



# SAFETY TOOLS®

PROTECTING LIVES SINCE 1922



**The Ultimate Guide  
for the Appropriate  
Use of Safety Tools**


**Learn about the benefits of non-sparking and non-magnetic safety tools**



## INTRODUCTION

There are many industry fields or workplaces that require special precautions due to various hazard sources such as sparks and magnetism. They can be inconvenient or extremely dangerous above all in chemical, oil or gas industries as well as in aircraft maintenance, radar transmission center maintenance or water treatment facilities.

Therefore, people working in such areas need **safety tools** that are **non-sparking** and **non-magnetic** to avoid risking their lives and the infrastructure of the plant they are working on. This guide aims to explain what **non-sparking, non-magnetic** tools are for, what makes good safety tools and why using the right safety tool is key for workplace safety.



Sparks and magnetism can be very dangerous for workers and industry infrastructure. Learn how to make your workplace safe with the usage of the right tools.

## HOW TO AVOID SPARKS AND MAGNETISM WITH THE RIGHT TOOLS

### Why do sparks endanger workplace safety?


**Sparks** are created when pieces of metal are extracted from the main body because of an impact. The energy required to separate the pieces is very high and the resulting heat creates hot sparks that can do a lot of harm by igniting gases.

### Why are magnetic tools inappropriate at your workplace?

Another safety problem comes from **magnetism**. Regular tools contain a high percentage of iron and can therefore cause magnetic disturbances in very sensitive electronic devices used in laboratories, hospitals, power plants and other places.

### How you can avoid sparks and magnetism with the right tools

If tools are made from the right materials, they can be **non-sparking** and **non-magnetic** at the same time. In order to avoid sparks, the tools have to be made out of soft materials or softer than steel. If the material in question is soft enough, the amount of energy required to extract pieces is smaller. Therefore, the separated pieces are not as hot and cannot be qualified as sparks, which means they cannot ignite gases. To avoid magnetism, tools can be crafted with limited amount of iron.



Manufacturing a good safety tool is not an easy task. Learn how you can balance safety and productivity by using the right tools.

## DON'T FOOL WITH YOUR TOOL - WHAT MAKES A GOOD SAFETY TOOL?

### Choosing the right tool

When it comes to choosing the right tool, ask yourself the following questions:

- For which task should the tool be used?
- In which environment (heat, humidity, air quality, day, night) should the tool be used?
- Who uses the tool? Is the person trained on the tool?
- On which material is the tool used? Is the material hard, soft, dry, wet, slippery...?
- In what condition is the material ? Is it rusty, canted, crushed, etc.?

### Defining the tool's properties

With the answers to these questions, the properties for a tool can be defined as follows:

- Handling
- Grip texture
- Weight of the tool
- Material hardness
- Material composition
- Ergonomics





### What makes a good safety tool?

1. Safety tools have to be **soft enough** to be safe, but **hard enough** to be useful.
2. The materials need to be hard and have **high yield** and **tensile strength** so they don't break easily and can be made in optimized dimensions, saving component weight.
3. They need **sufficient elongation** to reduce brittleness.
4. The used alloys must be **non-sparking** and **non-magnetic** and adequate for tool production.
5. Safety tools exhibit **stable properties** over the wide range of working temperatures and provide an outstanding **wear resistance** when properly used and cleaned.

### How are good safety tools made?

The best mix of safety and usefulness is achieved with **aluminium-bronze** and **copper-beryllium** alloys. They represent more than 90 % of the production of safety tools. The three following steps are vital when it comes to the production of high-quality safety tools:

1. It is vital that the **exact chemical make-up of the alloy** used for the safety tool production is attained with precision since even slight deviations can significantly impact the tools' properties in a negative way. It's important to note that the grain structure makes the material stronger; it needs to be the finest possible.
2. The **smelting process** must be executed with care. A tool could look great on the outside but its core could still be soft and defective.
3. The **heat treatment** is a key process to obtain the best possible characteristics. On copper alloys, for example, two heat treatments are necessary.



## WHAT MAKES AMPCO SAFETY TOOLS® STAND OUT?

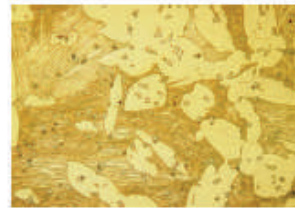
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### MICROCAST® method

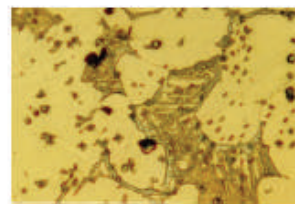
For the production of high performance **aluminium bronze** and speciality **copper alloys** tools, a patented technology called **MICROCAST®** is used. Based on the exclusive magnetic steering (Magneto-Hydro-Dynamic) at the melting, this manufacturing process has many advantages.

Benefits of MICROCAST® process:

- Fine and most uniform grain size available vs. standard products for better homogeneity
- High specific strength, allowing tools to be made in optimized dimensions.
- Outstanding higher wear resistance



**AMPCO® D4  
AIBz**



**COMMERCIAL  
ALUMINIUM  
BRONZE**

**AMPCO alloys have a unique microstructure that guarantees dependability. AMPCO PHASE results from the critical control of foundry techniques and gives our alloys a distinctive, uniform grain microstructure, unlike the usually large, segregated and uncontrolled structure of other alloys. You get proven strength, ductility and hardness, even in the most severe service environments.**

**2****Testing of hardness and composition**

The check of hardness and chemistry composition are important, but the mechanical properties that are needed to make a durable and strong tool are directly driven by the grain structure. If the grain structure is fine and regular, the mechanical properties of the material are reached. Otherwise, the tool can break and cause damages to the people and the installation.

**3****Safe handling of beryllium**

70 to 80 % of **beryllium** produced worldwide is used as an alloying component in **copper** tools. Beryllium copper is used in many products including non-sparking, non magnetic tools. Although beryllium tools are safe to use, special care should be taken. Tools must not be processed by grinding or melting as dust particles or fumes may endanger human health.





## CONCLUSION

It is easy to make a tool. It is not easy to make a good quality and safe tool. That is why AMPCO SAFETY TOOLS® puts a lot of effort into crafting **non-sparking, non-magnetic** and **corrosion resistant** hand tools. They are safe to use in dangerous environments and also come with all the qualities that our customers want and need in tools. We build on experience to protecting lives since 1922, and the unmatched strength and durability of our tools have satisfied many customers in industrial markets all over the world.

If you would like to know more about safety tools, contact AMPCO SAFETY TOOLS®. We are glad to answer your questions and provide the advice you need.



# ABOUT

Since 1922, AMPCO SAFETY TOOLS is a leading international manufacturer of non-sparking, non-magnetic and corrosion resistant hand tools.

AMPCO SAFETY TOOLS is part of AMPCO METAL company founded in 1914 in USA as an innovator in the introduction and application of aluminum bronze alloys. It has also introduced to the market several new metallurgical and process techniques that have made AMPCO METAL the recognized quality leader in specialty bronzes and copper alloys.

Today, AMPCO SAFETY TOOLS manufactures the widest range of non-sparking, non-magnetic and corrosion resistant hand tools maintaining the AMPCO METAL traditions of highest quality.



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