Agilent DNA 7500 and DNA 12000

Kit Guide

Agilent Technologies

Notices

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WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Contents

Agilent DNA 7500 and DNA 12000 Kit

Agilent DNA 7500 Kit (reorder number 5067-1506)	Agilent DNA 12000 Kit (reorder number 5067-1508)
DNA Chips	**DNA Chips**
25 DNA Chips	25 DNA Chips
1 Electrode Cleaner	1 Electrode Cleaner
DNA 7500 Reagents (reorder number 5067-1507)& Supplies	**DNA 12000 Reagents (reorder number 6067-1509)& Supplies**
(yellow) DNA 7500 Ladder	(yellow) DNA 12000 Ladder
(green) DNA 7500 Markers (2 vials)	(green) DNA 12000 Markers (2 vials)
(blue) DNA Dye Concentrate[1](1 vial)	(blue) DNA Dye Concentrate[1] (1 vial)
(red) DNA Gel Matrix (3 vials)	(red) DNA Gel Matrix (3 vials)
3 Spin Filters	3 Spin Filters
Syringe Kit	**Syringe Kit**
1 Syringe	1 Syringe

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Table 1 Physical Specifications

Type	Specification
Analysis time	30 minutes
Samples per chip	12
Sample volume	1 µL
Kit stability	4 months (see box for storage temperatures)
Kit size	12 samples/chip = 300 samples/kit

Table 2 Analytical Specifications

Type	Agilent DNA 7500	Agilent DNA 12000
Sizing range	100 – 7500 bp	100 – 12000 bp
Sizing resolution	100 – 1000 bp: 5 % 1000 – 7500 bp: 15 %	100 – 1000 bp: 5 % 100 – 12000 bp: 15 %
Sizing accuracy	± 10 %	± 15 %
Sizing reproducability	5 % CV	5 % CV
Quantitation accuracy[1]	20 %	25 %
Quantitation reproducibility[1]	100 – 1000 bp: 10 % CV 1000 – 7500 bp: 5 % CV	100 – 1000 bp: 15 % CV 1000 – 12000 bp: 10 % CV
Quantitative range[1]	0.5 – 50 ng/µl	0.5 – 50 ng/µl
Maximum salt	250 mM for KCl 15 mM for $MgCl_2$ 250 mM NaCl	250 mM for KCl 15 mM for $MgCl_2$ 250 mM NaCl

[1] Determined using the respective DNA ladder as sample

Equipment Required for a DNA 7500 and DNA 12000 Assay

Equipment Supplied with the Agilent 2100 Bioanalyzer

- Chip priming station (reorder number 5065-4401)
- IKA vortex mixer

Additional Material Required (Not Supplied)

- Pipettes (10 µl, 100 µl and 1000 µl) with compatible tips
- Microcentrifuge tubes:
  - 0.5 ml for sample preparation
  - 1.5 ml for gel-dye mix preparation
- Microcentrifuge

Check the Agilent Lab-on-a-Chip webpage for details on assays:

www.agilent.com/chem/labonachip.

Setting up the Assay Equipment and Bioanalyzer

Before beginning the chip preparation protocol, ensure that the chip priming station and the bioanalyzer are set up and ready to use.

You have to

- replace the syringe at the chip priming station with each new kit
- adjust the base plate of the chip priming station
- adjust the syringe clip at the chip priming station
- set up the vortex mixer
- finally, make sure that you start the software before you load the chip.

NOTE The DNA 7500 and DNA 12000 assay is a high sensitivity assay. Please read this guide carefully and follow all instructions to guarantee satisfactory results.

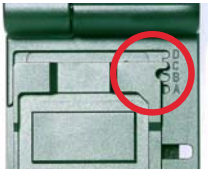
Setting up the Chip Priming Station

NOTE Replace the syringe with each new reagent kit.

1 Replace the syringe:

- **a** Unscrew the old syringe from the lid of the chip priming station.
- **b** Release the old syringe from the clip. Discard the old syringe.
- **c** Remove the plastic cap of the new syringe and insert it into the clip.
- **d** Slide it into the hole of the luer lock adapter and screw it tightly to the chip priming station.

2 Adjust the base plate:



- **a** Open the chip priming station by pulling the latch.
- **b** Using a screwdriver, open the screw at the underside of the base plate.
- **c** Lift the base plate and insert it again in position C. Retighten the screw.

