10 points Unsatisfactory - below 10 points

-

**Information sheet3 Carrying out removal activities in according to industry regulations/guidelines, WHS requirements, legislation and enterprise procedures/policies**

## Introduction

Managing occupational health and safety in the workplace Occupational health and safety (OHS) in the workplace requires an effective management system which is consistent with OHS legislative requirements throughout Australia. To implement effective occupational health and safety management, managers, supervising personnel and employees require a range of OHS system-focused competencies based on practices, procedures and systems that are similar in all work places. OHS 'system-focused' units of competency need to address the range of skills and knowledge required within every workplace to:-

.Establish, implement and monitor an OHS system address OHS legislation, regulations and codes of practice fulfill the duty of care for those in the workplace;

It may be worth getting independent advice on the WHS requirements for your business Work functions are a great way to celebrate and thank your staff for their hard work. But remember that while your staff may be 'off the clock', you're probably still responsible for their health and safety. Here are some suggestions to help celebrate safely.

Before the event:

- make sure your internal policy procedure are up to date, including those for acceptable behavior, and building & harassment in the workplace
- send a friendly email to staff, reminding them:
    - that while the party is a time to relax, it's still a work function
    - of any rules, including those around sexual harassment
    - to be careful if consuming alcohol

| Self-Check – 3 | **Written test** |
|---|---|

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Explain the following Question

1 . write the role of personal protective Equipment?

*Note:* Satisfactory rating – greater than 2 points Unsatisfactory – less than 2 points

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

**Information sheet 4 Accessing and interpreting Information from manufacturer/ component supplier specifications**

## 4.1 Introduction

Checking specifications is critical: During the manufacture of auto parts, specifications must be met – whether by the auto parts supplier or the automobile manufacturer. It is important that the parts meet specifications as they are critical for maintaining the performance standards and safe operation of automobiles, trucks, and other vehicles during their lifetimes. However, the demand for faster, cheaper production of parts while still meeting or exceeding ever-stricter quality standards keeps increasing. This report explains how digital microscopy is used to inspect and document parts easily and quickly in order to determine conformity with specifications.

The purpose of this document is to describe and inform minimum criteria required from all Ensto's key Suppliers and Subcontractors. The document is public and introduced to the key suppliers at least during the tendering process. Suppliers have a very important role in the value chain we offer to our customers and with these requirements we want to ensure the irreproachable performance of our Suppliers and Subcontractors. The general requirements described herein do not supersede requirements in the contracts, specifications or applicable legislations. Required documents can be checked during visits or audits.

All the Suppliers and Subcontractors shall have documented policies and processes to ensure that their operations comply with all relevant health and safety standards and legislations. We appreciate our Suppliers and Subcontractors having implemented and certified OHSAS 18001 or equivalent management systems for occupational health and safety.

## Ethical Principle

The Suppliers and Subcontractors shall follow the highest ethical standards as disclosed in Ensto Supplier Code of Conduct published on Ensco website. Values and Ethical principles are based on the United Nations Global Compact initiative and embedded in Ensco Employee Code of Conduct.

**A specification**:- often refers to a set of documented requirements to be satisfied by a material, design, product, or service.[1] A specification is often a type of technical standard.

There are different types of technical or engineering specifications (specs), and the term is used differently in different technical contexts. They often refer to particular documents, and/or particular information within them. The word specification is broadly defined as "to state explicitly or in detail" or "to be specific".

A requirement specification is a documented requirement, or set of documented requirements, to be satisfied by a given material, design, product, service, etc.[2] It is a common early part of engineering design and product development processes, in many fields.

A functional specification is a kind of requirement specification, and may show functional block diagrams

A design or product specification describes the features of the solutions for the Requirement Specification, referring to either a designed solution or final produced solution. It is often used to guide fabrication/production. Sometimes the term specification is here used in connection with a data sheet (or spec sheet), which may be confusing. A data sheet describes the technical characteristics of an item or product, often published by a manufacturer to help people choose or use the products. A data sheet is not a technical specification in the sense of informing how to produce.

An "in-service" or "maintained as" specification, specifies the conditions of a system or object after years of operation, including the effects of wear and maintenance (configuration changes).

| Self-Check – 4 | **Written test** |
|---|---|

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Give short answer

1…… often refers to a set of documented requirements to be satisfied by a material, design product, or service.

2---------- specification describes the features of the solutions for the Requirement Specification,

*Note:* Satisfactory rating – greater than 2 points Unsatisfactory – less than 2 points

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

**Information sheet 5 Selecting adhesives according to material type and adhesive produce/manufacturer/component supplier recommendations**

## 5.1characteristics of adhesive materials

Specifications are a type of technical standard that may be developed by any of various kinds of organizations, both public and private. Example organization types include a corporation, a consortium (a small group of corporations), a trade association (an industry-wide group of corporations), a national government (including its military, regulatory agencies, and national laboratories and institutes), a professional association (society), a purpose-made standards organization such as ISO, or vendor-neutral developed generic requirements. It is common for one organization to refer to (reference, call out, cite) the standards of another. Voluntary standards may become mandatory if adopted by a government or business contract

As outlined above all adhesives operate by the same basic properties. However, there are several different types of adhesives available, each of which can be differentiated by their particular

characteristics. Some of the characteristics by which adhesives are commonly classified and categorized include:

- Load carrying capacity
- Chemical composition
- Reactivity

The load carrying capacity of an adhesive refers to the maximum load an adhesive-bonded joint can support or bear without experiencing deformation or failure of the adhesive. Depending on the load carrying capacity demonstrated by the adhesive, it can be further classified as structural, non-structural, or semi-structural.

## 5.2 Common Types of Adhesives

Adhesives is an umbrella term which refers to any substances which, when applied between the

surfaces of two or more materials or objects (i.e., substrates), can be used to hold, fasten, or bond them together. The durability of the attachment (i.e., the bond strength) formed between substrates

By the adhesive largely depends on the particular adhesive's properties—specifically its adhesion and cohesion. These properties are the primary mechanisms underlying adhesives; therefore, calculating the failure point of both properties for each adhesive available helps to determine The most suitable adhesive for use in an application given the technical requirements and specifications.

Adhesives are widely employed throughout industry for permanent, semi-permanent, and temporary attachment purposes in a variety of residential, commercial, and industrial applications. Some of the characteristics by which the wide range of adhesives available can be classified and categorized include load carrying capacity, chemical composition, reactivity or inertness, and form. Each of these adhesives demonstrates different properties and offers different advantages, but, as with adhesive and cohesive strengths, the suitability of a particular property or characteristic (and the respective adhesive) is dependent on the application.

