

Application of Pd Alloy Material on Test Probe Barrel

RAY CAO
ZHEJIANG GOLDLINK TECH CO.,LTD.



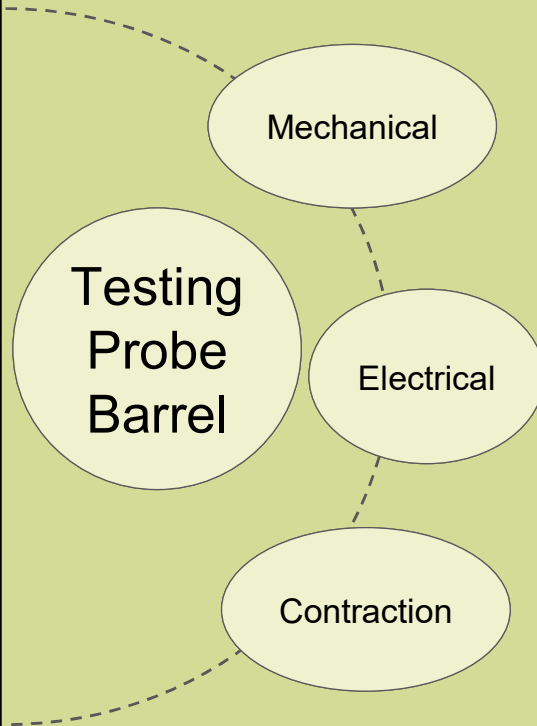
Virtual ▪ November 21-23, 2023



Contents

- About Testing Probe Barrels
- Advantages and disadvantages of existing barrels
- Advantages of new Pd alloy material barrel
- Future Study
- Conclusion

About Testing Probe Barrels



The testing probe barrel is the very important component of the probe.

- Mechanical Properties.
- Electrical Properties.
- Contraction



Advantages & Disadvantages of Existing Barrels

■ The current testing probe barrels : PBT & EF barrels

Phosphorus bronze barrel (PBT)

Advantages

Low cost
and easy
processing

Disadvantages

- 1). The strength is low.
- 2). Need gold plating inside the hole. When the inner diameter is less than 0.2 millimeters, micro hole electroplating becomes very difficult.
- 3). PBT is a product formed by mechanical processing of BP tubes. Due to the limitations of its tube drawing process, when the inner hole is less than 0.2mm, the process is very difficult.

Advantages & Disadvantages of Existing Barrels

Electroformed nickel tube barrels (EF barrels)

Advantages

- 1). The EF tube can be built with very thin-wall and very small inner diameter, such as 0.04mm.
- 2). A complete gold plating layer can be formed on the inner wall of the nickel tube well.
- 3). Good mechanical strength can be achieved with very thin pipe walls.

Disadvantages

1. Higher costs;
2. Without flange on barrels. This has become a bottleneck in the application of electroformed nickel tube barrels.

Advantages of New Pd Alloy Material Barrel



1). The material itself has good conductivity and does not need to be plated with gold, avoiding the problem of difficult micro hole electroplating;

2). The hardness of this Pd alloy material before heat treatment is about HV250. easy to machine and assembly;

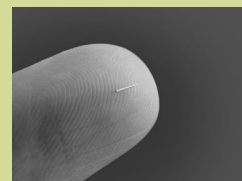
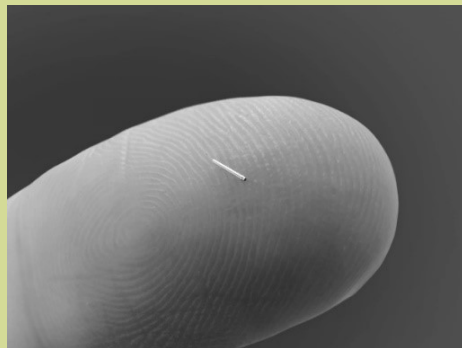
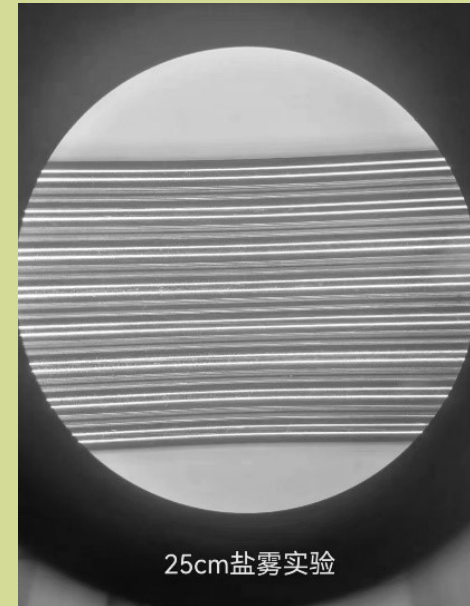
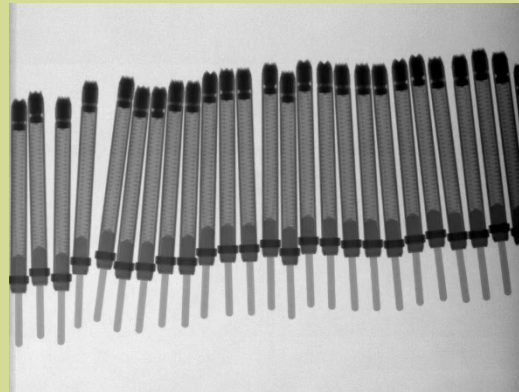
3). The material has good strength, so the barrel can be made very thin;

4). With flanges and closure shapes.

5). Lower cost, the palladium content of the precious metal is reduced to 20% or lower;

6). Use our unique micro machining process for further reducing barrel costs;

Advantages of New Pd Alloy Material Barrel



Micro probe barrel and probe made of GPAC-800 material
(outer diameter 0.185mm, inner diameter 0.15mm)

Advantages of New Pd Alloy Material Barrel

The comparison of the advantages and disadvantages of different material probe barrels is shown in the table below:

Name	Component	Hardness HV0.2	Volume resistivity Ω.cm	Tensile strength MPa	Inner diameter of barrel mm	Barrel wall thickness mm	Inner and outer diameter tolerance mm	With flange	Machinability	Need plating	Service life	Cost
PBT Barrel	PB	200	14.9	500	>0.16	≥0.03	0.003	Y	Easy	Y	Good	Low
EF Barrel	Nickel	400	14	317	<0.25	≥0.005	0.003	N	Difficult	Y	Good	High
GPAC-800 Barrel	Pd,Ag,Cu	250-300	9.5	870	0.1~0.25	≥0.015	0.003	Y	Easy	N	Better	Middle

Future Study

- Developing seamless pipes using this material?
- Non-magnetic application?
- Other applications?

Conclusion

In summary, GPAC-800 Pd alloy material has the advantage of being irreplaceable by other material probe barrels when applied to thin-walled probe barrels with inner diameters ranging from 0.1 to 0.25mm, providing a new solution for the testing probe industry. We believe that with the miniaturization of chip testing probes, the future application prospects of GPAC-800 Pd alloy material probe barrels will be very broad.

COPYRIGHT NOTICE

This multimedia file is copyright © 2023 by TestConX. All rights reserved. It may not be duplicated or distributed in any form without prior written approval.

The content of this presentation is the work and opinion of the author(s) and is reproduced here as presented at the TestConX China 2023 virtual event.

The TestConX China logo and 'TestConX China' are trademarks of TestConX.

www.testconx.org



2023