3 Adjust the syringe clip:

- **a** Release the lever of the clip and slide it up to the top position.

Setting up the Bioanalyzer

1 Open the lid of the bioanalyzer and make sure that the electrode cartridge is inserted in the instrument. If not, open the latch and insert the electrode cartridge.

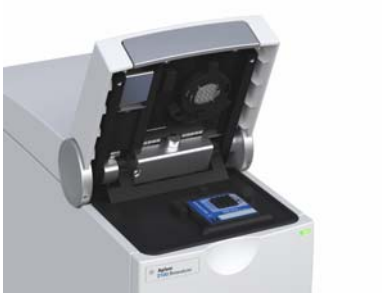


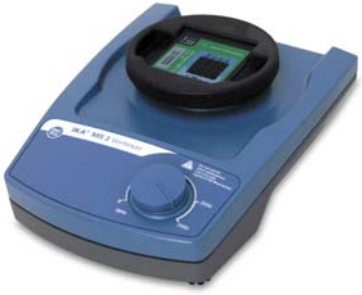
Figure 1 Electrode cartridge inserted in the instrument (graphic shows an example).

2 Remove any remaining chip.

Vortex Mixer

IKA - Model MS3

1 To set up the vortex mixer, adjust the speed knob to 2400 rpm.

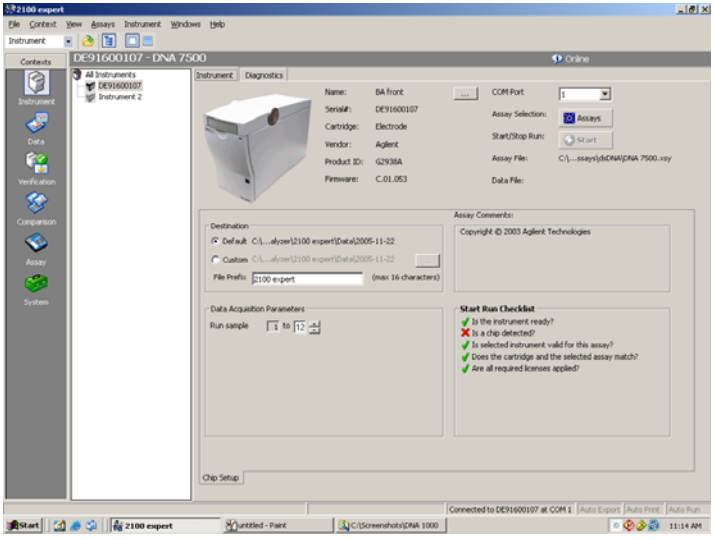


Starting the 2100 Expert Software

To start the software:

1 Go to your desktop and double-click the following icon.

The screen of the software appears in the **Instrument context**. The icon in the upper part of the screen represents the current instrument-PC communication status:



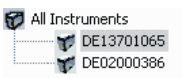
Lid closed, no chip or chip empty

Lid open

Dimmed icon: no communication

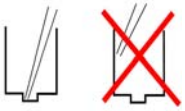
Lid closed, chip inserted, DNA or demo assay selected

2 If more than one instrument is connected to your PC, select the instrument you want to use in the tree view.



Essential Measurement Practices

- Handle and store all reagents according to the instructions on the label of the individual box.
- Avoid sources of dust or other contaminants. Foreign matter in reagents and samples or in the wells of the chip will interfere with assay results.
- Keep all reagents and reagent mixes refrigerated at 4 °C when not in use.
- Allow all reagents and samples to equilibrate to room temperature for 30 min before use.
- Protect dye and dye mixtures from light. Remove light covers only when pipetting. The dye decomposes when exposed to light and this reduces the signal intensity.
- Always insert the pipette tip to the bottom of the well when dispensing the liquid. Placing the pipette at the edge of the well may lead to poor results.



- Use a new syringe and electrode cleaners with each new kit.
- Use loaded chips within 5 min after preparation. Reagents might evaporate, leading to poor results.
- Do not touch the Agilent 2100 Bioanalyzer during analysis and never place it on a vibrating surface.