This article focuses on adhesives, exploring the various classifications and categories available and explaining their respective characteristics, advantages, and disadvantages. Additionally, it outlines some of the common types employed and the selection considerations for choosing an adhesive for an application.

Based on the characteristics outlined above, there are several different types of adhesives available. Some of the more common types of adhesives employed throughout industry include:

- Anaerobic adhesives: Anaerobic adhesives are acrylic-based adhesives which cure in the absence of air. The presence of metal accelerates the curing process. This type of adhesive typically has low viscosity, is available in liquid and paste solutions, and is suitable for securing, sealing, and retaining close-fitting and structural parts.
-

- **Cyanoacrylates adhesives**: Cyanoacrylate adhesives, also referred to as “instant glues”, are adhesives which cure in the presence of moisture and ultraviolet (UV) light (e.g., Krazy Glue ®, a trademark of Toagosei Co., Ltd). This type of adhesive is available in a variety of formulations ranging from low to high viscosity and is suitable for porous and non-porous substrates. It is not suitable for structural applications due to its low shear strength.

- Epoxy adhesives**:** Epoxies are typically available as single-part and multi-part systems. These types of adhesives demonstrate high shear and peel strength (even in extreme temperatures and environments) and are suitable for gap filling and bonding dissimilar substrates.

- **Hot glue**: Hot glue is a type of hot melt adhesive typically derived from thermoplastic compounds. This type of adhesive demonstrates high levels of tackiness and is suitable for use on both porous and non-porous substrates. Generally, hot glue solidifies by cooling, but some variants can be cured by the presence of moisture or UV light.

- **White glue**: White glue is a common polyvinyl acetate (PVA) glue traditionally used for arts and crafts purposes (e.g., Elmer’s® Glue, a trademark of Elmer's Products, Inc.). This type of adhesive requires contact and pressure during solidification and is suitable for cloth, cardboard, paper, wood, an

- d other porous substrates.

**Figure 12 Adhesives vs. Sealants**

### 5.3 Basic Mechanisms UnderlyinAdhesives

Adhesives are composed of similar materials, employ similar mechanisms, exhibit similar characteristics, and are used in some of the same applications as those of sealants. Therefore, in a discussion about adhesives, the topic of sealants invariably comes up.

As indicated previously, adhesives are substances which, by way of surface attachment, can be used to hold, fasten, or bond two or more substrates together. On the other hand, sealants are substances which, by way of surface attachment, can be used to fill the space between two or more substrates to

create a seal or barrier which prevents the penetration of different elements—e.g., fluids, dust, fire, noise, etc.

### 5.3.1 Adhesives vs. Sealant

These definitions allude to some of the similarities between adhesives and sealants as both substances primarily make use of the property of adhesion to form surface attachments. Other overlapping characteristics include some of the composition materials, application and processing requirements, failure Mechanisms, substance-to-substrate interactions, and, depending on the type of adhesive or sealant employed, capabilities for both adhering and sealing.

Despite these numerous similarities, industrial standards typically classify adhesives and sealants as two distinct and separate substances. This delineation is largely due to their differing primary functions. Whereas the primary function of adhesives is to bond two or more substrates together, sealants are primarily employed to fill a space and create a barrier between two or more objects

. Although some adhesives—typically referred to as adhesive sealants—can fulfill both adhering and sealing functions, in general, their primary function is not necessarily to fill spaces or create barriers between substrates. Conversely, while some stronger sealants may qualify as adhesives, most sealants demonstrate weaker attachment and are not suitable for bonding or attachment purposes. Therefore, the following article will only focus on adhesives and will not cover sealants.

As indicated previously, adhesion and cohesion are the primary mechanisms underlying adhesives. Regardless of type and design, all adhesives operate by these same fundamental properties, which describe the interactions between the adhesive, the substrate (also referred to as the adherend once the adhesive has been applied), and the substrate's surface; the components of the adhesive; and the components of the substrate.

**Adhesion**

Adhesion is a measure of the attractive forces between two different substrates which bond them together. By calculating the level of adhesion demonstrated by an adhesive, one can determine the strength of the attachment formed between the adhesive and substrate and, combined with the measure of cohesive forces, the bond strength.

Several theories have been developed to define and describe this property, but no single theory has yet to accurately and comprehensively explain adhesion across the wide range of adhesives available. Some of the most common theories of adhesion include:

- Adsorption: The adsorption theory states that adhesion results from the intermolecular contact between the surfaces of two substances—i.e., between the adhesive and substrate. The attractive forces resulting from the contact—e.g., chemical bonds, van der Waals forces, etc.—hold the two substrates together.

- Mechanical interlocking: The mechanical interlocking theory states that adhesion results from the flow of the adhesive into and around the cavities and protrusions of both substrates' surfaces. Once hardened, the adhesive mechanically holds the two substrates together.

- Inter diffusion: The inter diffusion theory states that adhesion results from the diffusion of molecules into and between the adhesive and substrate(s). In some cases, the adsorption of the adhesive's molecules into the surface(s) of the substrate(s) can result in a chemical reaction—e.g., melting. The diffusion of molecules and subsequent hardening of the adhesive leads to the formation of a bond between the adhesive and the substrate(s) which effectively bonds together the two substrates.

As outlined above, there are several different types of compounds from which adhesives are derived, including acrylic, neoprene, polyurethane, silicone, and urethane. These various compounds can be categorized into larger umbrella groups, with the most commonly employed being synthetic materials, such as:

- Thermoplastic adhesives: Thermoplastic adhesives do not require a curing period. Instead, once the adhesive has been applied, it either cools (e.g., in the case of hot melt adhesives) or dries (e.g., in the case of glue) to form an adhesive bond between substrates.

  As thermoplastic materials do not require a curing period, they do not undergo a physical or chemical change upon the application of heat. Therefore, they can be remelted and recycled for future attachment applications. While this ability offers some advantage in regard to long-term adhesive costs, it also limits the suitable operating temperatures and the environmental

conditions (specifically chemical and solvent exposure) for thermoplastic adhesives.

Some of the compounds from which thermoplastic adhesives are made include cellulose derivatives, poly acrylates, poly ethers, poly sulfonic, saturated polyesters, and vinyl polymers and copolymers.

