

ProcartaPlex™ Human Apolipoprotein Panel 5-Plex

USER GUIDE

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For descriptions of symbols on product labels or product documents, go to [thermofisher.com/symbols-definition](https://www.thermofisher.com/symbols-definition).

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| Revision | Date | Description |
|----------|------------------|-------------|
| A.0 (30) | 15 February 2021 | new manual |

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ProcartaPlex™ Human Apolipoprotein Panel 5-Plex



WARNING! Read the Safety Data Sheets (SDSs) and follow the handling instructions. Wear appropriate protective eyewear, clothing, and gloves. Safety Data Sheets (SDSs) are available from [thermofisher.com/support](https://www.thermofisher.com/support).

Introduction

The ProcartaPlex™ Human Apolipoprotein Panel 5-Plex has been optimized for detection of multiple analytes from serum and plasma.

The panel is provided in a ready-to-use format with individual vials of 1X capture and detection reagents that require less pipetting and experimental setup. These reagents are not combinable with simplexes or other panels.

ProcartaPlex™ preconfigured panels are extensively tested for analyte combinability, interference and cross-reactivity to provide the highest level of validation and precision. All ProcartaPlex™ panels are supplied with the necessary reagents to perform the assay.

| Analytes | | |
|----------|--------|-------|
| Apo A1 | Apo A2 | Apo B |
| Apo C | Apo E | |

For detailed product information, visit [thermofisher.com/procartaplex](https://www.thermofisher.com/procartaplex)

Contents and storage

Upon receipt, store the kit at 2°C to 8°C. When stored as indicated, all reagents are stable until the expiration date.

| Contents | Amount |
|---|------------|
| Standard Mix Apolipoprotein (lyophilized) | 2 each |
| Biotinylated Detection Antibody Mix (1X) | 1 x 3.5 mL |
| Capture Bead Mix (1X) | 1 x 5 mL |
| Streptavidin-PE (SA-PE) (1X) | 1 x 5 mL |
| Wash Solution Concentrate (20X) | 1 x 50 mL |
| Assay Diluent | 1 x 100 mL |
| 8-Tube Strip | 2 each |
| Flat Bottom 96-well Plate, black | 1 each |
| Microplate Lid | 1 each |
| Plate Seals | 8 each |

Retain the lot-specific Certificate of Analysis that contains the product expiration date. The Certificate of Analysis also contains important information such as bead number, analyte names and highest standard concentration required for the assay setup on the xMAP instrument.



CAUTION! This kit contains materials with small quantities of sodium azide. Sodium azide reacts with lead and copper plumbing to form explosive metal azides. Upon disposal, flush drains with a large volume of water to prevent azide accumulation. Avoid ingestion and contact with eyes, skin and mucous membranes. In case of contact, rinse affected area with plenty of water. Observe all federal, state and local regulations for disposal.

Required materials not supplied

- xMAP™ instrument
- Hand-Held Magnetic Plate Washer (Cat. No. EPX-55555-000)
- Deionized water
- Vortex mixer (e.g., Cat. No. 88882010)
- Microcentrifuge
- Adjustable single and multichannel pipettes with disposable tips and low volume reservoirs (e.g., Cat. No. 95128093)

- Beakers, flasks, and cylinders necessary for preparation of reagents
- Orbital microplate shaker with at least 1.5 mm or 0.059 inch orbit diameter capable of maintaining a speed of 600 ± 50 rpm (e.g., Cat. No. 88882006)

Note: The use of rockers or large orbit shakers may cause adverse results.

Precautions and technical hints

1. Thoroughly read this User Guide and Certificate of Analysis prior to using the kit.
2. All chemicals should be considered potentially hazardous.
3. To avoid cross-contamination, do not invert the assay plate during the assay or allow contents from one well to mix with another well.
4. Use a multichannel pipette and reagent reservoirs whenever possible to achieve optimal assay precision.
5. Ensure that the xMAP™ instrument has been properly calibrated and set up prior to preparing and running the assay.

Workflow

Assay protocol

Prepare antigen standard

1. Incubate with shaking using wash buffer for 10 min.
2. Remove liquid.

Add capture beads

1. Vortex capture beads for 30 sec. Add 50 μ L of the capture beads to each well.
2. Remove liquid.

Note: Wash the plate after adding the beads.

Add samples and standards

1. Add the following according to sample type
-**Serum and plasma samples:** Add 25 μ L of Assay Diluent, then add 25 μ L of standards or prediluted samples. For background wells, add 50 μ L of 1X UAB.
2. Seal the plate and incubate with shaking at room temp for 2 hr.
3. Wash plate twice.