Agilent DNA 7500 and DNA 12000 Assay Protocol

After completing the initial steps in "Setting up the Assay Equipment and Bioanalyzer" on page 7, you can prepare the assay, load the chip, and run the assay, as described in the following procedures.

Preparing the Gel-Dye Mix

WARNING

Handling DMSO

Kit components contain DMSO. Because the dye binds to nucleic acids, it should be treated as a potential mutagen and used with appropriate care.

- ➔ Wear hand and eye protection and follow good laboratory practices when preparing and handling reagents and samples.
- ➔ Handle the DMSO stock solutions with particular caution as DMSO is known to facilitate the entry of organic molecules into tissues.

1 Allow the blue-capped DNA dye concentrate (blue ●) and red-capped DNA gel matrix (red ●) to equilibrate to room temperature for 30 minutes.

NOTE

It is important that all the reagents have room temperature before starting the next step. Protect the dye concentrate from light.

2 Vortex the blue-capped vial with DNA dye concentrate (blue ●) for 10 seconds and spin down. Make sure the DMSO is completely thawed.

3 Pipette 25 µl of the blue capped dye concentrate (blue ●) into a red-capped DNA gel matrix vial (red ●). Store the dye concentrate at 4 °C in the dark again.

NOTE Always use the volumes indicated. Using different volumes in the same ratio will produce inaccurate results.

4 Cap the tube, vortex for 10 seconds. Visually inspect proper mixing of gel and dye.

5 Transfer the complete gel-dye mix to the top receptacle of a spin filter.

6 Place the spin filter in a microcentrifuge and spin for 10 minutes at room temperature at 1500 g ± 20 % (for Eppendorf microcentrifuge, this corresponds to 4000 rpm).

7 Discard the filter according to good laboratory practices. Label the tube and include the date of preparation.

NOTE The prepared gel-dye mix is sufficient for 10 chips. Use the gel-dye within 4 weeks of preparation.

Protect the gel-dye mix from light. Store the gel-dye mix at 4 °C when not in use for more than 1 hour.

Loading the Gel-Dye Mix

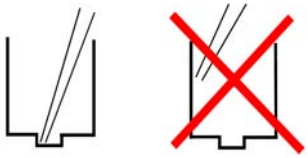
NOTE Before loading the gel-dye mix, make sure that the base plate of the chip priming station is in position (C) and the adjustable clip is set to the highest position. Refer to "Setting up the Chip Priming Station" on page 8 for details.

1 Allow the gel-dye mix to equilibrate to room temperature for 30 minutes before use. Protect the gel-dye mix from light during this time.

2 Take a new DNA chip out of its sealed bag and place the chip on the chip priming station.

3 Pipette 9.0 µl of the gel-dye mix at the bottom of the well marked G and dispense the gel-dye mix.

NOTE When pipetting the gel-dye mix, make sure not to draw up particles that may sit at the bottom of the gel-dye mix vial. Insert the tip of the pipette to the bottom of the chip well when dispensing. This prevents a large air bubble forming under the gel-dye mix. Placing the pipette at the edge of the well may lead to poor results.



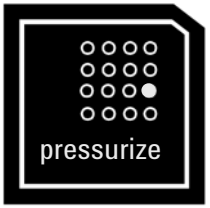
4 Set the timer to 30 seconds, make sure that the plunger is positioned at 1 ml and then close the chip priming station. The lock of the latch will click when the chip priming station is closed correctly.

5 Press the plunger of the syringe down until it is held by the clip.

6 Wait for exactly 30 seconds and then release the plunger with the clip release mechanism.

7 Visually inspect that the plunger moves back at least to the 0.3 ml mark.

8 Wait for 5 seconds, then slowly pull back the plunger to the 1 ml position.



9 Open the chip priming station.

10 Pipette 9.0 µl of the gel-dye mix in each of the wells marked G.

NOTE Protect the gel-dye mix from light. Store the gel-dye mix at 4 °C when not in use for more than 1 hour.

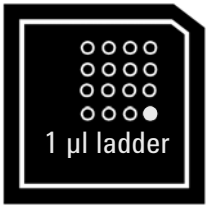
Loading the Marker

1 Pipette 5 µl of green-capped marker (green ●) into the well marked with the ladder symbol and into each of the 12 sample wells.

