

Most hooks are made from bent round wire. Special machined hooks of any shape are also available.

How to test bonds » Wire Pull » tool design and quality

...this is page 2; [click here to go to page 1](#).

5. Tool design

Wire pull is done using a hook. Hooks come in many shapes and sizes. Standard hooks are made from bent round wire and defined by their foot diameter, foot length and shaft diameter. A nice long hook length like 30mm is useful especially when deep access is a requirement, but also for vision lines and because length has very few downsides.



The wire hook diameter should be around 3X the wire diameter to avoid cutting the wire

XYZTEC Netherlands

J.F. Kennedylaan 14-B
5981 XC Panningen
Netherlands ([map / route](#))
Tel: +31-77-3060920
Fax: +31-77-3060919
sales@xyztec.com
support@xyztec.com

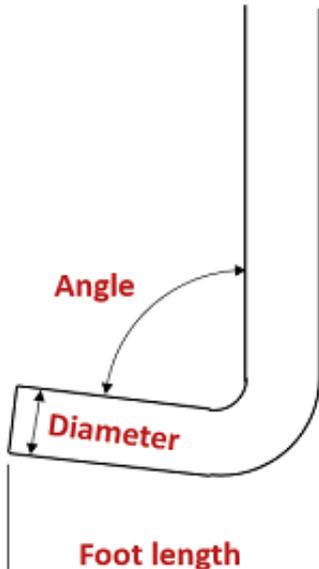
Other offices

- Germany
- Taiwan
- Thailand
- United Kingdom
- USA: California
- USA: Massachusetts
- [Distributors](#)

Bond testers

- Condor *Sigma*
- Condor *Sigma Lite*
- Condor *Sigma W12*
- Condor *150HF*

This is page 1/5
Click [here](#) for the [web version](#).



The angle is typically 85% to pull the wire into the hook so it does not slip off

Hook diameter is an important consideration. As a rule of thumb, one should choose a hook with a diameter at least 3 times the diameter of the wire to be tested. This reduces the stress in the wire bent over the hook, so that its strength is similar to the maximum tensile load of the wire ensuring the highest load on the bond possible. The hook should not cut into the wire.

The foot length is normally about 3-3.5 times the hook diameter. However, for fine pitch applications, a shorter length is required to avoid pulling multiple wires at once.



Ribbon pull by tweezers

Wires or ribbons with extremely low **loop heights** may require special tooling to get underneath. A flat wire hook may fit, where regular hooks are too high. Alternatively, one can opt for a tweezer pull, with a set closing distance (or grip force). **USB Tweezers** are very suitable for this.

6. Tool quality

i. Material and damage

A suitable hook material must be,

- Possible to manufacture to the required shape and accuracy
- Sufficient strength to withstand the maximum pull force

XYZTEC Netherlands

J.F. Kennedylaan 14-B
5981 XC Panningen
Netherlands ([map / route](#))
Tel: +31-77-3060920
Fax: +31-77-3060919
sales@xyztec.com
support@xyztec.com

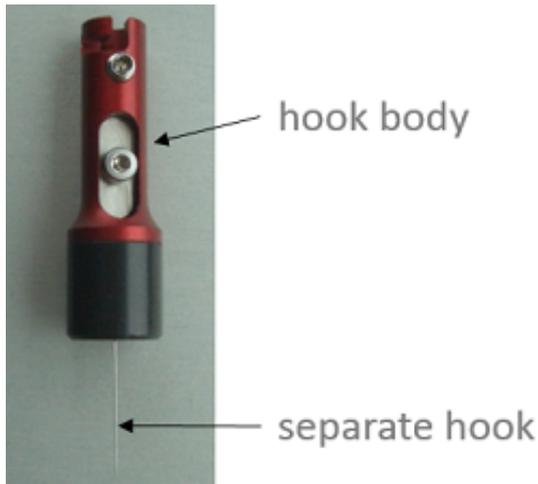
Other offices

- Germany
- Taiwan
- Thailand
- United Kingdom
- USA: California
- USA: Massachusetts
- [Distributors](#)