Add detection antibody

1. Add 25 μ L of Detection Antibody Mix (1X).
2. Seal the plate and incubate with shaking at room temp for 30 min.
3. Wash plate twice.

Add Streptavidin-PE

1. Add 50 μ L of Streptavidin-PE.
2. Seal the plate and incubate with shaking at room temp for 30 min.
3. Wash plate twice.

Resuspend beads

1. Add 120 μ L of 1X Wash Solution.
2. Seal the plate and shake at room temp for 5 min.

Acquire data on xMAP™ system

Sample preparation

Thaw frozen serum and plasma samples on ice and mix well by vortexing. Centrifuge at $10,000 \times g$ for 5–10 minutes to pellet out particulates. Avoid multiple freeze/thaw cycles. If samples are high in lipid content, centrifuge at $10,000 \times g$ for 10 minutes and transfer contents to a new tube.

Plasma sample preparation

1. Collect samples in sodium citrate or EDTA tubes. If using heparin as an anticoagulant, no more than 10 IU of heparin per mL of blood collected should be used to prevent assay interference that can result in a false positive signal.
2. Centrifuge samples at $1,000 \times g$ at 4°C for 10 minutes within 30 minutes of collection.
3. Collect the plasma fraction. Use immediately or store aliquots at -80°C .

Serum sample preparation

1. Allow blood to clot for 20–30 minutes at $20\text{--}25^{\circ}\text{C}$.
2. Centrifuge at $1,000 \times g$ for 10 minutes at $20\text{--}25^{\circ}\text{C}$.
3. Collect the serum fraction. Alternatively, a serum separator tube can be used following the manufacturer's instructions.
4. Use immediately or store aliquots at -80°C . Avoid multiple freeze/thaw cycles.

Dilution of serum and plasma samples

The analytes included in the panel typically have high serum and plasma concentrations. We recommend that you dilute serum and plasma samples 1:20,000 in Assay Diluent to ensure that they fall within range of the assay.

Dilute each sample according to the following scheme:

| Tube | Sample volume | Assay Diluent volume |
|--------------------|--------------------------------|----------------------|
| Dilution 1 (1:50) | 5 μL | 245 μL |
| Dilution 2 (1:100) | 5 μL of Dilution 1 | 495 μL |
| Dilution 3 (1:4) | 50 μL of Dilution 2 | 150 μL |

Preparation of reagents

Before starting with the assay protocol, define the plate map. Mark the standard, sample and background wells using the plate map found in Appendix A, “Recommended plate layout” to determine the number of wells used.

Prepare 1X Wash Solution

Bring the Wash Solution Concentrate (20X) to room temperature and vortex for 15 seconds. Mix 25 mL of the Wash Solution Concentrate (20X) with 475 mL ddH₂O. Mix gently to avoid foaming. Wash Solution (1X) can be stored at 2–8°C for up to 6 months.

Prepare Standard Mix

This kit is supplied with one lyophilized Standard Mix for generation of standard curves. Two vials of each Standard Mix are provided to permit the user to run the assay twice if running a partial plate. For experiments measuring serum or plasma samples, use Assay Diluent as the diluent to reconstitute and dilute the standard.

Note: Change pipette tips after each dilution step and avoid air bubbles.

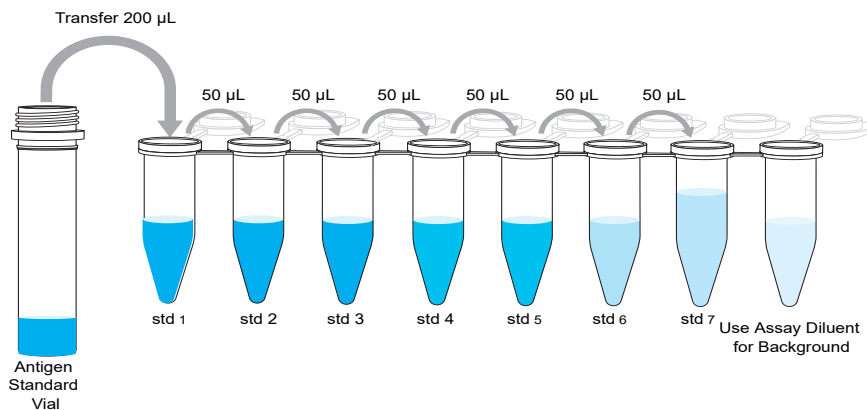
1. Centrifuge the standard mix stock vial at 2,000 x *g* for 10 seconds.
2. Add 250 µL of diluent to the stock vial.
3. Vortex the vial at high speed for 30 seconds and centrifuge at 2,000 x *g* for 10 seconds to collect contents at the bottom of the vial.
4. Incubate on ice for 10 minutes to ensure complete reconstitution.