- Thermosetting adhesives: Unlike thermoplastic adhesives, thermosetting adhesives do require a curing period. When first applied to a substrate, thermoset adhesives have short polymer molecules. However, during the curing process, these adhesives undergo an irreversible chemical cross-linking reaction, which bonds together long chains of polymer molecules. This reaction changes the physical properties and chemistries of thermoplastic adhesives, allowing them to harden and the adhesive bond to set. Depending on the type of thermosetting adhesive employed, there are several methods of curing it, including the application of heat and pressure, or exposure to moisture, radiation, or a catalyst.
  As thermosetting adhesives require a curing period for the adhesive bond to set, these types of adhesives cannot be sufficiently softened for re-positioning or adjustment nor reused for future attachment applications. Additionally, while they typically express greater resistance to heat and solvents and provide higher bond strengths than thermoplastic adhesives (making them suitable for structural applications), extreme temperatures may still result in the degradation or weakening of
  Some of the compounds from which thermosetting adhesives are made include amino plastics, epoxies, furans, phenolic resins, poly aromatics, and unsaturated polyesters. These adhesives are available in several forms, including liquids, pastes, and solids, and single- or multi-part solutions.
- Elastomeric adhesives: Elastomeric adhesives, such as rubber adhesives, can be made from natural or synthetic elastomers. Due to these compounds' natural elasticity, durability, and capability to withstand extension and compression stresses, these types of adhesives are suitable for attachment applications requiring high bond strength, especially for uneven loads.

- Elastomeric adhesives are available in several forms, including liquids, pastes, tapes, and single- or multi-part solutions. Depending on the composition of the type employed, a curing period may be required to set the adhesive bond.
- Hybrid adhesives: Hybrid adhesives are derived from an amalgamation of thermoplastic, thermosetting, and elastomeric compounds which exhibit some combination of the chosen materials' advantageous characteristics. For example, a hybrid adhesive can express the resistance to peel and impact demonstrated by elastomeric adhesives, as well as the high resistance to heat and solvents demonstrated by thermosetting adhesives. These adhesives are available as liquids, films, and single- or multi-part solutions.

- Additives: In addition to the standard compounds found within a specific type of adhesive (as outlined above), certain attachment applications may also require additives to enhance the adhesive's qualities. For example, colorants (such as dye or pigments) can be added for aesthetic purposes, plasticizers can be added to increase flexibility, and fillers (such as mica, alumina, silica, etc.) can be added to extend the formula and improve specific performance characteristics.

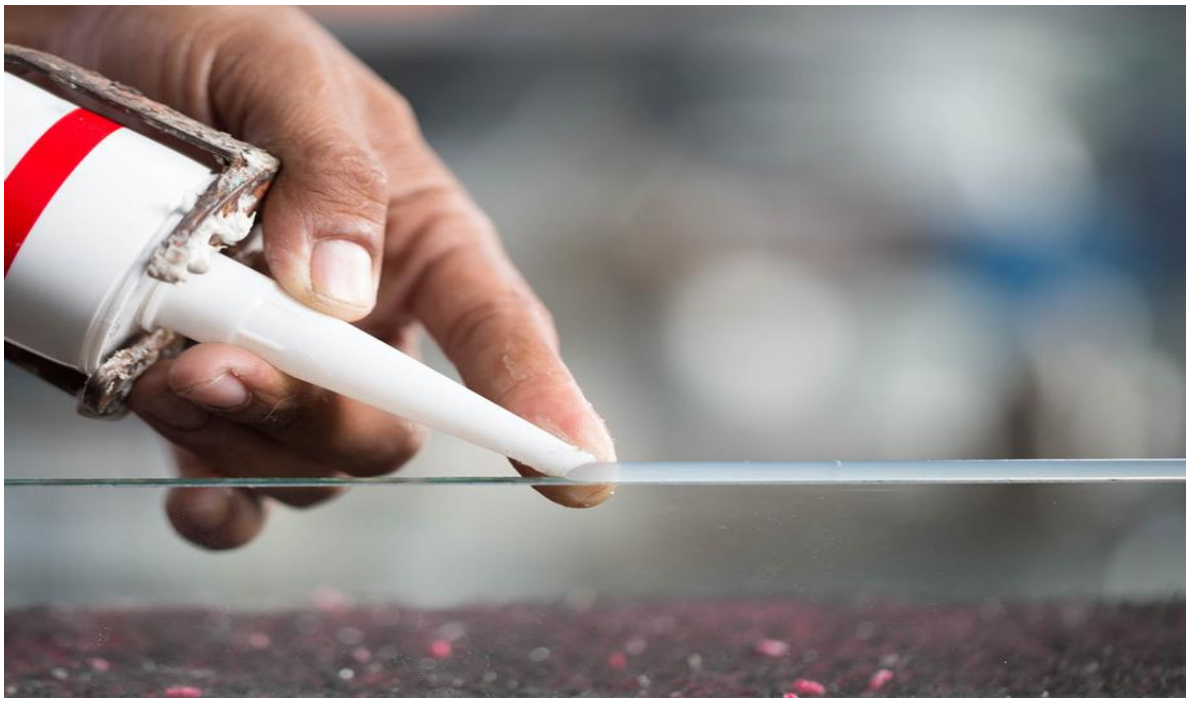


**Figure 13 plasticizers adhesive**

## 5.4 Solidification by Chemical Reaction

With regards to adhesives, chemical reaction, depending on the adhesive employed, refers to the adhesive's reaction to a curing agent or another catalyst, such as heat, moisture, ultraviolet (UV) radiation, and lack of oxygen.

Adhesives which solidify by chemical reaction are, by nature, thermosetting. Therefore, they generally express high bond strengths, offer significant temperature and solvent resistances, and are suitable for structural and non-structural applications. Additionally, they can be used for bonding substrates with larger surface areas.

Chemically-reactive adhesives are available in several forms, including single-part and multi-part solutions, as well as liquids, pastes, tapes, films, and powders. Some examples of this type of adhesive include acrylic, anaerobic, cyanoacrylates, and epoxy adhesives.


**Figure 14 chemically -reactive adhesives— cyanoacrylate "instant" adhesives.**

## 5.5 Solidification by Solvent Loss

Solvent-based adhesives, such as water-based latexes or other water-based dispersions, solidify due to the evaporation or diffusion of the solvent. Solvents serve as carrier materials within these types of adhesives, lowering their viscosities and allowing for their application onto the substrate. Once a solvent-based adhesive is applied onto a substrate, the solvent evaporates from the adhesive into the atmosphere or diffuses into the substrate, allowing viscosity to increase, the adhesive to dry, and eventually, the adhesive bond to set.