Bond testers

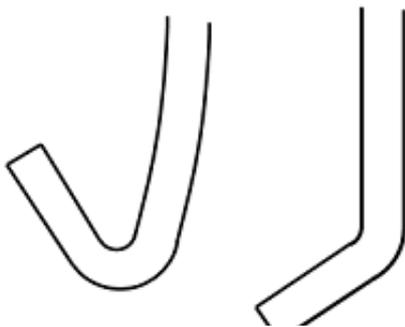
- Condor *Sigma*
- Condor *Sigma Lite*
- Condor *Sigma W12*
- Condor *150HF*

This is page 2/5
Click [here](#) for the [web version](#).



Concentricity of the hook is guaranteed by a good hook body design. Shown in the picture is the Concentric Tool Holder.

Tungsten often meets these requirements and is widely used. The material pulled by a hook is typically softer than the hook and so hook wear is rarely a problem. Poor hook quality is normally due to damage.



Examples of damaged wire hooks that are not suitable for use. The one on the left is bent, probably because of a heavy landing or by a collision with the sample. The one on the right was probably too small for the test force.

Most hooks are delicate and easily damaged if you touch them. The most common causes of damage are being hit by the sample or work holder when changing the sample to be tested.

A separate hook from the hook body is preferable because there is more chance of successful repair after a collision. Also, the concentricity of the hook can be readjusted (see below). A damaged hook should not be used, as it will affect your measurement results.

© 1999-2019 XYZTEC BV

XYZTEC Netherlands

J.F. Kennedylaan 14-B
5981 XC Panningen
Netherlands ([map / route](#))
Tel: +31-77-3060920
Fax: +31-77-3060919
sales@xyztec.com
support@xyztec.com

Other offices

- Germany
- Taiwan
- Thailand
- United Kingdom
- USA: California
- USA: Massachusetts
- [Distributors](#)

Bond testers

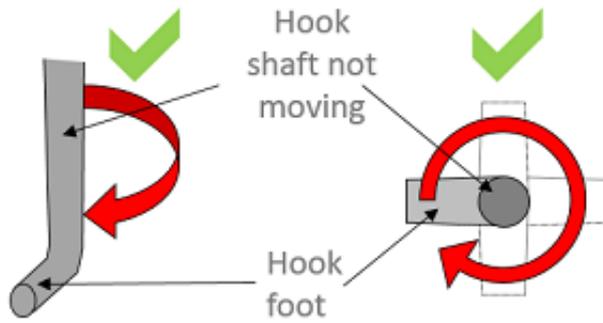
- Condor *Sigma*
- Condor *Sigma Lite*
- Condor *Sigma W12*
- Condor *150HF*

This is page 3/5
Click [here](#) for the [web version](#).

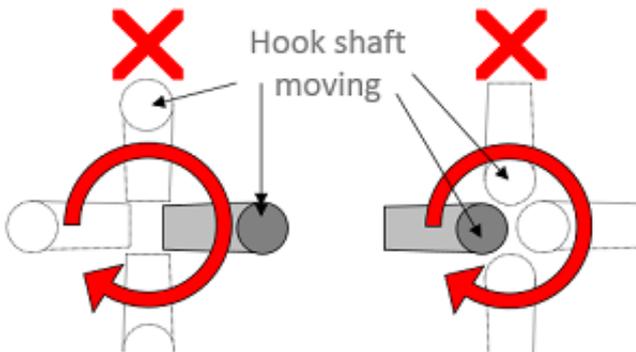
Technology leader in bond testing worldwide



CONCENTRIC



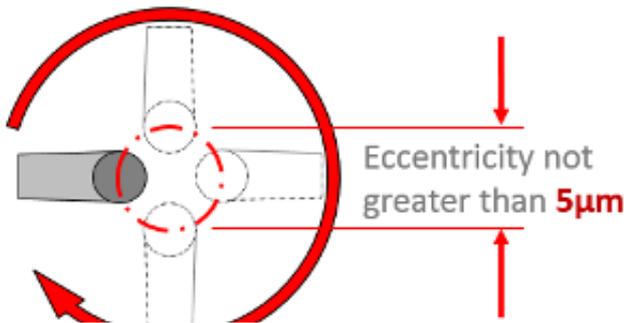
NOT CONCENTRIC



Examples of hook concentricity and non-concentricity. Views from above when the hook rotates.

