

- + CLEAN THE BOARD
- + MEASURE AND CUT FILM
- + REMOVE COATING AND APPLY FILM
- + LAMINATE

## Part 1

» Make your own presensitized copper clad board

## Part 2

» Make your own circuit board

### FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML

# NEGATIVE PROTOTYPING PROCESS



- + CLEAN THE BOARD
- + MEASURE AND CUT FILM
- + REMOVE COATING AND APPLY FILM
- + LAMINATE

## Step1 Clean the board.

BACK

NEXT

### FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML

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# NEGATIVE PROTOTYPING PROCESS



- + CLEAN THE BOARD
- + MEASURE AND CUT FILM
- + REMOVE COATING AND APPLY FILM
- + LAMINATE

For best results, clean the board using fine steel wool or similar abrasive pad and rinse with water. This will remove dirt, oils, and other contamination.

Wear powder-free gloves when working with Negative Dry Film Resist.

BACK

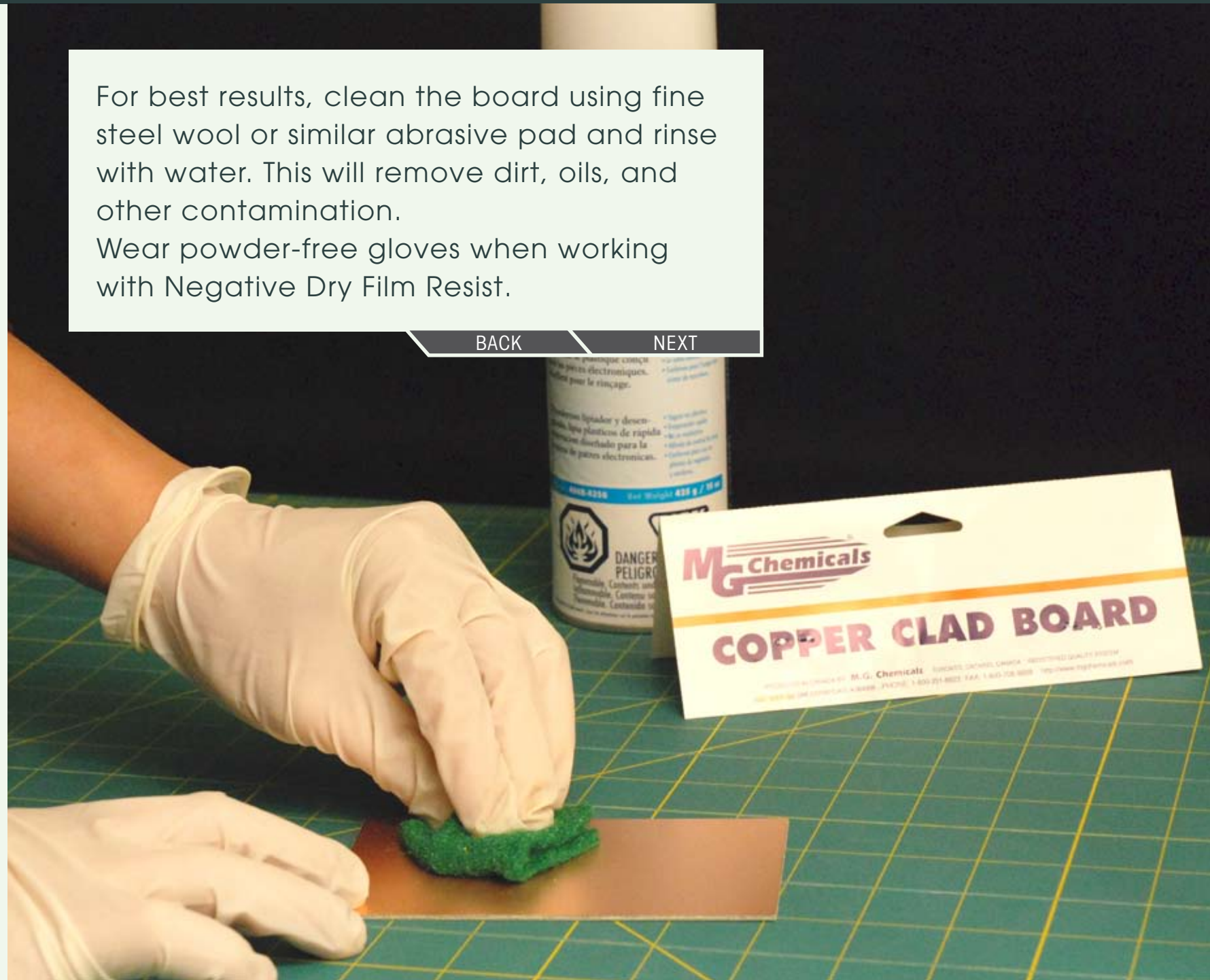
NEXT

## FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML

[www.mgchemicals.com](http://www.mgchemicals.com)





# NEGATIVE PROTOTYPING PROCESS



- + CLEAN THE BOARD
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- + REMOVE COATING AND APPLY FILM
- + LAMINATE

Use M.G. Chemicals Super Wash Electronics Cleaner to quick dry board or heat it in an oven for 5 minutes or use a blow dryer. The board must be absolutely clean and dry prior to applying film. Note: After rinse, the board should be dried quickly to avoid oxidation.

BACK

NEXT

## FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML

[www.mgchemicals.com](http://www.mgchemicals.com)



# NEGATIVE PROTOTYPING PROCESS



- + CLEAN THE BOARD
- + MEASURE AND CUT FILM
- + REMOVE COATING AND APPLY FILM
- + LAMINATE

## Step2

# Measure and cut film.

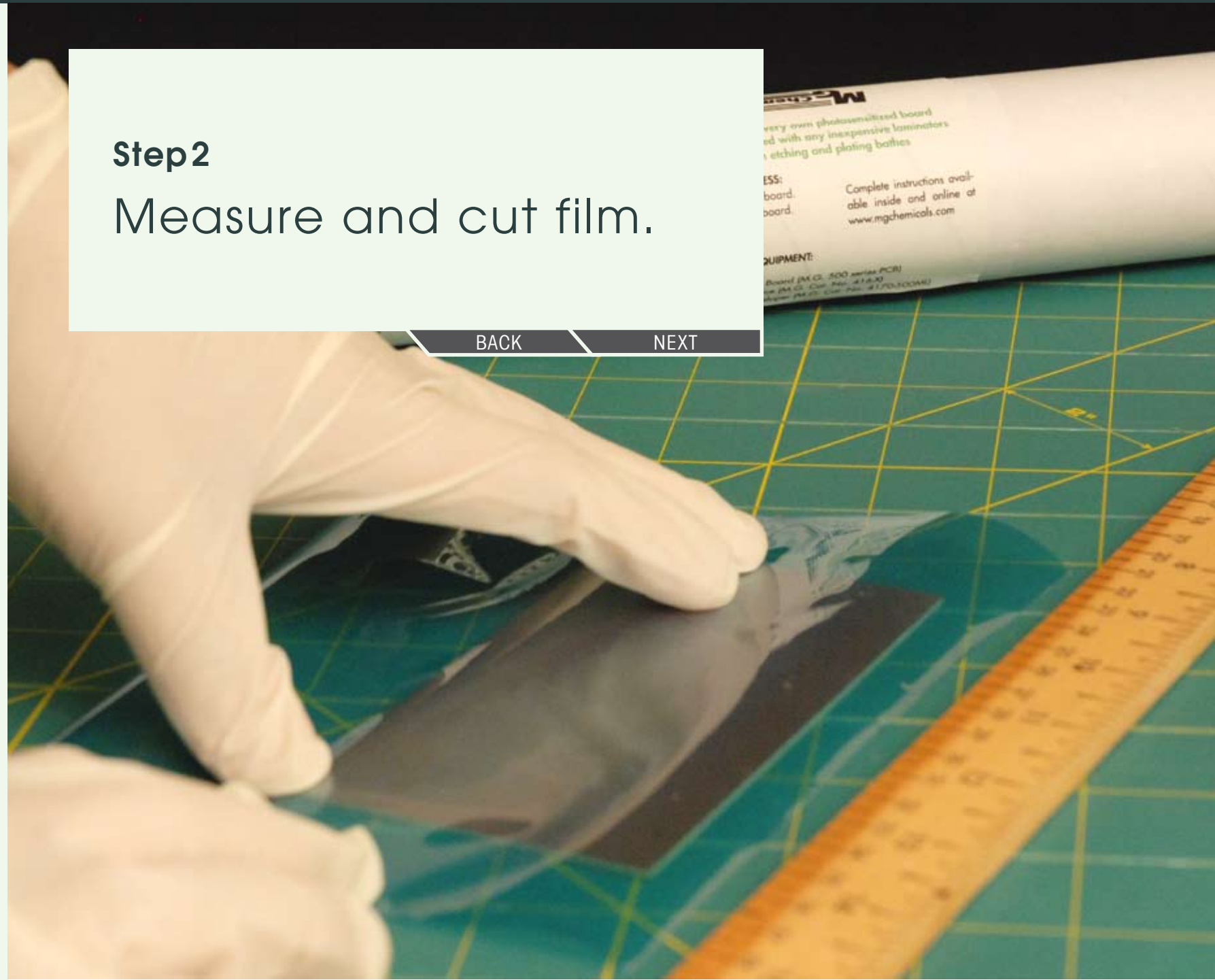
[BACK](#)[NEXT](#)

### FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML

[www.mgchemicals.com](http://www.mgchemicals.com)





# NEGATIVE PROTOTYPING PROCESS

- + CLEAN THE BOARD
- + MEASURE AND CUT FILM
- + REMOVE COATING AND APPLY FILM
- + LAMINATE

Work in a safe light environment when handling the film – any exposure to UV light will expose the film. Safe light refers to any incandescent bulb less than 40 watts.

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NEXT

## FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML



# NEGATIVE PROTOTYPING PROCESS



- + CLEAN THE BOARD
- + MEASURE AND CUT FILM
- + REMOVE COATING AND APPLY FILM
- + LAMINATE

Sharp scissors work best for cutting this film. The amount of film required depends on the size of the board being laminated. A 1 cm border should be left on all sides of the board due to shrinkage from heat.

BACK

NEXT

## FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML

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# NEGATIVE PROTOTYPING PROCESS

- + CLEAN THE BOARD
- + MEASURE AND CUT FILM
- + REMOVE COATING AND APPLY FILM
- + LAMINATE

For double sided boards, cut the film big enough (one piece) to sandwich the board in the middle. For a double-sided board, you will only have the 1 cm border on 3 sides. No border is required for the side where the film meets the board.

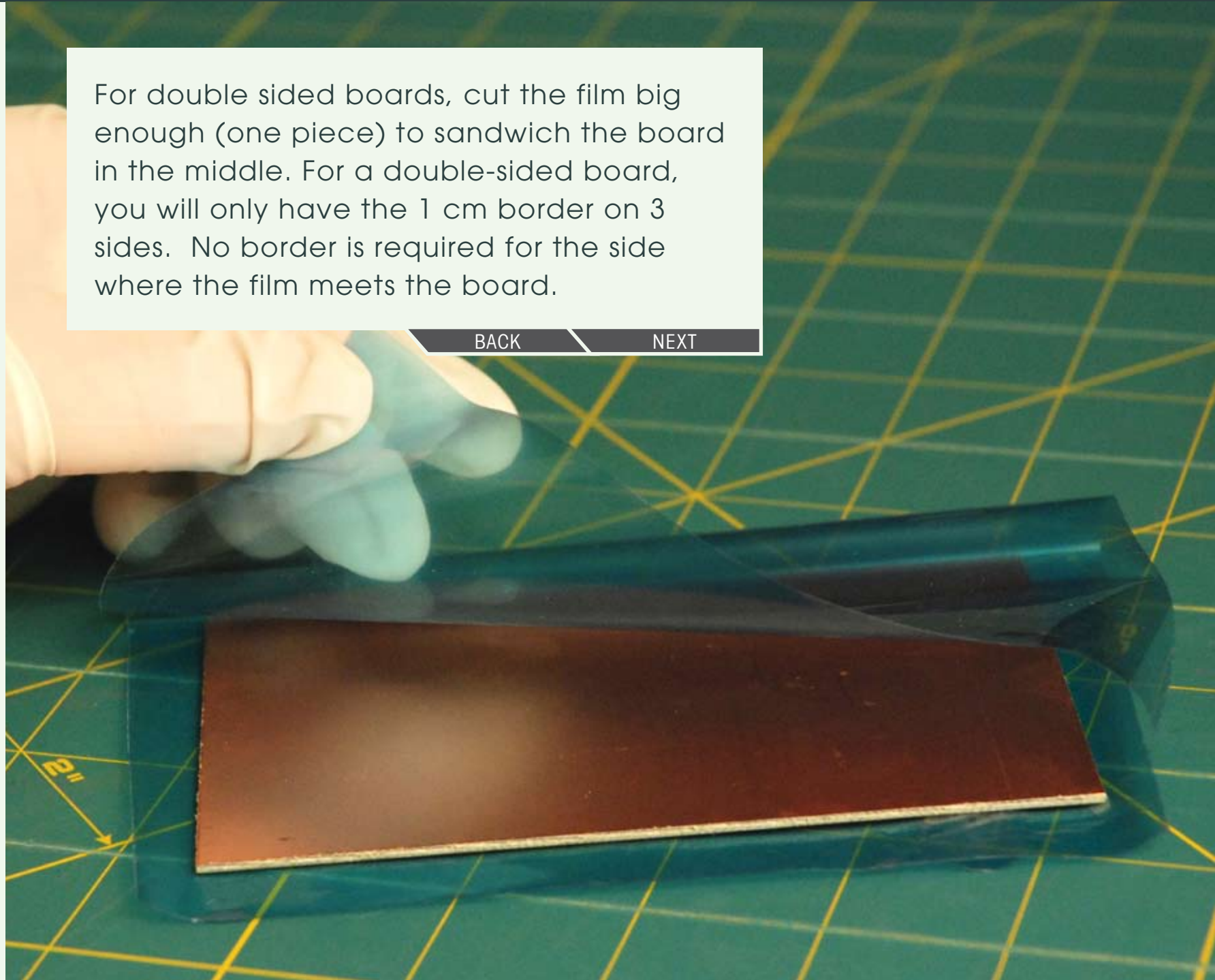
BACK

NEXT

## FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML





# NEGATIVE PROTOTYPING PROCESS



- + CLEAN THE BOARD
- + MEASURE AND CUT FILM
- + REMOVE COATING AND APPLY FILM
- + LAMINATE

## Step 3

Remove protective coating and apply film.

BACK

NEXT

### FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML

[www.mgchemicals.com](http://www.mgchemicals.com)



# NEGATIVE PROTOTYPING PROCESS

- + CLEAN THE BOARD
- + MEASURE AND CUT FILM
- + REMOVE COATING AND APPLY FILM
- + LAMINATE

First peel off the protective coating (on the side with the sticker - the soft hazy side). Apply the film face down with the side that just had the film removed.

