# Technical information

**Use of non-sparking tools, their quality characteristics and the correct treatment**

As well as the basic questions of the spark safety, as the use, the quality characteristics and the treatment of non-sparking tools, the most different and partial mistaken ideas exist.

The most important aspects should be stressed in the following, to show also the non-professionals an applicable picture of the potential dangers and their correct abatement. These are only practical advices. The more complicated physical and technological questions can not be answered here.

**1.** Different mixtures can end in explosions, through sparks, which can occur by beating usual steel tools; including primarily mixtures of air and carbon disulfide, hydrogen, acetylene, ethylene oxide, carbonic oxide and hydrogene sulphide.

To work against the availability of such creations the development of flammable sparks has to be avoided in every case. The use of non-sparking tools is a very good measurement for this, but not the only one. It has to be amended through other wise precautions.

Non-sparking tools, e.g. ENDRES-safety tools, are made of special alloys based of copper which do not make flammable sparks when beating or rubbing it. The tools are absolute sparkproof in all practical strains.

**2.** In very unfavourable circumstances also a non-sparking tool can produce indirectly flammable sparks. This is possible, if you are working on rusty steel surfaces . The danger becomes bigger as soon as a painting of aluminium is existent. The separation of spark building parts of metallic or mineral surfaces (e.g. cement) with a non-sparking tool happens the bigger the difference of the hardness between tool and treated material is.

The result is that non-sparking tools have to be made of less hard alloys; this demand finds its barrier in the using hardness of the different tool, which says that you can not surrender hardness by chisels; but a hammer, a wrench or a wrecking bar can be made of less hard material.

So the guide lines for ENDRES-safety tools producing come to an agreement.

**3.** Because you can not switch-off the danger of explosion only by using non-sparking tools, you also have to make other precautions to achieve safety. First of all rusty or with light alloy painted surfaces have to be sprinkled with a little bit of water or oil, if you did not abolished these rusts or paints before. You have to look for good air ventilation in the room. Also the use of a working tent against external influences can also be practicable. Boxes, accessories and pipelines have to be filled with protective gas in every case.

You also have to pay attention to nothing falls down which can cause sparks; as a precaution you should sprinkle the floor. Also your working clothes should not have any steel parts, especially no cleats, steel of heel or something like this. To achieve the best safety all these point have to be considered.

**4.** It is a characteristic of non-sparking tools that the basic materials are more sensitive than those of steel tools. The use have to be more accurately and gentle than usually. If attritions appear it is convenient to check up the tool in time.

Also every tool should be used only for that what it is made for. So a chisel should not be used as wrecking bar and a usual wrench should not be used as striking wrench.

ENDRES safety tools demand only small precautions by reworking. Regrinding should be made wet to avoid losing the hardness.

Non-sparking tools made of copper-beryllium, e.g. spatulas, screwdrivers, pliers, etc. are not allowed to be grinded the same way as usual steel tools. Heating above 250°C should be avoided as the using characteristic will be lost and the tool only has the hardness of copper, which means that it can not be used any more. Because of this these tools should be grinded only wet.

The wet grinding prevents the breathing of dust and smokes of copper-beryllium, which could cause sanitary problems. In usual use the tools made of copper-beryllium are not dangerous.

An accurate consideration of all these advices advises for every user of non-sparking tools in their own interest because only then the biggest safety can be reached and a long life of the tools can be ensured.

# Aftertreatment

To rework Endres Safety Tools correctly and with success you have to check first of which metal alloy the tool is made.

Tools made of Special-Bronze are yellowish coloured (differences on the surface because of the atmosphere's influence, chemicals and heatings are possible). Tools made of Copper-Beryllium are more reddish coloured and stamped with "CuBe" on the surface.

**1.** Endres Tools can be resharpen with forging, welding and with cutting remove.

Those aftertreatments should be better done in our company because the tools have to get a hardness test or heat-treatment.

**a)** Forging usually happens between 785°C and 900°C; the best temperature for this is 880°C. These temperature limits have to be noticed exactly. The tools have to dry slowly in the air and not with deterring.

**b)** Welding on or welding for repair happens with the addition of same material.

**c)** Also by cutting remove no special precautionary measurements have to be kept. Therefore you can use the same tools and machines which you use for conventional tools made of steel. Regrind working should happen with very good colding (e.g. water).

**2.** Endres Tools made of CUBE should be resharpen with a lot of care. The smoke and the dust are toxic and carcinogenic. Also, copper loses its quality if it is heated up with too high temperature and could have only properties of usual copper if it is heated up too much. You have to cool down the material carefully and you should avoid to get a heating over 250°C. If you always keep the material wet when you sharpen it, there will be no danger. If it is possible you always have to wear a dust-mask and gloves and you should avoid contact with skin and eye Another important point is, that CUBE, if it is overheated, can loose its alloying attributes! After this its attributes would be the same like general copper!

**a)** Afterforging of tools made of CUBE can not be recommended, because forging needs to have longtime operating experience in additional softening treatment. Please ask us if forging is realizable in specific case

**b)** By machining, especially by forging, you have to cool down really carefully, and you have to avoid in every case heating over 250°C. The cutting tools have to have a chip angle of approx. 0°, as long as the treatment is done in hardened condition.

**Important advice for afterforging of Endres tools made of copper-beryllium (CUBE):**

Beryllium is one of the materials which fall under the ordinance on toxic working materials!

This is especially to be related on dusts and smokes which can be produced during melting, grinding and welding.

There is no danger, if you do the grinding wet!

If this is not possible in some exceptional cases, there are some actions needed:

1. **don't inhale the dust (use a mask)**
2. **avoid contact with skin and eyes**
3. **wear protective clothing**
4. **at dust- and smoke emission, wear an effective gas mask**

## LONGLIFE GUARANTEE

ENDRES TOOLS contain a longlife guarantee against mistakes in material and producing!

This guarantee does not include damages caused by an improper handling. We reserve the right to any changes in material, workmanship and design without notice.