

## FAQ

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### How to

#### How to make DNA yourself using Kilobaser?

Kilobaser is a lab device that can produce DNA primers and oligos in just 60 minutes on your lab bench. Kilobaser incorporates a microfluidic and a novel reagent cartridge technology. Currently it can synthesize high-quality and ready-to-use DNA primers and oligos. This allows you to do several DNA based experiments in a single day.

Our goal is that scientists are able to make DNA sequences by themselves without being dependent on other service providers. Additionally to that, Kilobaser keeps your data completely private, as your data stays in house. In the video, we will explain to you how easy it is to make your own DNA primers or DNA oligos.

All you have to do is, enter your desired DNA sequence on the tablet screen. Press "add DNA" and then "Start Synthesis". Next the screen tells you every single step you should do using descriptive words and pictures. As you will see in the video it is extremely easy to use, everybody in the lab is able to synthesize oligos by themselves without any special training.

On the button it says open lid. You need to press confirm, so the lid opens.

The reagent cartridge is already in the machine and holds material for about 200 bases. So, for every couple primers you synthesize you have to change the cartridge.

Once the lid is open it tells you to remove the placeholder and insert the fluidic chip instead. You have to remove the black placeholder and put the transparent fluidic chip into the machine.

After pressing confirm, it tells you to insert the PCR vial. The vial is a standard 0,2 mL PCR vial. The DNA gets flushed into this vial when the synthesis is finished. When the vial is put into Kilobaser, you need to press confirm, again. After that the lid of Kilobaser closes and the synthesis starts. The synthesis is fully automated and in the end you get your desired primer dry and ready-to-use in the PCR vial. The total operation time is about two minutes.

That's all we got to do. The synthesis is fully automated. It takes about one hour to synthesize one DNA primer with 20 bases. In the end you have your desired primer dry and ready-to-use in the PCR vial. Remove the vial with your DNA, store it in the fridge or

immediately use it. Remove the single use chip and insert a new chip for the next synthesis or put back the placeholder if you want to give Kilobaser a little break before the next synthesis.



<https://youtu.be/whaHojN70GO>

Kilobaser's CEO, Alex, shows you how easy and straightforward it gets to make DNA yourself in the video above.

### **How to connect a gas supply to Kilobaser?**

For your Express DNA machine to function properly, an argon gas supply with pressure between 6 and 10 bar needs to be connected to Kilobaser.

Have a look at our gas supply tutorial, where Alex shows you how to connect a 1 liter argon gas bottle to the push-in connector on the Kilobaser using a 6 mm O.D. flexible pneumatic tubing. You can either use a gas houseline or a gas bottle as you can see in the video. Gas cylinders can be obtained in several different sizes. For an idea: a 50 liter, 10 liter or 1 liter compressed argon cylinder (all 200 bar) will suffice for approximately 1000, 200 or 20 syntheses, respectively.

You can usually rent gas bottles and get refillings from your local gas supplier. We provide you with the specifications, which you send to your supplier to get the right gas bottle with the correct gas regulator.

For more detailed information about the gas supply check out our blog post: [Gas Supply for Kilobaser](#).

### **How to change the reagent cartridge of Kilobaser?**

When there are no more reagents in the cartridge or the cartridge has expired, Kilobaser will automatically plan a replacement of the cartridge. The software tells you to change the cartridge with a "Cartridge change" symbol on the Kilobaser software.

In [a video](#), Kilobaser CEO, Alex, shows you how intuitive it is to remove the empty cartridge and to insert a new one. The software guides you through the process step-by-step. Inserting a new reagent cartridge adds 20 minutes prior to the synthesis itself to automatically prepare the new phosphoramidites. The new reagent cartridge can be used for up to two weeks or until 200 bases are synthesized.

## General information

### What is Kilobaser?

Kilobaser is a desktop DNA synthesizer, which can produce DNA sequences within minutes. It is the only device combining microfluidic chip technology and a unique cartridge system. Kilobaser is focused on custom oligos and primers. This is where fast turn-around times (TAT) are needed. Primers are mainly used for PCR applications and usually about 25 bases long. A PCR system cannot work efficiently and progressively without instant primer supply, therefore Kilobaser is the perfect companion device to accelerate your PCR workflow.

### What is PCR?

The polymerase chain reaction is a technique used in medical and biological research labs to make millions of copies of a particular DNA section, from a very small amount of DNA. This is the point where Kilobaser comes into play, because the small amount of DNA you need for the PCR is produced by our device. The PCR is used for DNA sequencing, for the detection of genes in order to identify pathogens during infection and to generate forensic DNA profiles.

### What are the benefits of using Kilobaser?

Independence. Planability. Speed. Security. Scientists can synthesize custom primers by themselves, whenever they want. You know exactly when your DNA is ready to use, no need to hope for the courier to arrive. Faster innovation cycles due to quickly available oligos. This makes it easy to plan experiments ahead. Several iterations can be done on a single day. The customer is able to stay in control of proprietary information as your data stays inhouse.

### If the instrument is off, how long does it take to start up and be ready for synthesis?

If a reagent cartridge is in place from a prior synthesis, roughly one minute. You enter your desired DNA sequence in the software, insert a fresh fluidic chip and a fresh 200 $\mu$ L PCR vial, and then you select "Start Synthesis".

