

Examination report for fuse samples manufactured by „ahp” distributed in USA by PS-Audio

General

Each fuse sample of ratings T0,5A (500mA.); T5A; T10A of dimension 5x20mm was examined for electrical and optical parameter.

1. optical examination:



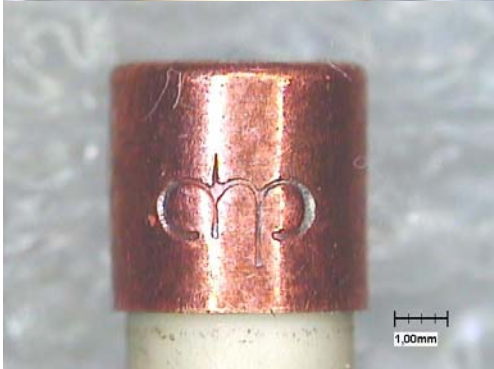
fig. 1: overview fuse design

body: ceramic
end caps: copper
size: 5x20mm



fig. 2: end cap with stamping of rated voltage and company logo (only on one end cap)

material: copper, with stamping „250 V”,
„ahp“



same end cap like fig. 2

Analysis fuse sample T10A

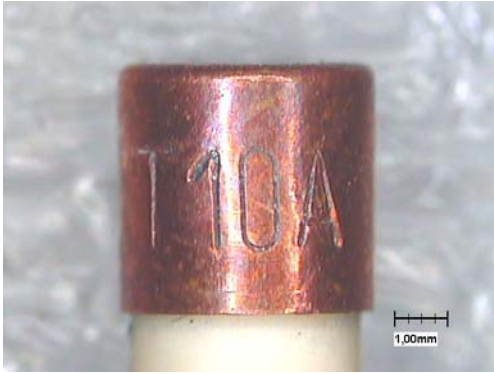


fig. 1: end cap

material: copper, with stamping „T10A“

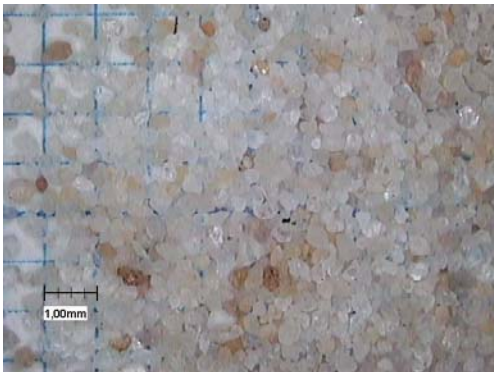


fig. 2: extinguishing agent sand

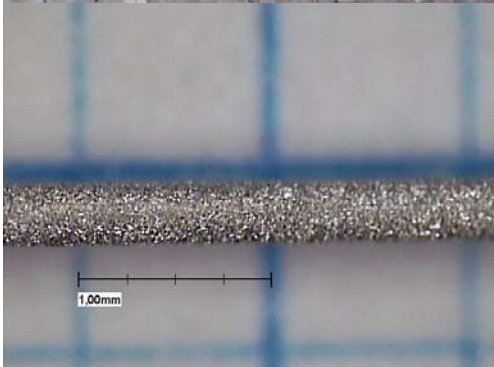


fig. 3: melting wire T10A

The position of the melting wire inside the fuse body is diagonal with a inner soldering on both end caps. The wire diameter is about 0,340mm and has a crystalline tinned surface.

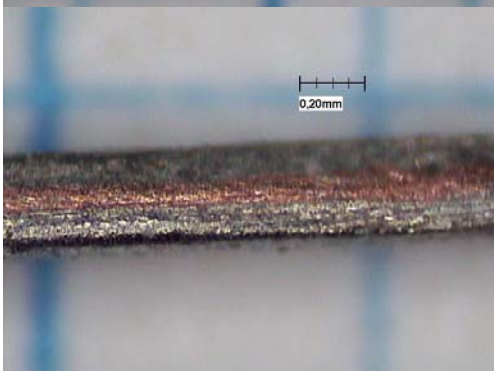


fig. 4: melting wire, prepared

After a mechanical grind of the tinned surface a copper shape core wire is visible.

Analysis T5A

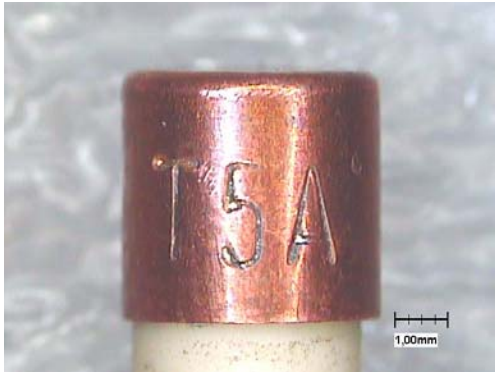


fig. 1: end cap

material: copper, with stamping „T5A“



fig. 2: extinguishing agent sand

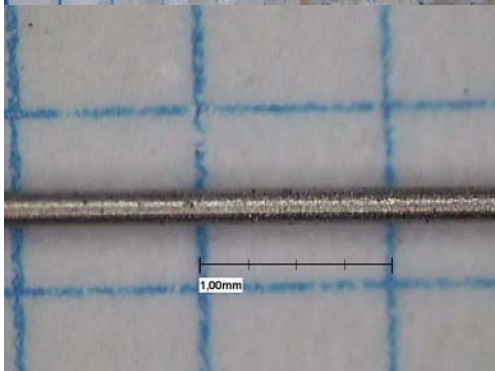


fig. 3: melting wire T5A

The position of the melting wire inside the fuse body is diagonal with a inner soldering on both end caps. The wire diameter is about 0,220mm and has a tinned surface.