These types of adhesives are available in several forms, including

- **Contact adhesives**: Typically applied through spray or roll coating, contact adhesives are adhesives of high cohesive strength which must be applied to both substrates to form an adhesive bond. Once applied to the substrates, the adhesive is subjected to a drying period in which a portion of its solvent is evaporated (in some cases, with the addition of heat) to develop the adhesive's tackiness. Once the optimal level of tackiness is attained, there is a short window of time in which the two adherents must be brought into contact. Within this window, the properties of the adhesive and the application of pressure allow the adhesive bond to form.
- **Pressure-sensitive adhesives** (**PSAs):** While pressure-sensitive adhesives are applied similarly to contact adhesives (i.e., applied to a substrate and allowed to dry), unlike contact adhesives they exhibit permanent tackiness, even after complete solidification. Because of this quality, these types of adhesives can be pre-applied to a substrate (e.g., film, form, or other backing material) and dispensed as needed. One common example of pressure-sensitive adhesives is adhesive tapes.
- **Resinous solvent adhesives**: Resinous solvent adhesives, also known as resin adhesives, are adhesives which are typically applied to porous substrates. The porosity allows these adhesives to flow into and around the cavities and protrusions of the substrates. As the solvent evaporates or diffuses into the substrate, the adhesive hardens and mechanically interlocks the two substrates together.
- **Reactiveable adhesives**: Reactive able adhesives, also known as solvent-activated adhesives, are adhesives which are pre-applied to a substrate and allowed to dry to a non-tacky state for storage and shipment purposes. As needed, these adhesives can be re-activated (i.e., made to be tacky again) by the application of a solvent, which allows substrates to be bonded together given contact and pressure. One common example of this type of adhesive is moisture-activated stamps.

**Fig 10 pressure-sensitive adhesives—adhesive duct tapes.**

## 5.6 Solidification by Cooling

Solidification by cooling occurs in solid adhesives (typically thermoplastic-based adhesives) which are subjected to melt conditions. Melting the adhesives allows them to soften, flow out across, and be applied to the substrate(s). After application, the melted adhesive cools and hardens, forming a bond between substrates. One example of adhesives which employ this heat-and-melt application method is hot glue.

**Figure 11 adhesives solidify by cooling**

## Adhesive Form

As outlined above, there are several different classifications and categories of adhesives, each of which exhibits different properties and characteristics. Depending on the adhesive employed, they are also available in various physical forms, including:

- Liquid (solvent less)
- Paste (solvent less)
- Solvent-based
- Solid

Both liquid and paste adhesives are available in single-part or multi-part solvent less solutions. Solvent-based adhesives generally come in liquid form but are classified separately from the general liquid adhesives category as they require additional conditions for use—i.e., materials and an environment which are conducive to solidification by evaporation or diffusion (solvent loss). Solid adhesives are available in a variety of different forms, including sheets, powders, and various shapes and preforms

| Self-Check – 5 | **Written test** |
|---|---|

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Explain the following question

1. Write the characteristics of adhesives in commonly classified and categorized

2. Write at list three types of adhesives

*Note:* Satisfactory rating – greater than 2 points Unsatisfactory – less than 2 points

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

**Information sheet 6 Carrying out activities according to industry regulations/guidelines, WHS requirements, legislation and enterprise procedures/policies**

**Introduction**

Consistent with the OSH policy and based on the initial or subsequent reviews, measurable OSH objectives should be established, which are:

- specific to the organization, and appropriate to and according to its size and nature of activity;
- consistent with the relevant and applicable national laws and regulations, and the technical and business obligations of the organization with regard to OSH;
- focused towards continually improving workers' OSH protection to achieve the best OSH performance;
- realistic and achievable;
- documented, and communicated to all relevant functions and levels of the organization; and
- periodically evaluated and if necessary updated.

**6.1 OHS management system requirements**:-

This involves the need for OHS system-focused units of competency to ensure that employees at all levels are skilled appropriately to support the management of an effective OHS system. This includes OHS units of competency that are relevant to an individuals work role, for example knowledge of OHS legislation, hazard control or communication of OHS issues.

Industry-specific OHS management strategies In some industries, occupational health and safety management requires specific processes and procedures that should be reflected in relevant qualifications and units of

The practical recommendations of these guidelines are intended for use by all those who have responsibility for OSH management.

Occupational safety and health, including compliance with the OSH requirements pursuant to national laws and regulations, is the responsibility and duty of the employer. The employer should show strong leadership and commitment to OSH activities in the organization, and make appropriate arrangements for the establishment of an OSH management system. The system should contain the

main elements of policy, organizing, planning and implementation, evaluation and action for improvement.


**Figure 12 Main element of OHS management system**

| Self-Check – 6 | **Written test** |
|---|---|

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Define the following question

1. Write the improvement .of elements of policy, organizing, planning and implementation, evaluation

2.Write OHS management system requirements

*Note:* Satisfactory rating – greater than 2 points Unsatisfactory – less than 2 points

**Operation Sheet 1– Remove seat interior trim**

Procedures to ensure the job gets done safely and with

First, let's talk about assessing the condition of the cloth seats.

Step 1 Park the vehicle in a shaded and well-lit area, preferably inside a garage.

Step 2. Cloth seats are protected by seat covers, remove the covers from the seats.

Step 3 Remove the floor matting and set aside.

Ste 4. Grab a vacuum cleaner and proceed to suck out any traces of loose dirt and debris on the seats..

Step5. Check the seats for signs of deep-seated dirt, stains, and friction wear. If the seats are still in mint condition,

| LAP TEST | Performance Test |
|---|---|

Name…… ID……Date……

Time started: _____ Time finished: _____

**Instructions:** Given necessary templates, tools and materials you are required to perform the following tasks within **2** hour. The project is expected from each student to do it.

Task 1: perform remove seat interior trim

| LG #50 | LO#3 Replace seats interior trim components and fitting |
|---|---|

Instruction sheet

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

- Using protective clothing and equipment appropriate to the replacement activities.
- Replacing seats and fittings using approved methods, tooling and equipment.
- Carrying out replacement activities according to industry regulations/guidelines, WHS requirements, legislation and enterprise procedures/policies.

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:

- Use protective clothing and equipment appropriate to the replacement activities.
- Replace seats and fittings using approved methods, tooling and equipment.
- Carry out replacement activities according to industry regulations/guidelines, WHS requirements, legislation and enterprise procedures/policies

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

**Information sheet 1 Protective clothing and equipment appropriate to the replacement activities are used.**

## 1.1 Introduction

This guide is for PCBUs (persons conducting a business or undertaking) who provide their workers with protective clothing.

The guide offers advice on what to consider when selecting protective clothing and outlines requirements for providing and maintaining protective clothing for your workers. It will help you to meet your obligations regarding providing protective clothing under the Health and Safety at Work Act 2015 and the Health and Safety at Work (General Risk and Workplace Management) Regulations 2016.