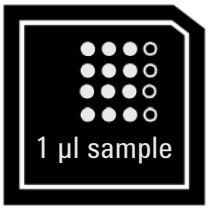
NOTE Do not leave any wells empty, or the chip will not run properly. Add 5 µl of green-capped DNA marker (green ●) plus 1 µl of deionized water to each unused sample well.

Loading the Ladder and the Samples

1 Pipette 1 µl of the yellow-capped ladder vial (yellow ●) in the well marked with the ladder symbol .



2 In each of the 12 sample wells pipette 1 µl of sample (used wells) or 1 µl of deionized water (unused wells).



NOTE For optimal results, samples should be of pH 6 to 9 and should not have an ionic content greater than twice that of a typical PCR buffer.

3 Set the timer to 60 seconds.

4 Place the chip horizontally in the adapter of the IKA vortex mixer and make sure not to damage the buldge that fixes the chip during vortexing.

CAUTION Wrong vortexing speed

If the vortexing speed is too high, liquid spill that disturbs the analysis may occur for samples generated with detergent containing buffers.

➔ Reduce vortexing speed to 2000 rpm!

5 Vortex for 60 seconds at 2400 rpm.

6 Refer to the next topic on how to insert the chip in the Agilent 2100 Bioanalyzer. Make sure that the run is started within 5 minutes.

Inserting a Chip in the Agilent 2100 Bioanalyzer

1 Open the lid of the Agilent 2100 Bioanalyzer.

2 Check that the electrode cartridge is inserted properly and the chip selector is in position (1). Refer to "Setting up the Bioanalyzer" on page 9 for details.

3 Place the chip carefully into the receptacle. The chip fits only one way.

CAUTION

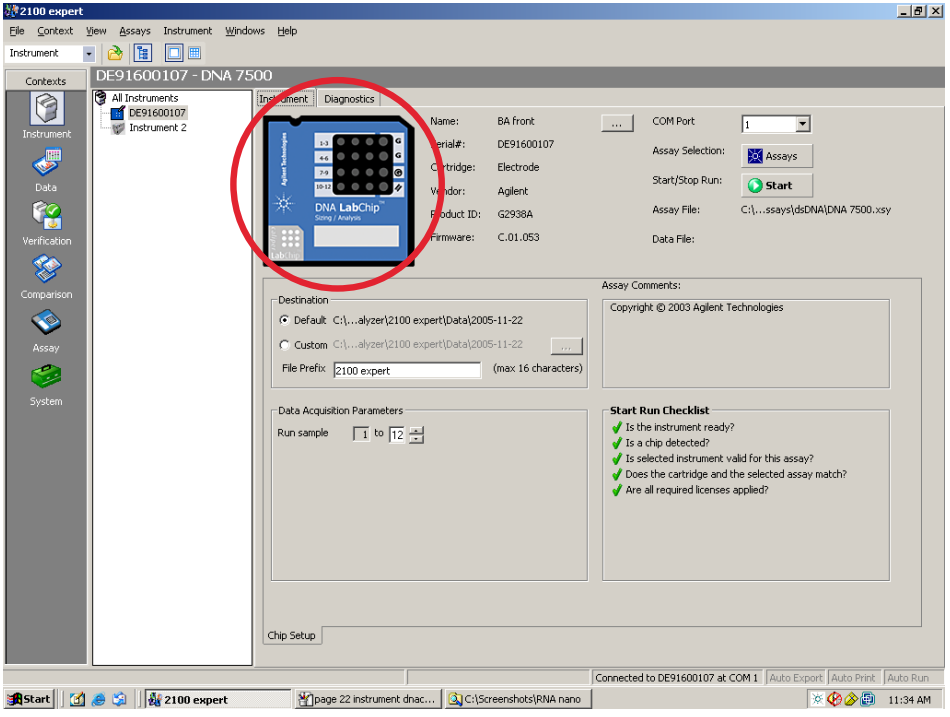
Sensitive electrodes and liquid spills

Forced closing of the lid may damage the electrodes and dropping the lid may cause liquid spills resulting in bad results.

➔ Do not use force to close the lid and do not drop the lid onto the inserted chip.