ii. Hook concentricity

A concentric hook is one where the main shaft of the hook, in the vicinity of the foot, does not move when the hook is rotated. It is important to have a concentric hook, especially when using some form of automation, like **auto hook** or **full automation**. If the hook is not concentric and you rotate it when you are below the wire, you may bend the wire and test two wires at once, or miss the wire altogether. Good hook concentricity also makes manual alignment much easier.



Hook eccentricity not greater than 5µm

Given the very small gap between fine pitch wire bonds hook eccentricity may need to be no greater than 5µm. Because it is not possible to manufacture a sensor spindle and hook to this accuracy, XYZTEC developed the Concentric Tool Holder. Using this tool holder, an experienced

© 1999-2019 XYZTEC BV

XYZTEC Netherlands

J.F. Kennedylaan 14-B
5981 XC Panningen
Netherlands ([map / route](#))
Tel: +31-77-3060920
Fax: +31-77-3060919
sales@xyztec.com
support@xyztec.com

Other offices

- Germany
- Taiwan
- Thailand
- United Kingdom
- USA: California
- USA: Massachusetts
- Distributors

Bond testers

- Condor *Sigma*
- Condor *Sigma Lite*
- Condor *Sigma W12*
- Condor *150HF*

This is page 4/5
Click [here](#) for the [web version](#).

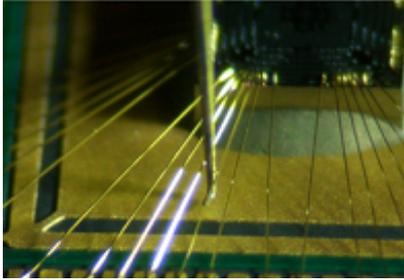
Technology leader in bond testing worldwide



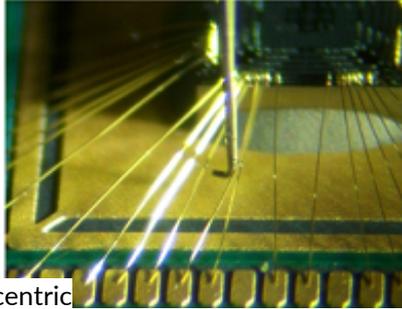
user can obtain concentricity easily. Of course, all hooks are shipped concentric.

Problems when your hook is not concentric

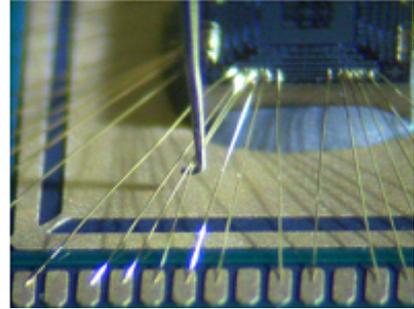
The hook is below the wires ready to rotate



a) Miss the wire and damage the wire next to it



b) Bend the wire and test two wires at once



Problems when your hook is not concentric

Continue to read:

Previous page: [Introduction](#) / [What is wire pull?](#) / [What types of wires can be tested?](#) / [Objectives](#)

Next page: [Alignment](#)

XYZTEC Netherlands

J.F. Kennedylaan 14-B
5981 XC Panningen
Netherlands ([map](#) / [route](#))
Tel: +31-77-3060920
Fax: +31-77-3060919
sales@xyztec.com
support@xyztec.com

Other offices

- Germany
- Taiwan
- Thailand
- United Kingdom
- USA: California
- USA: Massachusetts
- [Distributors](#)

Bond testers

- Condor *Sigma*
- Condor *Sigma Lite*
- Condor *Sigma W12*
- Condor *150HF*

This is page 5/5
Click [here](#) for the [web version](#).