



" METALMINOTTI SAS"
RE.:ENPI CERTIFICATION
TESTING STATEMENT C.C.T. N°1.385 of 28.01.64

>> English Translation <<

subject: SAFETY HAND-TOOLS OUT OF TWO DIFFERENT ALLOYS:
THE FORMER NAMED "MZW", THE LATTER "BERYLLIUM COPPER

I - AIM OF THE TESTING

Verification of the technical features, especially concerning spark-proof.

II - DESCRIPTION OF THE SUBJECT:

The tested tools belong to the following types:

a) " MZW" ALLOY

- double-head wrenches mm. 12x13; 18x19; 19x24; 27x29
- single-head wrenches mm.41/64
- box wrenches mm. 16x17 and mm.20x22
- combination plier L=mm.200
- adjustable wrenches L=mm.205-250 and 300
- cross slot screw-driver L=mm.350

b) " BERYLLIUM COPPER" ALLOY

- chisels L=mm.200 and 250
- cutting pliers L=mm.300

III - RESULTS OF THE TESTINGS

1) COMPOSITION OF THE ALLOYS:

The chemical analysis tests, determining the main components of the materials have been performed on samples taken from the tools of both alloys.

Components	MZW ALLOY	BERYLLIUM COPPER ALLOY
Copper (Cu)	82,13	96,97
Aluminium (Al)	10,76	trails
Iron (Fe)	3,89	0,07
Nickel (Ni)	1,87	0,56
Manganese (Mn)	1,32	absent
Zinc (Zn)	trails	trails
Beryllium (Be)	absent	2,30



2) MAGNETIC PERMEABILITY:

The concerned magnetic permeability is

" MZW" ALLOY	$\mu_r=1.09$
BERYLLIUM COPPER ALLOY	$\mu_r=1.00$

This checking has been performed through < SIEMENS MAGNETOSCOPE > for values of magnetic force included between 10.000 and 6.000 A sp/m.

3) ROCKWELL HARDNESS:

The estimations have been performed according to UNI standards (tab.UNI 562-563) through < HARDNESS TESTER "GALILEO" > provided with a conic diamond, as penetration tester. The performed load has been 100 kgs (scale D). On each of the two alloys No.5 tests have been performed and here are the respective results:

" MZW" ALLOY	HRD 36,9
BERYLLIUM COPPER ALLOY	HRD 57,6

4) CHECKING OF SPARK-FREE PROPERTIES:

The testings have been performed in a dark room, by pressing bars of the material first, and then the tools themselves, against grinding-wheels of different grain size and different hardness, spinning at 2.900 r.p.m. The touch-pressure of the bars against the grinding wheel varied from 1 to 10 kg/cm². With high pressures and long touching times some little sparks of poor brightness and quick extinction-time have been remarked. During the whole testing. During the whole cycle of the testing at all the mentioned pressures, we have remarked rare and isolated sparks of extremely short lighting-time. The sparkling has been slightly more frequent for the tools out of MZW Alloy. Besides, always in a dark-room the tools have been submitted to percussion and chipping tests on a silicon stone, on a plaster conglomerate and on a rough carbon-steel surface. The sparkling has been slightg and the lighting hardly remarkable.

5) CONCLUSIONS:

In compliance to the results of the testings and to the composition of the tested materials, we hereby declare that the tools out of MZW Alloy and out of Beryllium Copper Alloy, manufactured by SOCIETA' METALLURGICA MINOTTI - Milan, can be consideres as SAFETY, SPARK-FREE TOOLS.