4 Carefully close the lid. The electrodes in the cartridge fit into the wells of the chip.

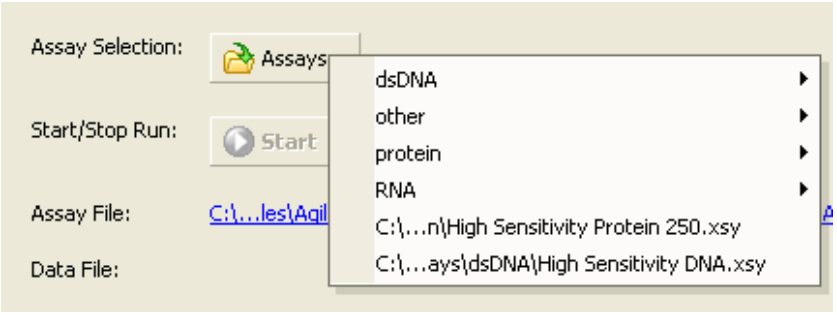
5 The 2100 expert software screen shows that you have inserted a chip and closed the lid by displaying the chip icon at the top left of the **Instrument** context.



Starting the Chip Run

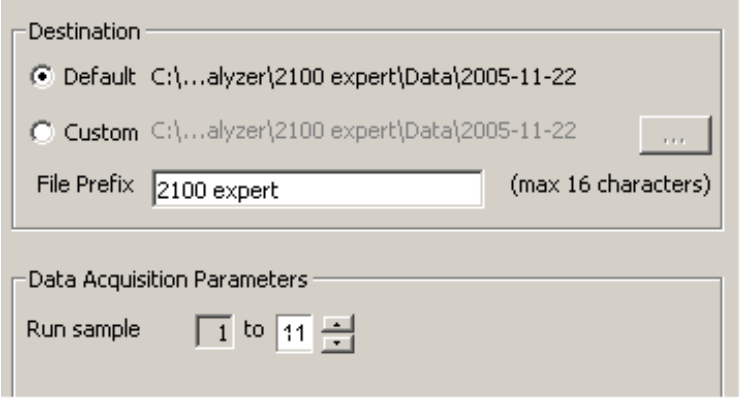
NOTE Please note that the order of executing the chip run may change if the Agilent Security Pack software (only applicable for Agilent 2100 expert software Revision B.02.02 and higher) is installed. For more details please read the 'User's Guide' which is part of the Online Help of your 2100 expert software.

1 In the **Instrument** context, select the appropriate assay from the Assay menu.



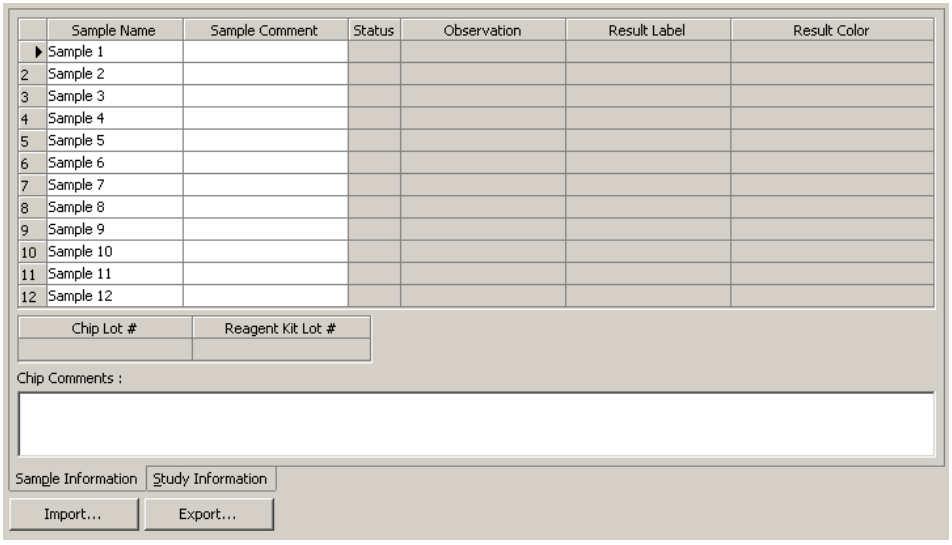
2 Accept the current **File Prefix** or modify it.

NOTE Run sample numbers can vary between assays.



Data will be saved automatically to a file with a name using the prefix you have just entered. At this time you can also customize the file storage location and the number of samples that will be analyzed.

