

**Knowledge domain: Mechanical**  
**Unit: Lubrication**  
**Skill: Using a thin penetrating oil**

**Tools and Parts Required:**

- 1) Assortment of penetrating oils and nozzles
- 2) Screwdriver
- 3) Cotton cloth
- 4) Protective gloves (optional)

**Introduction**

Thin penetrating oil is very low viscosity oil. Thin penetrating oils are petroleum based. Penetrating oil can seep into narrow spaces, dissolve rust or residue and improve movement. Penetrating oils are generally available in liquid or aerosol form.

**Example**

Thin penetrating oil can be used:

- to loosen threads on screws,
- to lubricate fast-moving parts of centrifuges and motors,
- to reduce noise and heat due to friction,
- to act as a water-repellant and prevent corrosion,
- to remove dirt that has gone into small and internal crevices in a machine

Below is a picture of a screw in a motor that is too tight to be removed. Thin penetrating oil may loosen the screw.



## Types of thin penetrating oils

**WD-40** is used for cleaning and protection of metallic parts.

WD-40 displaces moisture and leaves a lubricating residue. Polycarbonate and clear polystyrene plastic are not compatible with WD-40. WD-40 will corrode polycarbonate and clear polystyrene plastic.

Below is a picture of a WD-40 container.



**Tri-Flow** is used for loosening and lubricating nuts, bolts and chains. Tri Flow is useful at high temperatures and humidity. Tri Flow lubricates, cleans and protects from rust.

**P7** is used for lubricating, loosening and cleaning. P7 is safe to use on metal, paint, rubber and most plastics.

**3-in-One** is relatively thin lubricating oil. It has a corrosion resistance additive and a distinctive sharp citronella smell.

## Identification and Diagnosis

Equipment will become rusted over time and develop friction. Screw or bolt joints may become rusty. Rotating or sliding machine parts may get hot and make a squealing or scraping noise. Heat or noise is an indicator of friction. Machine parts made of iron or aluminum may be prone to rust and corrosion. Rust and corrosion will damage a machine or impair its performance.

Visually inspect the equipment for rusty screw or bolt joints. Examine the rotating or sliding equipment parts for rust. Listen for squealing or scraping noises while the equipment is in use. Determine if the equipment is producing excess heat by touching.

## **Procedure**

The selection of the thin penetrating oil to be used depends on the task to be performed. Some thin penetrating oils also dissolve paint and adhesive stickers on medical equipment. Solvents used in thin penetrating oils may destroy o-rings and seals. Some thin penetrating oils may be flammable.

If the thin penetrating oil is in aerosol form, spray it into the crack or crevice of the machine. Some aerosol cans are equipped with a nozzle to direct the spray. If the thin penetrating oil is in liquid form, dip a screwdriver into the oil or use a similar tool to put drops of oil onto the joint surface.

Wait a few minutes for the oil to work.

For a tight or stuck screw-bolt joint, tap the screw/bolt with the head portion of a screwdriver with light-medium blows. Tapping helps loosen the residue and rust. Alternately, gently tighten and loosen the screw to loosen the rust. Add more oil each time after loosening.

For lubricating the moving portions of a machine, coat the surfaces sufficiently with the thin penetrating oil. Do the same for noisy, squealing joints. It is a good preventative maintenance practice to coat the joints of all new machines with a thin penetrating oil to prevent rust formation.

## **Exercise**

Your instructor will give you a rusted mechanical part or a part that squeaks such as a screw or bolt and nut. You must clean the joint with a cotton cloth first. You must decide if the joint is accessible. If it is not easily accessible, use a nozzle to spray the thin penetrating oil. You must use the thin penetrating oil to loosen and open the stuck joint. Do not damage the joint in the process.

Your instructor must verify your work before you continue.

## **Preventative Maintenance and Calibration**

Mechanical parts of a medical device function well when lubricated and cleaned regularly. Regular lubrication prevents the parts from rusting and prevents friction. Regular lubrication is recommended for maintenance of health care equipment.

Do not use penetrating oils near gaskets, seals or o-rings.

Always calibrate every medical device before returning it to use.