

hemaPEN[®] research use only

hemaPEN device

What is hemaPEN[®]?

The hemaPEN is a handheld device for blood microsampling that can be used by both researchers and healthcare professionals. As the device name implies, hemaPEN has a pen-like design and is supplied as a non-sterile, single-use device for collection of small accurate volumes of blood via four (4) small glass capillaries that protrude slightly from the body of hemaPEN. After blood collection, the device is engaged into its protective cap and the blood transfers from the capillaries onto four discrete 3.5 mm pre-punched substrate discs. The four identical blood spots are contained within the body of the device and the blood dries within one hour. The dried device can then be transported under ambient conditions to the testing laboratory using standard postal services.

What sources of blood is it compatible with?

Capillary blood from a finger stick is anticipated to be the most common blood source. However, hemaPEN can be used to collect blood from any source provided it is presented in a droplet and has not coagulated.

Does the hemaPEN contain a lancet?

No – the hemaPEN is a blood collection and storage device so the source of blood is not limited to a finger stick with lancet. Blood from any source can be used.

Sample collection with hemaPEN

How much blood do I need for collection?

Not much – we suggest a minimum volume of 25-30 μ L. So if you have a tube of blood, you need to dispense 25-30 μ L onto a surface to ensure each capillary is filled.

For finger stick collection, perform the puncture with a sterile lancet, express and remove the first volume and express the second volume for collection.

How much is 25-30 μ L?

Great question – a drop of blood that falls from the finger is ~50 μ L which is more than is needed. So if you are working with a finger stick ensure you wipe away the first volume that expresses onto the finger and then express a fresh volume that just stays on the finger without dripping.

How do I know the capillaries are filled?

If you have enough blood the capillaries will fill within a few seconds. Don't worry about looking to see if they are filled or not – just count to 10 seconds. The key is to ensure you have enough blood for collection and the capillaries are submerged in the blood droplet.

What if I think I've run out of blood and at least one capillary isn't filled?

You've probably done a finger stick – place the hemaPEN back into its base (don't plunge and lock the hemaPEN) and see if you can express a little more blood. You can try and keep collecting – you need to work quickly as the clotting cascade gets underway after the finger stick.

I've capped the hemaPEN and nothing happened – what do I do now?

Two things could have happened:

- There wasn't enough blood to begin with
- The blood has clotted in the capillaries

If this continues to occur please contact your Trajan representative.

I've capped the hemaPEN but only 1, 2 or 3 capillaries transferred. What do I do now?

There are a few reasons why this may have happened:

- One or more of the capillaries didn't fill
- Rarely we see a broken capillary
- The blood source was a very high hematocrit

Either way you have a collection so please return the hemaPEN for testing and we'll inspect it and let you know what happened. The testing lab will inspect it and inform you whether the sample is appropriate for analysis.

Is there a blood sample that can't be used with the hemaPEN?

Yes – unless you are collecting off the finger, heel or earlobe, the blood sample must be collected into a tube with anticoagulant such as heparin or EDTA. These chemicals halt the clotting process and enable the blood to be used after some time following collection. We always recommend you use fresh blood.

In addition blood with very high hematocrit (>65%) is relatively viscous and while this is very rare it's not impossible. With high hematocrit the capillary may have filled but didn't transfer.

Can I use another device to add blood into the hemaPEN, such as a pipette?

No – we wouldn't recommend that type of collection. The hemaPEN uses a special dimension of capillary that allows the blood to fill without fear of overfilling. This is how we guarantee the accurate volume. Never use other devices to fill the hemaPEN.

I dropped the hemaPEN – can I still use it?

That depends on where in the collection process you dropped it:

- Before blood collection:
 - Check to see if any capillaries are broken before proceeding. Never use a hemaPEN with a damaged capillary.
- After blood collection but uncapped:
 - Cap the hemaPEN and see if any blood samples transfer. It is likely some or all capillaries will have been compromised following dropping the device.
- After collection and capped:
 - This will not impact the success of the collection.

Can I use the hemaPEN to collect plasma or serum?

Yes – while we haven't done this collection routinely, plasma and serum will work in the hemaPEN.

I've got a tube of blood but I can't get the hemaPEN into the tube – what do I do?

We recommend you remove a small volume (25-50 μ L) and dispense it onto a clean flat surface such as the cap of a microcentrifuge tube. Then continue collecting with the hemaPEN.

I've completed the collection but I can see blood on the tips and between the capillaries – what should I do?