3 To enter sample information like sample names and comments, complete the sample name table.



4 Click the **Start** button in the upper right of the window to start the chip run. The incoming raw signals are displayed in the **Instrument** context.

CAUTION

Contamination of electrodes

Leaving the chip for a period longer than 1 hour (e.g. over night) in the Bioanalyzer may cause contamination of the electrodes.

➔ Immediately remove the chip after a run.

5 After the chip run is finished, remove the chip from the receptacle of the bioanalyzer and dispose of it according to good laboratory practices.

Cleaning Electrodes after a Chip Run

When the assay is complete, *immediately* remove the used chip from the Agilent 2100 Bioanalyzer and dispose of it according to good laboratory practice. Then perform the following procedure to ensure that the electrodes are clean (i.e. no residues are left over from the previous assay).

NOTE Use a new electrode cleaner with each new kit.

CAUTION Leak currents between electrodes

Liquid spill may cause leak currents between the electrodes.

➔ Never fill too much water in the electrode cleaner.

1. Slowly fill one of the wells of the electrode cleaner with 350 µl deionized analysis-grade water.
2. Open the lid and place the electrode cleaner in the Agilent 2100 Bioanalyzer.
3. Close the lid and leave it closed for about 10 seconds.
4. Open the lid and remove the electrode cleaner.
5. Wait another 10 seconds to allow the water on the electrodes to evaporate before closing the lid.

NOTE Replace the used electrode cleaner with each new kit.

NOTE When switching between different assays, a more thorough cleaning may be required. For more details please refer to the "Maintenance and Troubleshooting Guide" which is part of the Online Help of the 2100 Expert software.

Checking Your Agilent DNA 7500 and DNA 12000 Assay Results

DNA 7500 and DNA 12000 Ladder Well Results

To check the results of your run, select the Gel or Electropherogram tab in the **Data** context. The electropherogram of the ladder well window should resemble those shown below.