Inserting a new reagent cartridge adds 20 minutes prior to the synthesis itself to automatically prepare the new phosphoramidites.

### How much waste is generated per run?

The total liquid volume in each cartridge is just roughly 18mL. The volume of all microfluidic channels in the microfluidic chip is 4 $\mu$ L and thus Kilobaser produces 50% less hazardous waste than usual column-based synthesizers. Per base, the Kilobaser needs 75 $\mu$ L of total liquid volume which will eventually turn to waste. The waste is constantly pumped back into a waste bottle in the cartridge and can be long term stored in there.

Since the cartridge contains hazardous chemicals, please ensure cartridges are removed in accordance with current regulations in your country.

### **Is it possible to synthesize modified oligos/probes with Kilobaser?**

Since February 2021, we started selling a complementary product for Kilobaser: 6-FAM DNA cartridges and Quencher Fluidic Chips.

### **Can Kilobaser synthesize RNA as well?**

Currently, DNA only. We have started development on RNA reagent cartridges this year and will be available mid next year. In general, the Kilobaser hardware is able to synthesize both DNA and RNA, means RNA can be synthesized with the same device but will require another cartridge for RNA synthesis.

## **Requirements**

### **Can the Kilobaser sit on a benchtop and are there any special spatial requirements?**

Yes, Kilobaser can be operated on a benchtop. It should be a stable, flat and dry environment. Behind the device, there should be at least 15 cm of clearance for proper ventilation and necessary electrical and gas connections as well as at least 25 cm of clearance above to give the lid proper clearance to open. The Kilobaser should be operated in normal indoor laboratory conditions. The area must be clean and well-ventilated. Temperature should be stable, and humidity should not be too high as the DNA synthesis is moisture sensitive.

### **What kind of maintenance is involved?**

There is no maintenance needed for Kilobaser.

## **Cartridges**

### **How many oligos can be synthesized with one reagent cartridge?**

One reagent cartridge holds material for 200 bases. For example you can print:

Six oligos with 30 bases

Eight oligos with 25 bases

Ten oligos with 20 bases

Two 80mer oligos and two 20mer oligos

until 200 bases are used up. Basically, you can print oligos with different length until the reagents for 200 bases are finished.

### **What is the shelf life and storage conditions of reagent cartridges?**

The shelf life of cartridges is one year minimum, and we recommend reagent cartridges be stored at 4°C. After inserted into Kilobaser, the reagent cartridges can be used for up to two weeks or until 200 bases are synthesized. The cartridge should remain inserted into Kilobaser until it is used up.

### **How much are cartridges?**

One cartridge which holds all the reagents needed for the synthesis of 200 bases is approximately £100. Please check our website [www.cambio.co.uk](http://www.cambio.co.uk) for the latest pricing.

# Chips

## **What is chip based DNA synthesis? Does Kilobaser use it?**

Chip based means using a small synthetic chip instead of a reagent carrying tubing system, which wastes a big amount of chemicals during operation. This technique is one of the main reasons why Kilobaser saves costs on a large scale. On the one hand you need a lot less reagents and on the other hand you produce a lot less hazardous waste, manufacturing the same amount of DNA as conventional synthesizers.

A fluidic chip is a single use chip.

## **What is the shelf life and storage conditions of fluidic chips?**

The fluidic chips should be stored in the dark at room temperature.

# DNA OLIGOS

## **How is the quality of the oligos?**

For PCR and many other applications, you can expect the same performance as with primers from online synthesis providers. Oligos printed by Kilobaser show a stepwise yield of 99,5%, which is comparable to any other manufacturer. Have a look at our DNA Synthesis Report.

## **Is the product dried? And how long are oligos stable at room temperature?**

The product is a dry DNA of any desired length up to 50 bases.

Oligos can either be stored dry or resuspended in TE (Tris-EDTA) buffer. Tris-EDTA is a commonly used buffer solution for storing nucleic acids, especially DNA. The buffer keeps the DNA soluble in water and EDTA, a chelator of cations such as magnesium, protects DNA against enzymatic degradation.

Oligos that are stored at RT or 4°C in TE buffer are more stable than dry oligos. Oligos resuspended in water are the least stable. However, at 4°C, DNA is stable for at least one year under all these conditions. Additionally, it is recommended to store oligos in the dark.

## **Is post-processing included in the instrument?**

The DNA comes out of the machine dry and ready to use and automatic cleavage and final deprotection is performed by Kilobaser. There is no de-salting step involved as our system produces an extremely low amount of salt due to the low total reagent volume used while synthesizing.

## **Are there any additional purification steps needed after synthesizing oligos?**

The primers are eluted and ready-to-use out of Kilobaser for most applications such as PCR/qPCR. An automatic final deprotection/cleavage step is performed by the device after each DNA synthesis.

There is no de-salting step involved. Due to the very low total volume of all microfluidic channels, our system produces very low concentrations of salt. So far, we haven't encountered any applications where that is an issue.

For highly demanding applications sensitive to even trace amounts of salts, e.g., NMR or crystallography, we recommend using a size exclusion column as a purification step. The columns are available on request. Other specific applications might need HPLC or PAGE purification.