- Protective clothing is a type of PPE (personal protective equipment). It can provide protection for workers when all other control measures can't adequately eliminate or minimize risks to a worker's health and safety.
- Protective clothing must be suitable for the nature of the work and any risks associated with that work.
- Protective clothing must be a suitable size and fit. It must also be reasonably comfortable to wear and be compatible with any other PPE or clothing workers are required to wear or use.
- PCBUs (persons conducting a business or undertaking) must make sure protective clothing is maintained, repaired and replaced so it continues to protect workers.
- PCBUs cannot pass on the cost of providing protective clothing to workers, or make them provide their own.
- PCBUs must engage with workers when making decisions about worker health and safety. This includes choosing and making changes to protective clothing

## 1.2 what is protective clothing?

Protective clothing is a type of PPE (personal protective equipment). Protective clothing is any clothing specifically designed, treated, or made to help minimize risk to a worker's health and safety while working.

Examples of protective clothing include:

- safety boots
- gloves
- hard hats
- high visibility clothing
- overalls and protective aprons.

**PPE is the last resort**

PPE should only be used as a last line of defense after all other reasonably practicable actions have been taken to eliminate or minimize risks.

Risks must be managed firstly by elimination, or if this is not reasonably practicable, through minimization. You can minimize risk by using substitution, isolation, or engineering control measures. If it is not reasonably practicable to minimize using those control measures, you can use administrative controls, and then, PPE to reduce any remaining risks to workers' health and safety.

The table below lists possible protective clothing options for various parts of the body. Your workers, PPE supplier, and a health and safety professional will be able to offer advice on the best options for your situation (see Get expert advice).

| Body area | Potential clothing examples |
|---|---|
| Head and neck | • Face shields<br>• Sunhats |

| | |
|---|---|
| | • Safety helmets (hard hats)<br>• Neck protection (eg scarves for use during welding)<br>• Hairnets |
| Eyes | • Safety glasses and goggles<br>• Face shields<br>• Visors<br><br>See our quick guide: Protecting your workers' eyes |
| Ears | • Earplugs<br>• Earmuffs<br>• Semi-insert/canal caps<br><br>See our guidance: Hearing protection [PDF, 639 KB] (PDF 639 KB) |
| Hands and arms | • Gloves (latex, rubber, leather)<br>• Long sleeved tops<br>• Gauntlets and slaving that covers part or all of the arm |
| Feet and legs | • Rubber boots<br>• Thermally insulated boots<br>• Safety boots with protective toecaps and penetration-resistant mid-soles<br>• Foundry boots<br>• Chainsaw boots<br>• Anti-static, electrically conductive boots<br>• Boots with oil/chemical resistant soles<br>• Non-slip shoes |

| | |
|---|---|
| Whole body | • Conventional or disposable overalls<br>• Aprons<br>• Chemical suits<br>• Cooling vests<br>• Weather-proof gear – water-proof trousers, rain coats<br>• Fire-proof clothing<br>• Hi-visibility (hi-viz) clothing |

## 1.3 Compatibility with other clothing and PPE

- Clothing should be easy to put on and take off.
- It should not interfere with normal movement required for the job. For example walking, climbing stairs or ladders, sitting, standing, and operating plant or machinery.
- It should not be too loose or baggy. Loose or baggy clothing could get snagged on objects or cause tripping.
- Pants and sleeves should not hang down over hands or feet. Rolled up sleeves and trousers could get caught in machinery.
- Protective clothing should cover an entire area, even when a worker is moving. For example, if a person raises their arms or leans over, clothing should not leave parts exposed.
- Head protection should be snug. It should not be able to slide around or tip forward.
- Clothing should not be so tight that it restricts blood flow.
- Clothing should not have sharp edges or rough surfaces that could harm the worker or others near them.
- Where possible, protective clothing should be made of breathable materials to avoid thermal discomfort (workers becoming too hot or sweaty while working).

Protective clothing must be compatible with other PPE workers may need to wear or use at the same time. For example:

- gloves should fit with sleeves
- trousers should fit over or inside boots (whichever is best practice in your industry)
- protective eye wear should be compatible with any head protection or respiratory equipment (not cause air leaks around face seals)
- ear muffs should not interfere with wearing safety helmets. Some safety helmets can be fitted with specially-designed eye and hearing protection.
- Protective eyewear should fit comfortably over prescription glasses.

Sometimes protective clothing itself may create a new risk. For example:

- heavy or layered protective clothing may increase the risk of a worker over-heating and suffering a heat-related illness or injury
- bulky protective clothing may restrict a worker's mobility
- wearing gloves when operating machinery may create a risk of the gloves getting caught
- hearing protection could stop a worker hearing vehicles approaching
- face shields may reduce vision.

Any new risks identified as a result of PPE requirements must also be managed.

| Self-Check – 1 | **Written test** |
|---|---|

Name…… ID…… Date……..

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Briefly Explain the following Question

1. write the protective clothing itself may create a new risk?(4points)

2. when workers may need to wear or use PPE at the same time? (2pts)

*Note:* Satisfactory rating – greater than 3 points Unsatisfactory – less than 3 points

**Information sheet 2 Replacing seats and fittings using approved methods, tooling and equipment.**

## 2.1 Introduction

. If you would still like to check availability for your vehicle please enter the information in the below form and we will review and return a reply in a timely manner - Please limit your inquiry to the email form this will allow us the time to research and provide you with accurate information. Phone calls are not recommended.

**1 Seat Width**; Measured from the widest aspect of the user's buttocks, hips or thigh. It should be wide enough to avoid pressure on the hips.

**2.Seat Depth**; Measured from the user's posterior buttock, along the lateral thigh to the popliteal fold with your palm horizontal to the seat. Usually, a space of about 2 inches is preserved to avoid pressure from the front edge of the seat against the popliteal space. You should be able to fit 3-4 fingers between the front edge of the seat and the back of your knee.

**3. Seat Height**; Determined by the height of the individual and if the wheelchair is self-propelled. When using the feet to propel, the seat height should allow for them to reach the floor with their heel. Those using footrests have higher seat heights. It is measured from the user's heel to the popliteal fold. The bottom of the footrest is 2 inches from the floor.

**4Armrest Height;** Should allow user sit erect, with level shoulders when bearing weight on the forearms as they rest on the armrest. It is determined by measuring the distance between the seat of the chair and olecranon and adding one inch.

**5. Backrest Height**; The inferior angles of the scapula should be approximately 1 finger-breadth above the back when the user sits with erect posture. It is determined by measuring the distance between the seat of the chair to the patient's axilla, and subtracting four inches. The height of the backrest depends on the needs of the user. Wheelchair users who push themselves need a backrest

which allows their shoulders to move freely. Wheelchair users who have difficulty sitting upright may need a higher backrest which gives more support to the spine.