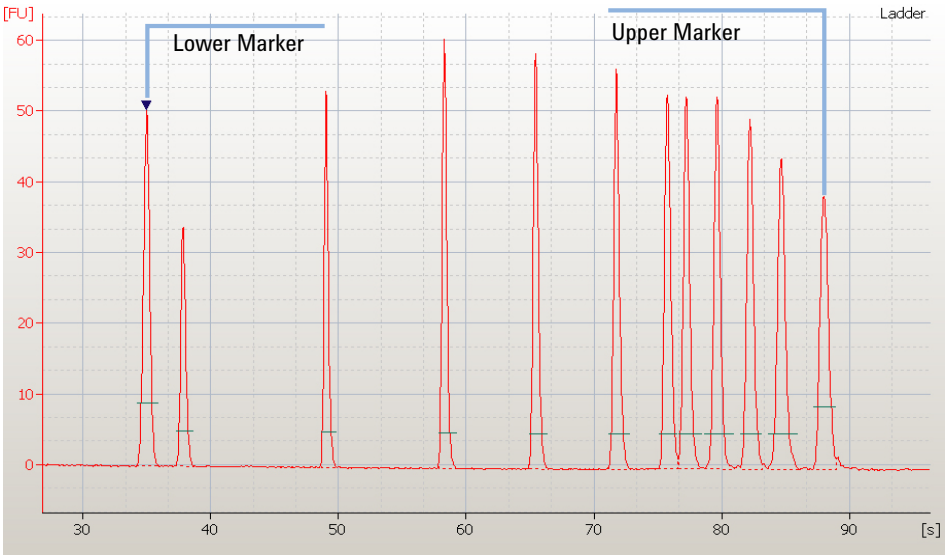


Figure 2 DNA 7500 ladder

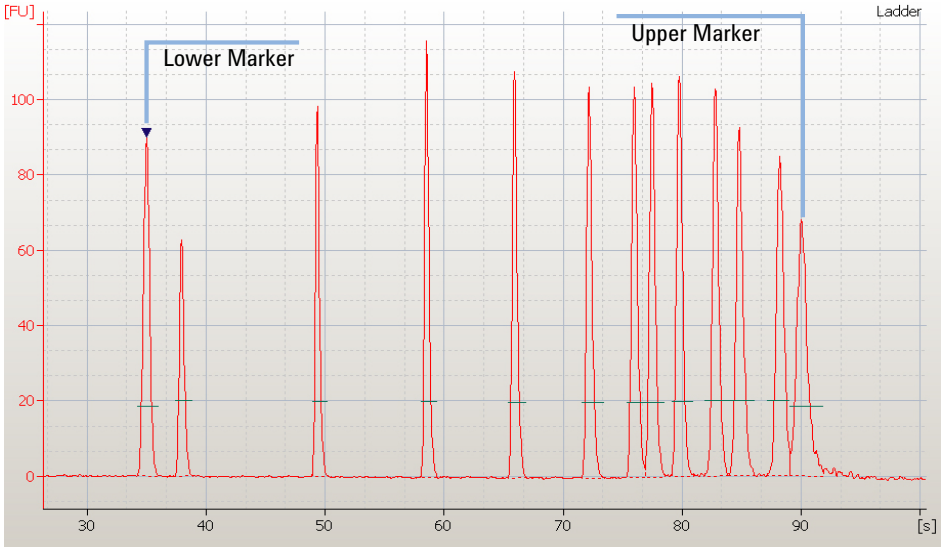


Figure 3 DNA 12000 ladder

Major features of a successful ladder run are:

- 12 peaks for the DNA 7500 ladder and 13 peaks for the DNA 12000 ladder
- All peaks are well resolved
- Flat baseline
- Correct identification of both markers

If the electropherogram of the ladder well window does not resemble the one shown above, refer to the *2100 Expert Maintenance and Troubleshooting Guide* for assistance.

DNA 7500 and DNA 12000 Sample Well Results

To review the results of a specific sample, select the sample name in the tree view and highlight the *Results* sub-tab. The electropherogram of the sample well window should resemble the one shown here.

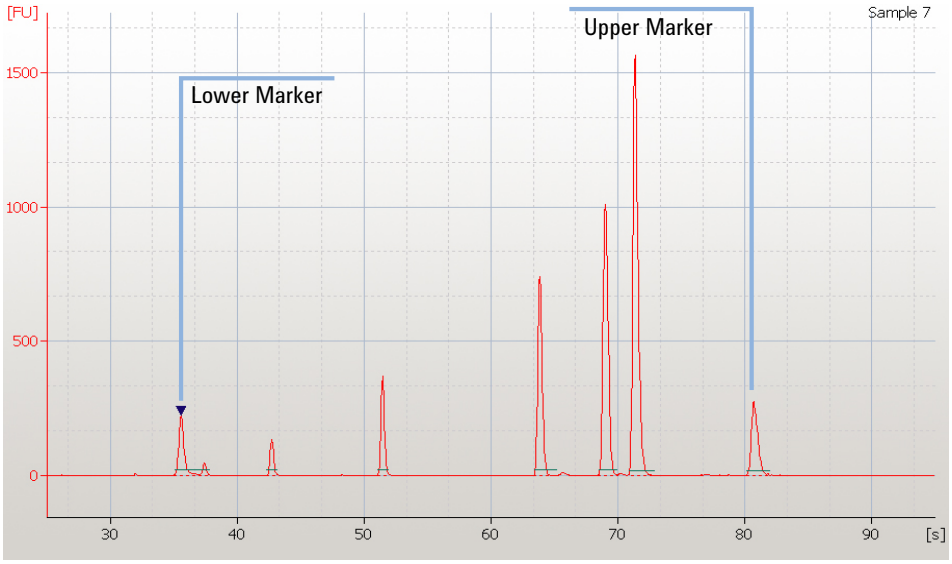


Figure 4 DNA peaks of a successful sample run

Major features for a successful DNA sample run are:

- All sample peaks appear between the lower and upper marker peaks. If some sample peaks are outside the marker bracket, adjust the upper or lower marker. Please refer to the 2100 Expert User's Guide or Online Help for details.
- Flat baseline
- Baseline readings at least 5 fluorescence units (see Zero Baseline in the User's guide or Online Help for details of how to see the baseline readings).
- Marker readings at least 3 fluorescence units higher than baseline readings.
- Both marker peaks well resolved from sample peaks (depends on sample).

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In This Book

you find the procedures to analyze DNA samples with the Agilent DNA 7500 and DNA 12000 reagent kit and the Agilent 2100 Bioanalyzer instrument.

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