

## OSH Answers

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## Non-sparking tools

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### What is a "non-sparking" tool?

"Non-sparking", "spark-resistant" or "spark-proof" tools are names given to tools made of metals such as brass, bronze, Monel metal (copper-nickel alloy), copper-aluminum alloys (aluminum bronze), copper-beryllium alloys (beryllium bronze), and titanium. Preferred "non-sparking" metals have less tensile strength than steels usually used to make tools. A lower tensile strength means the metal has less strength or resistance to tearing apart when stretched under test conditions. It also means that these tools are softer, wear down more quickly than ordinary steel tools, and have to be dressed more frequently.



### What is the most important thing to know about "non-sparking" tools?

Tools made from stainless steel also have a lower tendency to generate sparks than those made from steel commonly used for making tools (tool steels). The name "non-sparking" is misleading because these tools *are* capable of producing a spark: the term "reduced-sparking tools" better describes these tools.

All metal tools can produce sparks. While "non-sparking" tools may lower the risk of a spark, they do not eliminate the possibility of sparks. Non-metals like wood, leather, and plastic are suitable for some tools like shovels, scrapers or scoops and do not pose a friction spark hazard.

**Non-sparking tools cannot be relied upon when working in potentially flammable atmospheres in the same way one relies on certified explosion-proof motors or electrical equipment.** For example, the NFPA (National Fire Protection Association in the US) has reported that there is little or no advantage of using non-sparking tools instead of stainless steel tools in preventing explosions of hydrocarbon-air mixtures.



### What are the hazards of both "sparking" and "non-sparking" tools?

Both "sparking" and "non-sparking" materials can cause ignition. Two types of hazards are associated with tools manufactured of either material:

1. Ignition by friction, with impact on each other or on other materials such as steel or concrete, in which an "ordinary" (mechanical or frictional) spark is generated. All tools can ignite flammable mixtures by sparks generated by friction or impact. However, this is true only when the generated spark is incendiary: that means a spark that has to have enough heat content (i.e., enough mass and sufficiently high temperature) and has to last long enough to heat a flammable air-vapour mixture above its ignition temperature. This is more likely in the case of sparks formed when using a metal grinder than a spark

- generated when a hammer strikes some metal.
2. Ignition by a chemically-generated spark, caused by impact between certain metals and some oxygen-containing substances (such as rust, which is iron oxide).

**Non-sparking tools which contact oxygen-bearing materials, such as rust, can produce a spark which burns hotter and lasts longer than a "ordinary" spark.**



### What else should I know about these tools?

Steel tools, if handled carefully, are no more dangerous in hazardous environments than "non-sparking" ones.

Non-sparking tools are not certified for work in hazardous environments. Electric motors, on the other hand, can be certified as "explosion-proof" for use in hazardous work locations. This certification gives almost 100% assurance that use of this equipment *will not ignite* explosive atmosphere. In a hazardous environment these assurances can not be given with the use of non-sparking tools.



### What is the best safeguard against accidental explosions?

Follow safe work procedures. Always evaluate a job to be done in a hazardous environment (even the simplest one)! Keep in mind that there are no *truly* non-sparking tools.

In any work where flames are used, *or sparks are produced*, make sure that an explosive atmosphere *does not* develop. Such atmospheres include flammable vapour-air mixtures and organic dust clouds like flour or coal dust.. Isolation, ventilation and purging are methods of insuring a safe working atmosphere. Use explosimeters in the workplace to protect those working in hazardous environments.

Refer to *OSH Answers [General Hand Tool Operation](#)* for more tips.



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