This is a common observation – the blood that coats the outside of the capillaries or sticks between the capillaries at the collection point does not contribute to the accurate volume. So this blood is not relevant and simply return the hemaPEN for testing – your collection has been successful.

Please don't attempt to wipe off the blood with a tissue or a wipe, as this may cause blood to wick out of the capillary, therefore under-filling the capillary and invalidating the sample.

I've completed the collection process but the hemaPEN won't click into the base. What do I do now?

It is possible the transfer has been successful – check and see if that is the case. Try and cap the hemaPEN – it does take some force. If you still can't click the hemaPEN into its base, place the hemaPEN and base back into the protective shell the device was in when you first opened the package. Place into the polyfoil bag and return to the laboratory for testing.

Can I keep collecting multiple hemaPEN samples from the same finger stick by continued milking of the same puncture site?

No – we don't recommend this practice. Once you've punctured the skin the clotting cascade is triggered and the blood clotting properties start to change in the first minute. If you want to collect multiple samples we recommend you first collect a larger volume following the lancet puncture. Remember to use a tube coated with anticoagulant such as the BD Microtainers – these are ideal for 100–200 μ L of blood. Use this volume to fill multiple hemaPENs.

If one or more capillaries fail to collect a sample, are the other samples compromised?

No, each capillary in the hemaPEN collects a replicate but independent sample. The integrity of the collected samples will not be compromised.

What happens if I underfill the capillaries?

The hemaPEN has been designed to transfer blood from capillaries that have been completely filled. Underfilled capillaries will not transfer. This means that only samples of the correct volume will be transferred.

What should I do if blood remains in one or two of the capillaries after the use of hemaPEN?

You should discard only the DBS pre-punched discs that do not contain the accurate volume of blood that were connected to these capillaries.

Do you aim to replace Guthrie cards with hemaPEN, and will hemaPEN work the same as Guthrie card in any analysis?

hemaPEN can collect 4 x 2.74 µL blood samples accurately independent of hematocrit levels. Analysis of target analytes which utilize the similar blood volume sub-punched from Guthrie card can also be applied on hemaPEN. Please consult our customer service for established methodology.

Can we use hemaPEN to collect blood samples for DNA extraction?

There have been methods reported in the literature for DNA extraction from DBS based samples. Please consult our customer service for methodology.

The DBS sealed in the contained environment, will they dry?

The hemaPEN has an integrated desiccant and a detailed study has been conducted to show that all DBS in hemaPEN will be fully dried in an hour.

Sample access from hemaPEN

I've collected the blood samples – what do I do now?

The hemaPEN needs to be left sealed for at least one hour to ensure rapid desiccation of the blood sample.

Do I remove the cartridge from the hemaPEN? How do I open it?

No – unless you are a trained laboratory technician, do not try and open the hemaPEN as this will compromise the sample. Simply place the hemaPEN in the foil bag provided and return it to the laboratory for analysis.

Should I check if all capillaries have emptied their content onto the DBS pre-punched discs during the disassembly process?

Yes, at the laboratory, during disassembly, you should check if the capillaries have been emptied completely.

How do I know if the capillaries have been emptied completely?

The capillary should be transparent with no apparent remnants of blood/red marks.

I disassembled the hemaPEN and found that there are traces/marks of blood inside the capillary. The capillary seems emptied though. Should I discard the DBS spot?

It looks like blood has coagulated during the transfer of blood from the capillary to the DBS pre-punched discs. You should discard the DBS as the accurate volume may have not been transferred.

Some DBS pre-punched discs are stuck to the capillaries during disassembly. They seem glued onto them. Would removing the DBS pre-punched discs from the capillaries leave some blood/paper onto the capillaries and affect my result?

We currently have no evidence showing that the DBS glued onto the capillary present deficiency inaccuracy.

hemaPEN in an existing analytical workflow

How do we justify changing to hemaPEN if it is more costly than traditional DBS?

hemaPEN is an innovative tool to collect and store volumetrically accurate and precise dried blood spots independent of blood hematocrit. The integrated compartments protect collected samples at every stage of the process which confers a high level of sample integrity during sample collection, storage and transport as compared to traditional DBS.

Please discuss your substrate/matrix needs with your Trajan representative.

Information and support

Visit www.hemapen.com
or contact techsupport@trajanscimed.com

Specifications are subject to change without notice.



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The hemaPEN is under development and the prototype device is supplied for research or investigational purposes only. This device is not for therapeutic or diagnostic use.