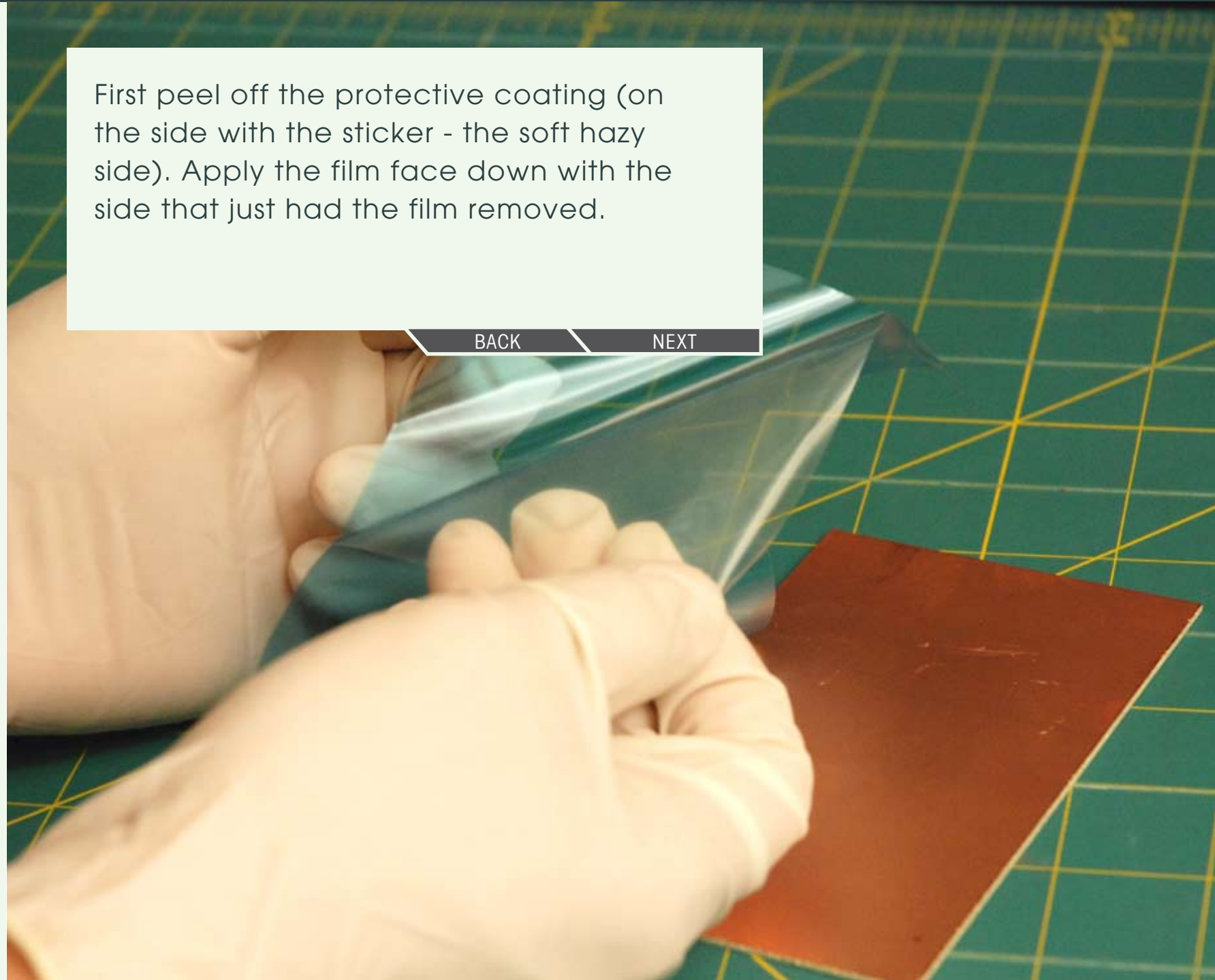
BACK

NEXT

## FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML



# NEGATIVE PROTOTYPING PROCESS

- + CLEAN THE BOARD
- + MEASURE AND CUT FILM
- + REMOVE COATING AND APPLY FILM
- + LAMINATE

Fold back the film on the side that will be fed into the laminator. It is important that the film is wrinkle free. For a double-sided board, no folding is required as the board is already sandwiched between the film.