**6 Footrest Length**; Affects the support of both the feet and the thighs and the clearance of the footplates and the ground. The footplate must be about 1 to 2 inches off the ground to permit adequate ground clearance

Due to the closure of 2 major Seat Cover manufacturing plants - Both Original and Custom Tailored style seat covers we are limited in vehicle patterns that are available for reproduction. You can submit an inquiry from the form below to check for your vehicle.

Original Sewn Style Replacement Seat Covers;-

- These are sewn to replicate the Original Sewn Appearance of the Stock seat. Does not mean Original Materials, they are only offered using aftermarket vinyl and cloth materials.
- We will be adding original replacement seat covers that are available in the very near future.
- These seat covers will install in the same manner as the original but are only available in certain materials.
- They are sold as kits and you can purchase a Front, Rear or the Complete Set depending on your needs.
- We do not offer PARTIAL section peace such as driver seat cushion, driver backrest, etc.

If you would still like to check availability for your vehicle please enter the information in the below form and we will review and return a reply in a timely manner - Please limit your inquiry to the email form this will allow us the time to research and provide you with accurate information. Phone calls are not recommended.


**Figure 15 old & new seat cover**

If Original Replacement seat covers are not available - you may be interested in -
Custom Tailored Seat Covers;-

These are tailored made to fit your vehicle but offered in SELECTED Design Layouts only.

- A great alternative for those older vehicles that we do not offer the Original Sewn Style patterns.
- Used for most vehicles 1990 and older.
- These seat covers do not come with plastic J-clips, listings and/or Zippers/Velcro hardware for installation - but they will have additional trim materials added to the perimeter for the hog ring installation to the springs.
- They are made to fit each vehicle's actual seat configuration but are only offered in the 4 Primary Design Layouts for this line.


**Figure 16 old & seat custom tailored**

## 2.2 Automotive covers

We offer a large selection of auto seat covers to fit everyone's needs. Our two permanent hog ring installation types are the Custom Tailored and the Factory Original sewn style replacement seat covers. These are offered in a cloth, vinyl or combination of both materials. If available, the Factory Replacements will also provide you the option of leather. Don't forget the additional items you may need to complete your interior project.

The Slip-over style seat covers are made for installing over your original covers to protect or upgrade your interior. They are available in an assortment of materials also. Some are universal in design fit and others are custom made for your vehicle application. The Lazio Leather line is also a Slip-over which gives you an opportunity to upgrade to leather or vinyl at a reasonable cost. Or maybe you are just looking for seat protection from pet hair, we have a line of pet seat covers, also. Let the family pets ride with you without the worry. Easy to clean!

| Self-Check – 2 | **Written test** |
|---|---|

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

TEST I Briefly Explain the following Question

1.Write the d/c between old & seat custom tailored?

*Note:* Satisfactory rating – greater than 2 points Unsatisfactory – less than 2 points

**Information sheet3 Carrying out replacement activities according to industry regulations/guidelines, WHS requirements, legislation and enterprise procedures/policies**

### 3.1 Regulations and procedures for guaranteeing OSH Employers –

Based on national OSH legislation standards, regulations, local OSH technical regulations and their business, production and working conditions - shall develop, issue and organize the implementation of regulations and procedures to guarantee OSH.

### 3.2 **Responsibilities of employers in guaranteeing OSH at the workplace**

1. Guarantee that the workplace meets the requirements in terms of space, ventilation, dust, steam, toxic gas, radiation, electro-magnetic fields, heat, moisture, noise, vibration, microorganisms, other hazardous and toxic factors as indicated in relevant technical regulations; examine and measure these factors regularly; ensure that there are enough proper shower rooms and toilets at the workplace as stipulated by the Health Minister

### 3.3 Responsibilities of workers in guaranteeing OSH at the workplace

1. Abide by OSH regulations, rules, procedures and requirements issued by employers or competent state agencies related to their work;
2. Comply with legislation and grasp knowledge and skills on measures to guarantee OSH at the workplace; use and maintain the provided personal protective equipment, OSH facilities at the workplace during the performance of the assigned work/duties.
3. Participate in OSH training before using machinery, equipment, supplies and substances subject to strict requirements for OSH.
4. Prevent direct risks of OSH failure, violations of OSH regulations at the workplace; timely report to responsible persons when detecting occupational accidents, incidents or risks of incidents, occupational accidents or diseases; actively participate in providing rescue, dealing with incidents

### 3.4 WHS Requirement

#### 3.4.1 Equipment, supplies and substances subject to strict requirements for OSH

1. Machinery, equipment, supplies and substances subject to strict requirements for OSH are those which are likely to cause occupational accidents and serious consequences to people's health and life despite appropriate transportation, storage, preservation and usage during the production and working process as instructed by manufacturers.

#### 3.4.1 Work health and safety (WHS) –

sometimes called occupational health and safety (OH&S) – involves the management of risks to the health and safety of everyone in your workplace. This includes the health and safety of anyone who does work for you as well as your customers, visitors and suppliers

It may initially cost money and time to implement safe practices and install safety equipment but is critical to the success of your business. Not taking action could also result in prosecution, fines and loss of your skilled staff.
Each state has its own WHS laws and a regulator to enforce them.

The WHS framework for each state includes the:

- **Act** – outlines your broad responsibilities.
- **Regulations** – set out specific requirements for particular hazards and risks, such as noise, machinery, and manual handling.
- **Codes of practice** – provide practical information on how you can meet the requirements in the Act and Regulation
-
- **Regulating agency (regulator)** – administers WHS laws, inspects workplaces, provides advice and enforces the laws. Check their website for WHS information and resources

Work functions are a great way to celebrate and thank your staff for their hard work. But remember that while your staff may be 'off the clock', you're probably still responsible for their health and safety. Here are some suggestions to help celebrate safely.