Prepare 4-fold serial dilution

1. Label the tubes in the 8-Tube Strip: Std1, Std2, Std3, Std4, Std5, Std6 and Std7.
2. Add 200 µL of the reconstituted standard mix into Std1 tube.
3. Add 150 µL of diluent into Std2–Std7 tubes.
4. Transfer 50 µL from Std1 tube into Std2 tube.
5. Mix by pipetting up and down 10 times.
6. Transfer 50 µL of the mixed standards from Std2 tube into Std3 tube using new pipette tip.
7. Mix by pipetting up and down 10 times.
8. Repeat steps 4–7 for tubes Std4–Std7, changing pipette tips between dilution steps.
9. Add 150 µL of diluent to the last tube of the 8-Tube Strip to serve as a background.

10. Keep tubes on ice until ready to use.

Note: Use the reconstituted standard immediately. The reconstituted standard cannot be stored. Discard unopened standard vials if the entire plate was used in a single experiment.



Assay protocol

IMPORTANT! Bring all buffers and samples to room temperature before loading onto the 96-well plate.

1. Incubate plate
 - a. Shake empty plate at 600 rpm with 200 μ L per well 1X Wash Solution for 10 min at room temperature.
 - b. Discard Wash Solution and blot excess on a stack of dry towels.
2. Add Capture Bead Mix to the plate.
 - a. Vortex the 1X Capture Bead Mix vial for 30 seconds at high speed.
 - b. Using a multichannel pipette, add 50 μ L of the Capture Bead Mix to each well of the plate.
3. Wash beads using a Hand-Held Magnetic Plate Washer.

Note: To avoid loss of beads, secure the plate using the clamps on both sides of the Hand-Held Magnetic Plate Washer during this procedure.

Note: This protocol was developed using the Hand-Held Magnetic Plate Washer (Cat. No. EPX-55555-000). Other washers should be validated by the end user.

- a. Place the plate on the Hand-Held Magnetic Plate Washer and wait 2 minutes to allow the beads to settle on the bottom of each well.
 - b. Remove the liquid by quickly inverting the washer/plate assembly over a sink or waste container.
 - c. Gently blot the inverted washer/plate assembly onto several layers of paper towels or absorbent surface to remove any residual liquid.
 - d. Add 150 μ L of 1X Wash Solution into each well and wait 30 seconds.
 - e. Remove the liquid by quickly inverting the washer/plate assembly over a sink or waste container.
 - f. Gently blot the inverted washer/plate assembly onto several layers of paper towels or absorbent surface to remove any residual liquid.
 - g. Remove the plate from the magnet and proceed to step 4.
4. Add samples and standards to the plate.
 - a. **Serum and plasma:** Add 25 μ L of Assay Diluent to each well followed by 25 μ L of prepared standards or prediluted samples as defined on the plate layout. Add an additional 25 μ L of Assay Diluent to the wells designated as backgrounds.
 - b. Seal the plate using one of the provided Plate Seals and cover with the provided Microplate Lid. Shake at 600 rpm for 2 hours at room temperature.

5. Remove and discard the Plate Seal. Wash the plate following the steps below.
 - a. Place the plate on the Hand-Held Magnetic Plate Washer and wait 2 minutes to allow particles to settle on the bottom of each well.
 - b. Remove the liquid by quickly inverting the washer/plate assembly over a sink or waste container.
 - c. Gently blot the inverted washer/plate assembly onto several layers of paper towels or absorbent surface to remove any residual liquid.
 - d. Add 150 μL of 1X Wash Solution into each well and wait 30 seconds.
 - e. Remove the liquid by quickly inverting the washer/plate assembly over a sink or waste container.
 - f. Gently blot the inverted washer/plate assembly onto several layers of paper towels or absorbent surface to remove any residual liquid.
 - g. Repeat steps 4d-4f once for a total of two washes.
 - h. Remove the plate from the magnet and proceed to the next step.
6. Add Biotinylated detection Antibody Mix to the plate.
 - a. Using a multichannel pipette, add 25 μL of the detection antibody solution to each well of the plate. Gently tap the plate to evenly distribute the solution in the wells.

Note: A narrow trough reservoir for multichannel pipetting is recommended to be used to prevent volume loss.