BACK

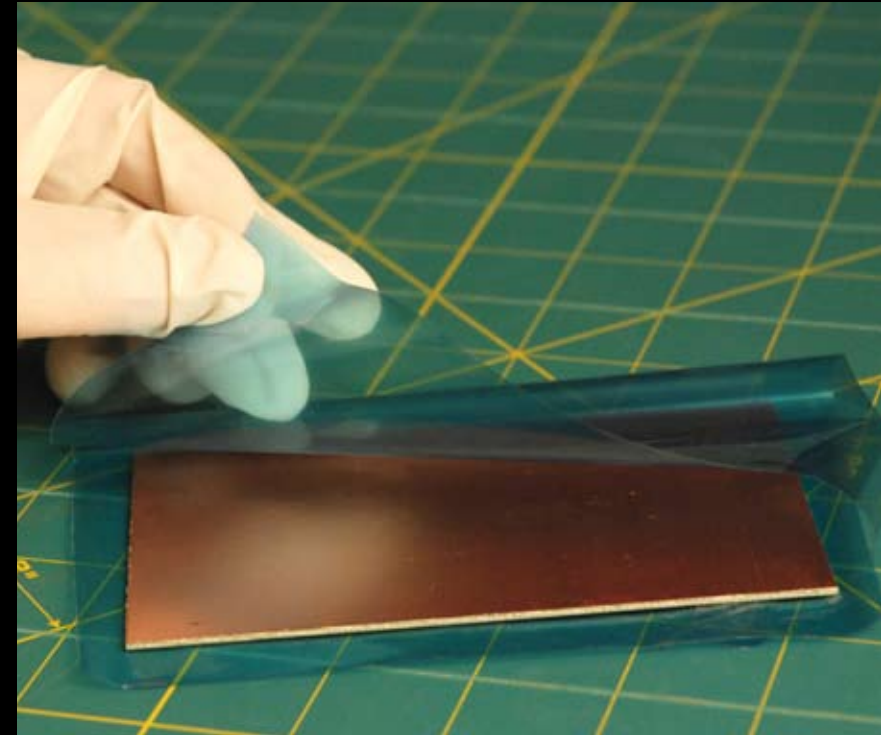
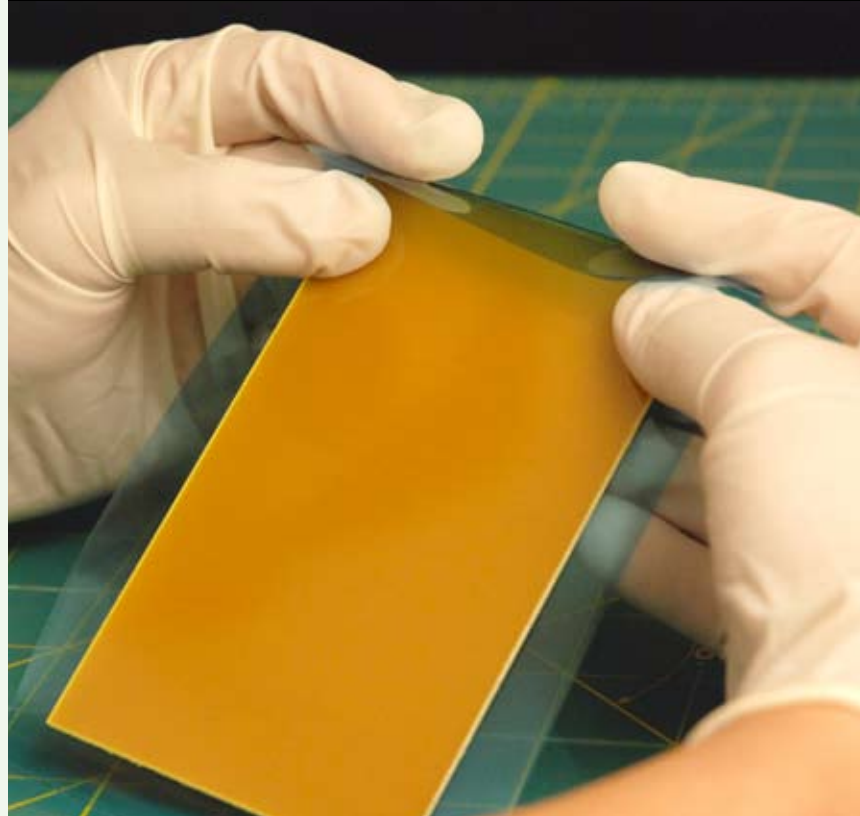
NEXT

## FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML

[www.mgchemicals.com](http://www.mgchemicals.com)





# NEGATIVE PROTOTYPING PROCESS



- + CLEAN THE BOARD
- + MEASURE AND CUT FILM
- + REMOVE COATING AND APPLY FILM
- + LAMINATE

## Step 4 Laminate.

BACK

NEXT

### FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML

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# NEGATIVE PROTOTYPING PROCESS

- + CLEAN THE BOARD
- + MEASURE AND CUT FILM
- + REMOVE COATING AND APPLY FILM
- + LAMINATE

Turn on the laminator. Wait until the laminator 'ready' indicator is on. Feed the board with the film side facing up into the laminator. Feed the side of the board with the excess border folded back.

BACK

NEXT

## FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML



# NEGATIVE PROTOTYPING PROCESS

- + CLEAN THE BOARD
- + MEASURE AND CUT FILM
- + REMOVE COATING AND APPLY FILM
- + LAMINATE

Once the board finishes laminating, put it through the laminator for a second time immediately after the first run (if required). The process is the same for the double-sided board. Store finished board in a dark and dust free environment until ready for use.