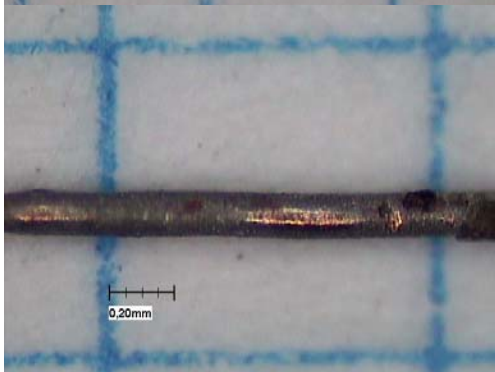
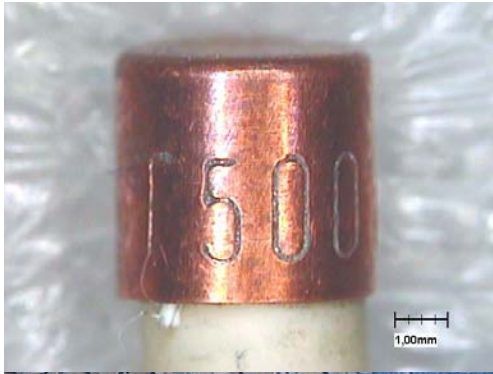


fig. 4: melting wire, prepared

After a mechanical grind of the tinned surface a copper shape core wire is visible.

Analysis T500mA (0,5 A)

fig. 1: end cap



material: copper, with stamping „T500mA“

fig. 2: extinguishing agent sand

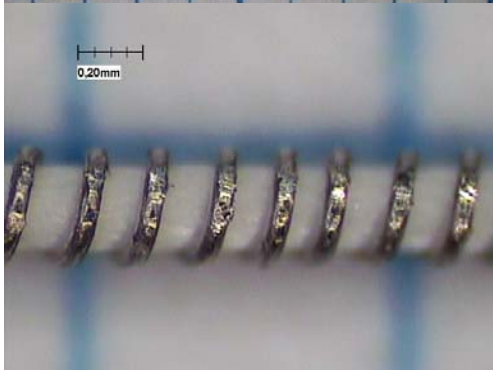


fig. 3: melting wire T5A



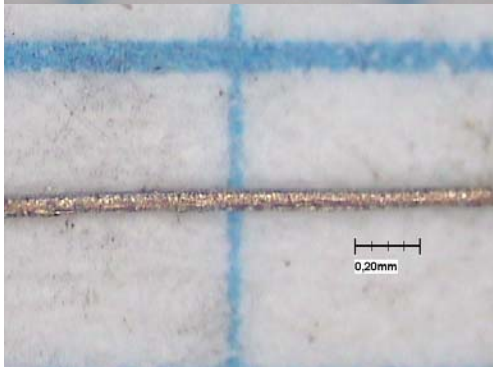
Inside the fuse there is a tinned wound wire with diagonal position.

fig. 4: detailed view on the wound wire material



The melting wire diameter is about 0,065mm. The fibre diameter is about 0,280mm (in wound situation). On 1mm wound wire length there are about 6 wire windings.

fig. 5: etched melting wire (unwound)



The optical and mechanical behaviour of the etched wire material is just like a copper alloy.

2. electrical parameter of fuses

T10A

wire diameter: ca. 0,340mm
voltage drop at rating: 66,3mV
cold resistance: 5,45mOhm

The cold resistance results for a fuse length of about 20mm a melting wire resistance of about 272mOhm/m.

On base of wire diameter and calculated cross-section area of about 0,090mm² the resistivity is about **0,0247Ohm mm²/m**.

note: resistivity of Cu 99,9%, 0,0171 Ohm mm²/m
resistivity of Cu with 20 area% Sn; 0,0232 Ohm mm²/m
resistivity of Cu with 30 area% Sn; 0,0266 Ohm mm²/m

T5A

wire diameter: ca. 0,220mm
voltage drop at rating: 81,3mV
cold resistance: 0,0139mOhm

The cold resistance results for a fuse length of about 20mm a melting wire resistance of about 695mOhm/m.

On base of wire diameter and calculated cross-section area of about 0,038mm² the resistivity is about **0,0264Ohm mm²/m**.

note: see data for T10A

T500mA

wire diameter: 0,065mm
fibre diameter: 0,280mm
windings / mm: 6
voltage drop at rating: 516mV
cold resistance: 925mOhm

The cold resistance results for a fuse length of about 20mm a wound wire resistance of about 46,25Ohm/m.

The windings / mm results to a factor for wire lengthening of about 5,20.

So the theoretical resistance of a nonwound wire is about 8,89Ohm/m.

On base of wire diameter and calculated cross-section area of about 0,00322mm² in combination with the theoretical resistance the resistivity is about **0,0295Ohm mm²/m**.

In view of the fact that the core wire appearance is just like a copper alloy possibly the wire material is a tinned silver-copper alloy.

note: resistivity of AgCu50: 0,0226 Ohm mm²/m
resistivity of AgCu50,Sn20%: 0,0275 – 0,0295 Ohm mm²/m
resistivity of AgCu50,Sn30%: 0,0313 – 0,0332 Ohm mm²/m