Before the event:

- make sure your internal policy and procedure are up to date, including those for acceptable behavior, and bullying and harassment in the workplace
- send a friendly email to staff, reminding them:
  - that while the party is a time to relax, it's still a work function
  - of any rules, including those around sexual harassment
  - to be careful if consuming alcohol

| Self-Check – 3 | **Written test** |
|---|---|

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

*Note:* Satisfactory rating – greater than 2 points Unsatisfactory – less than 2 points

**Operation Sheet 1– Replace seat interior trim**

**Procedures to ensure the job gets done safely and with**

1. Purchase replacement seat upholstery (either through a dealer, manufacturer, or aftermarket)
2. Using the appropriate socket wrench, detach the car seat base from the floor.
3. If there are any electrical components connected (e.g., power-seat controls), detach the connectors.
4. Remove the seat and set it on a work table or bench.
5. Remove the headrest by pushing in the small detent at its base.
6. Unzip the upholstery from the seat backing (gives access to the seat base)
7. Unscrew the seat base from the seat frame, but do not remove it.
8. Carefully detach the side clips holding the seat base to the cushion.
9. Lifting upward, remove the upholstery while carefully detaching the inner clips using the small pry bar.
10. Repeat steps 7 and 8 for the seat backing.
11. Place the new seat base upholstery on the base cushion and stretch to connect the first clip at the rear.
12. Working back to front, connect the clips to the cushion, ensuring it remains taut throughout.
13. Reattach seat base to seat frame.
14. Repeat steps 10 and 11 for the seat backing.
15. Once seat backing upholstery is secure and taught, zip up the backing.
16. Reinstall the headrest.
17. And finally, reinstall the seat.

| LAP TEST | Performance Test |
|---|---|

Name…… ID……Date……

Time started: _____ Time finished: _____

**Instructions:** Given necessary templates, tools and materials you are required to perform the following tasks within **3** hour. The project is expected from each student to do it.

Task 1: perform replace seat interior trim

| LG #51 | LO #4- Cleanup work area and maintain equipment |
|---|---|

Instruction sheet

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

4.1. Collecting and storing materials that can be reused

4.2. Removing waste and scrap by following workplace procedures.

4.3. Cleaning and inspecting equipment and work area for serviceable conditions

4.4. Identifying and tagging unserviceable equipment

4.5. Completing operator maintenance is in accordance with manufacturer specifications

4.6. Maintaining tool in accordance with workplace procedures and repair methods

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:

4.1. Collect and store materials that can be reused

4.2. Remove waste and scrap by following workplace procedures.

4.3. Clean and inspect equipment and work area for serviceable conditions

4.4. Identify and tag unserviceable equipment

4.5. Complete operator maintenance is in accordance with manufacturer specifications

4.6. Maintaining tool in accordance with workplace procedures and repair methods

Learning Instructions:

. **Learning Instructions:**

1.Read the specific objectives of this Learning Guide.

2Follow the instructions described below.

3.Read the information written in the information Sheets

4.Accomplish the Self-checks

5Perform Operation Sheets

6.Do the “LAP test”

**Information Sheet 1- Collecting and storing reused material**

The workplace or office is a place where productivity is expected and having a pleasant work area certainly adds to a positive environment. Employees can do their part in addition to regular cleaningstaff housekeeping and caretaker maintenance to keep it clean, safe, and healthy for all.

Collecting and storing material that can be reused

The proper care and storage of materials, tools and equipment’s are not only the concern of the management but of the workers who use the equipment.

A major responsibility of the technician is to ensure that materials, tools and equipment are maintained in a good condition and are readily available when required for the various work activities. Faulty tools and equipment’s are a common reason for delays on technical activities.

Good organization of stored materials is essential for overcoming material storage problems whether on a temporary or permanent basis. There will also be fewer strain injuries if the amount of handling is reduced, especially if less manual materials handling is required. The location of the stockpiles should not interfere with work but they should still be readily available when required. Stored materials should allow at least one meter (or about three feet) of clear space under sprinkler heads.

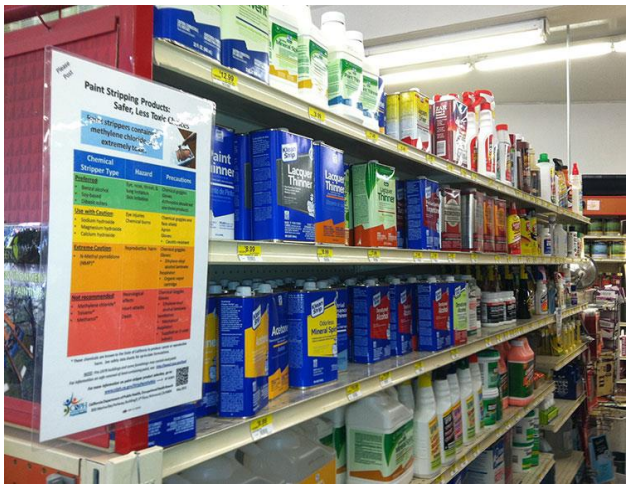




Figure 17 properly stored tools

Importance of proper storage of tools and equipment's

It is important factor for safety and health as well as good business.

Improves

appearance of general-shop and construction areas.

Reduce overall tool cost through maintenance.

This also ensures that tools are in good repair at hand.

Teaches

workers principles of tool accountability.

Pointers to follow in storing tools and equipment's

Have a designated place for each kind of tools.

Label the storage cabinet or place correctly.

Store them near the point of use.

Wash and dry properly before storing.

Store sharp edge materials properly when not in use with sharp edge down.

Put frequently used items in conveniently accessible conditions.

Gather and secure electrical cord to prevent entanglement or snagging.

Cutting boards should be stored vertically to avoid moisture collection

Metal equipment's can be stacked on one another after drying.

Make sure the areas where you are storing the equipment are clean, dry and not overcrowded.

| Information Sheet 2 - Removing waste and scrap |
|---|

## 2.1Waste Disposal Practices

There are eight major groups of waste management methods, each of them divided into numerous categories. those groups include source reduction and reuse, animal feeding, recycling, composting, fermentation, landfills, incineration and land application. You can start using many techniques right at home, like reduction and reuse, which works to reduce the amount of disposable material used.

Methods of Waste Disposal

Landfill:- which is the most popularly used method of waste disposal used today. This process of waste disposal focuses attention on burying the waste in the land

Incineration/Combustion:- which is a type disposal method in which municipal solid wastes are burned at high temperatures so as to convert them into residue and gaseous products..

Recovery and Recycling:- It is the process of taking useful discarded items for a specific next use. These discarded items are then processed to extract or recover materials and resources or convert them to energy in the form of useable heat, electricity or fuel.

Recycling is the process of converting waste products into new products to prevent energy usage and consumption of fresh raw materials. Recycling is the third component of Reduce, Reuse and Recycle waste hierarchy. The idea behind recycling is to reduce energy usage, reduce volume of landfills, reduce air and water pollution, reduce greenhouse gas emissions and preserve natural resources for future use.

Plasma gasification:- It is another form of waste management. Plasma is a primarily an electrically charged or a highly ionized gas. Lighting is one type of plasma which produces temperatures that exceed 12,600 °F .With this method of waste disposal, a vessel uses characteristic plasma torches operating at +10,000 °F which is creating a gasification zone till 3,000 °F for the conversion of solid or liquid wastes into a gas.