 - b. Seal the plate using a new Plate Seal and cover with the provided Microplate Lid. Shake at 600 rpm for 30 minutes at room temperature.
7. Wash the plate following step 5.
8. Add Streptavidin-PE (SA-PE) to the plate.
 - a. Add 50 μL of SA-PE solution to each well.
 - b. Seal the plate using new Plate Seal and cover with the provided Microplate Lid. Shake at 600 rpm for 30 minutes at room temperature.
9. Wash the plate following step 5.
10. Prepare the plate for analysis on a xMAP™ instrument.
 - a. Add 120 μL of 1X Wash Solution into each well.
 - b. Seal the plate using new Plate Seal and cover with the provided Microplate Lid. Shake at 600 rpm for 5 minutes at room temperature.
11. Remove the Plate Seal and run the plate on a xMAP™ instrument.

Instrument settings

Follow the recommended guidelines and procedures for calibration and verification of the instrument. Laser-based systems require 30 minutes to warm up prior to use.

| Instrument | Acquisition volume | Timeout (optional) | Bead type | DD gate | Reporter gain | Min. bead count |
|----------------------------------|----------------------|--------------------|-----------|--------------|---------------|-----------------|
| MAGPIX™ | 50 µL ^[1] | N/A | N/A | N/A | Standard PMT | 50 |
| INTELLIFLEX™ | 30 µL | 40 sec | MagPlex™ | 4,000–13,000 | Standard PMT | 50 |
| FLEXMAP 3D™ Luminex™ 100/200™ | 50 µL | 60 sec | MagPlex™ | 7,500–25,000 | Standard PMT | 50 |
| Bio-Rad™ Bio-Plex™ | 50 µL | 60 sec | MagPlex™ | 5,000–25,000 | Standard PMT | 50 |

^[1] MAGPIX volume can be changed during the run to optimize bead count.

Note: To assure a good bead count, the probe height must be adjusted to the plate provided in the kit. We recommend using two 5.08 mm spacer disks to adjust the sample probe height for Mylar-bottom plates.

Analyze results

The concentration of the samples can be calculated by plotting the expected concentration of the standards against the NET MFI generated by each standard. For Bio-Plex™ Manager, plot standard concentrations against FI-Bkgd. A 4PL or 5PL algorithm is recommended for the best curve fit. Analyze the assayed samples according to the operation manual for the Luminex™ or Bio-Plex™ instrument.

We offer a free and robust analysis software package for data analysis. To analyze the data, follow the instructions below or contact our technical support.

1. Export the run data in .csv format and navigate to the ProcartaPlex™ Analysis App on Thermo Fisher Connect: <https://apps.thermofisher.com/apps/procartaplex>

Note: Before exporting .csv raw data from Bio-Plex™ Manager, please make sure to set 'Analytes Labels' under 'Document Export Properties' to 'Name (Region)'. The .csv raw data exported as Report Type 'xPONENT' from INTELLIFLEX™ instruments are supported.

2. Upload the .csv files to the ProcartaPlex™ Analysis App to analyze the run data. The intuitive software features 4PL/5PL curve fit optimization, group-wise statistical and heat map analysis. Users can export detailed reports including images for presentations and publications.

Note: The samples have been diluted 1:20,000, which must be accounted for in the software analysis.

IMPORTANT! For ProcartaPlex™ getting started guides, technical literature, protocol support tools, and common troubleshooting questions visit thermofisher.com/procartaplexsupport
For more complete troubleshooting questions and answers, visit our FAQ database at thermofisher.com/procartaplexfaqs



Recommended plate layout

| Standards | | Samples | | | | | | | | | |
|---------------------|------|---------|---|----|----|----|----|----|----|----|----|
| 1 | 1 | 1 | 1 | 9 | 9 | 17 | 17 | 25 | 25 | 33 | 33 |
| 2 | 2 | 2 | 2 | 10 | 10 | 18 | 18 | 26 | 26 | 34 | 34 |
| 3 | 3 | 3 | 3 | 11 | 11 | 19 | 19 | 27 | 27 | 35 | 35 |
| 4 | 4 | 4 | 4 | 12 | 12 | 20 | 20 | 28 | 28 | 36 | 36 |
| 5 | 5 | 5 | 5 | 13 | 13 | 21 | 21 | 29 | 29 | 37 | 37 |
| 6 | 6 | 6 | 6 | 14 | 14 | 22 | 22 | 30 | 30 | 38 | 38 |
| 7 | 7 | 7 | 7 | 15 | 15 | 23 | 23 | 31 | 31 | 39 | 39 |
| Bkgd ^[1] | Bkgd | 8 | 8 | 16 | 16 | 24 | 24 | 32 | 32 | 40 | 40 |

[1] Background

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|----|----|----|
| A | | | | | | | | | | | | |
| B | | | | | | | | | | | | |
| C | | | | | | | | | | | | |
| D | | | | | | | | | | | | |
| E | | | | | | | | | | | | |
| F | | | | | | | | | | | | |
| G | | | | | | | | | | | | |
| H | | | | | | | | | | | | |