**Information Sheet 3- Cleaning and making ready tools and equipment and work area**

Cleaning up is not just a measure of respect for the workspace, it also removes hazards. Plan to easily and regularly remove trash and debris. Enforce a strict cleanup policy throughout the workspace. Keep work areas tidy as well by minimizing the number of wires running around. Extension cords quickly become tripping hazards, and power strips also cause trouble on the ground or as they tumble erratically on a desktop. We suggest you provide access to grounded outlets all along the perimeter of the room and/or dropped from the ceiling for each workbench.

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.

**Table kinds of cleaning solvents based on their solubility in water.**

| Cleaning Solvents | Solubility in Water | Polar | Non polar |
|---|---|---|---|
| a. water | soluble | x | |
| b. gasoline | insoluble | | x |
| c. kerosene | insoluble | | x |
| d. thinner | insoluble | | x |
| e. detergent soap | soluble | x | |

**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.

**Table 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.

| Self-Check – 3 | Written test |
|---|---|

Name…… ID…… Date…….

**Directions:** Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

**Instruction I** : match column "A" with "B" (2points each)

| "A" | "B" |
|---|---|
| -----1. kerosene | A. used to wash oil/greasy tools/equipments |
| -----2. Gasoline | B. used to wash oil engine, transmission and other parts of the vehicle |
| -----3. Diesoline | C. used to remove dust, grease oil, paint, etc |
| -----4. Thinner | D. used to wash/clean upholstered furniture such as seats, tables, cabinets, etc |
| -----5. Soap and water | E. used to remove spilled paint on the floor, walls and tools. |

**Information Sheet 4- Tagging unserviceable equipment and identifying faults**

## TAGS

The use of tags is considered an administrative control and as such only provides limited protection to people and plant; therefore in all cases a physical isolation must be used in conjunction with a tag to prevent the accidental activation of an isolation point.

Attaching the Tag

The person attaching the tag must completely fill the tag with the following information:

- Name & company of person placing tag
- The classification/department the person works for
- The date that the tag was placed
- The equipment / plant the tag was placed on
- Contact number
- Work order / job number if applicable
- Signature

It is important to clearly identify the exact piece of equipment that the tag and lock was placed on to allow identification of those personnel working on the plant.

Depends on what you need it for. You can include a stub to give to your customers, or feature numbering so you can easily track each defective part. Choose materials with a bit more durability if you'll be working outside, replace old tags, or fasten your tags to something new.

We specialize in Repair Tags and we stock several different options for whatever suits your space. Check out our repair tag material guide to compare.

All tags feature smudge-proof surface. Write your information with a pen, pencil, or marker.

Bright colored repair and inspection tags with bold, legible prints display and highlight vital information.

Order tags with our handy Tag-in-a-Box® for convenient storage and dispensing of tags. Just pull and tear!

Looking for the right fit? Get a custom design. Our customer service staff is happy to help you find what you need.

| Self-Check -4 | Written Test |
|---|---|

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Mention six information must completely fill the tag during a person attaching the tag (6 pts)

*Note:* Satisfactory rating - 3 points & above Unsatisfactory - below 3 points

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

**Information Sheet 5- Completing operator maintenance in accordance to worksite procedure**

All tools, equipment and vehicles must be properly maintained so that workers are not endangered. Construction regulations require inspections of vehicles, tools, machines and equipment before use. components of maintenance program.

A maintenance strategy includes procedures as well as corrective and preventive maintenance Inspections ensure that tools and equipment's are operating correctly. Safety inspections ensu tools/ equipment's are safe for both patients and operators.

Corrective maintenance (cm) restores the function of a failed device and allows it to be put back in to service.

Preventive maintenance (pm) aims to extend the life of the tools/equipment and reduce failure rates.

Preventive maintenance is the systematic care and protection of tools, equipment, machines and vehicles in order to keep them in a safe, usable condition, limit downtime and extend productivity. We must always be aware that maintenance tasks themselves are potentially hazardous and can result in injury.

**The successful maintenance program is:**

- ✓ well organized and scheduled,
- ✓ controls hazards,
- ✓ defines operational procedures, and
- ✓ trains key personnel.

**Information Sheet 6- Maintaining tooling in accordance with workplace procedures.**

Tools need to have enough space to be operated safely and not endanger the operator or other people in the space. People need to concentrate when trying new tools, especially ones that can injure. Make sure there is enough real estate to use a tool safely. Work areas need to be well lit and clean. Ventilation and/or air filtering is required for many tools.

The equipment itself needs to be as safe as possible. Tools should be well maintained and not have safety features removed or defeated. This is especially important when using second-hand tools that might not have a perfectly safe heritage. When acquiring new tools consider spending the extra money on models with advanced safety features, such as a Saw Stop table saw.

Make well-stocked first-aid kits visible and easily accessible throughout your space. Post clear and visible warning signs on all equipment and where necessary.

Provide personal safety equipment such as goggles, earplugs, gloves, etc. to those who don't have their own.

Accidents may happen. They probably will, and let's hope they are all minor. Nonetheless, do make sure that there is a legal entity that owns the space so that the effects of a serious injury don't extend the horror with legal ramifications

| Self-Check -6 | Written Test |
|---|---|

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1 Which of the following are false during maintaining tooling

A tools not endanger the operator or other people in the space.

B .The tools itself not needs to be as safe as possible

C Tools should be well maintained and not have safety features removed or defeated

D Tools need to have enough space to be operated safely

*Note:* Satisfactory rating - 1 points & above Unsatisfactory - below 1 points

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____ Date: _____

Short Answer Questions

## Reference Materials

Book:

The Repair of vehicle bodies- fifth Edition

WEB ADDRESSES

https;//image to open expanded view

https://images-na.ssl-images-amazon.com/images/I/719A481SCTL._AC_SL1200_.jpg

https://www.rustoleum.com/product-catalog/consumer-brands/auto/general-purpose-

AKNOWLEDGEMENT

We wish to extend thanks and appreciation to the many representatives of TVET instructors who donated their time and expertise to the development of this Teaching, Training and Learning Materials (TTLM).

We would like also to express our appreciation to the TVET instructors and respective FTA experts of Regional TVET BIRUE, TVET college/ Institutes, and Agency (FTVET) who made the development of this Teaching, Training and Learning Materials (TTLM) with required standards and quality possible.

This Teaching, Training and Learning Materials (TTLM) was developed on December at Adama, comfort International Hotel.

The trainers who developed the learning guide

| No | Name | Qualification | Educational background | Region | E-mail |
|---|---|---|---|---|---|
| 1 | | A | | | |
| 2 | | A | | | |
| 3 | | A | | | |
| 4 | | A | | | |