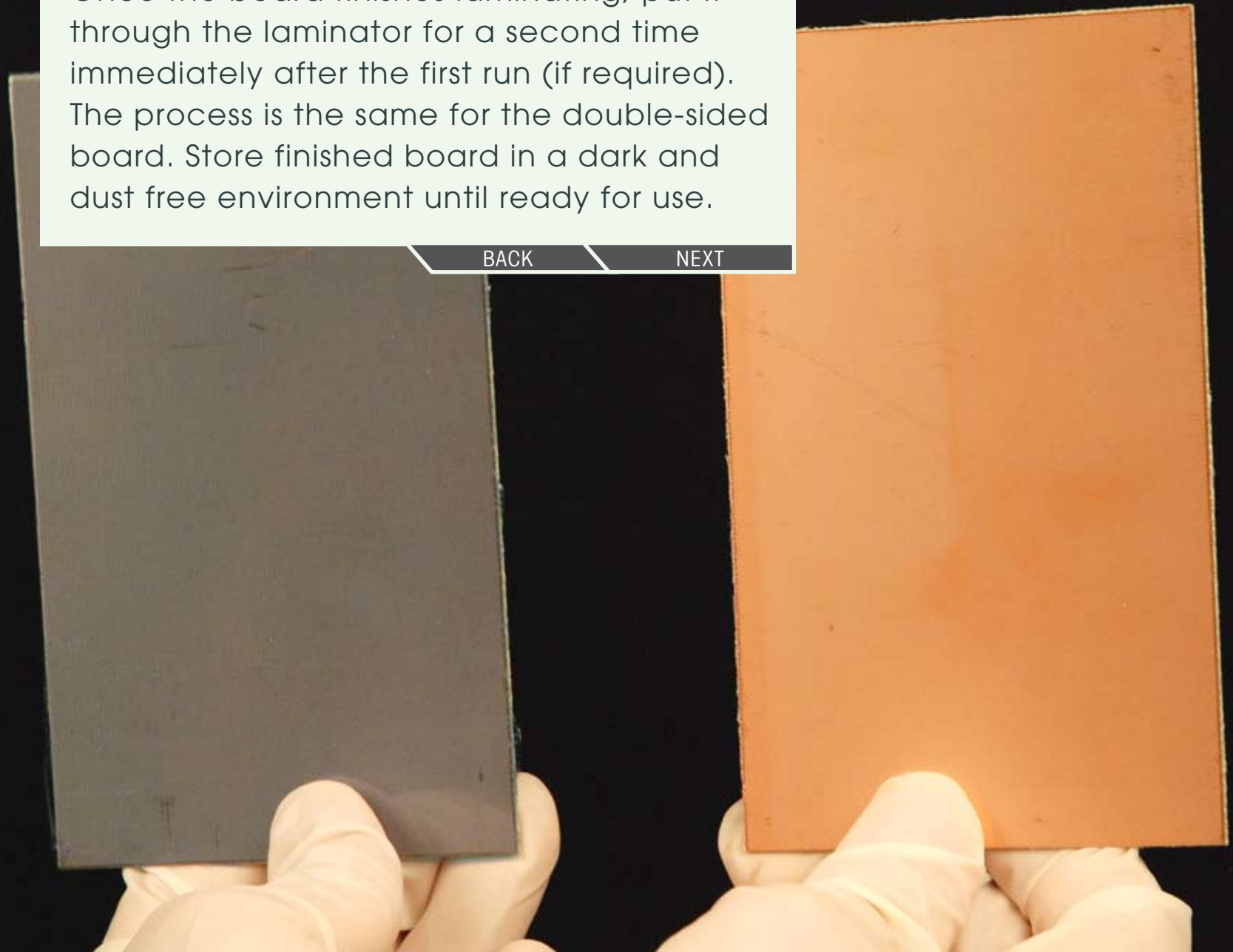
BACK

NEXT

## FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML





# NEGATIVE PROTOTYPING PROCESS

+ CREATE ARTWORK

+ EXPOSE

+ DEVELOP

+ RINSE

+ ETCH

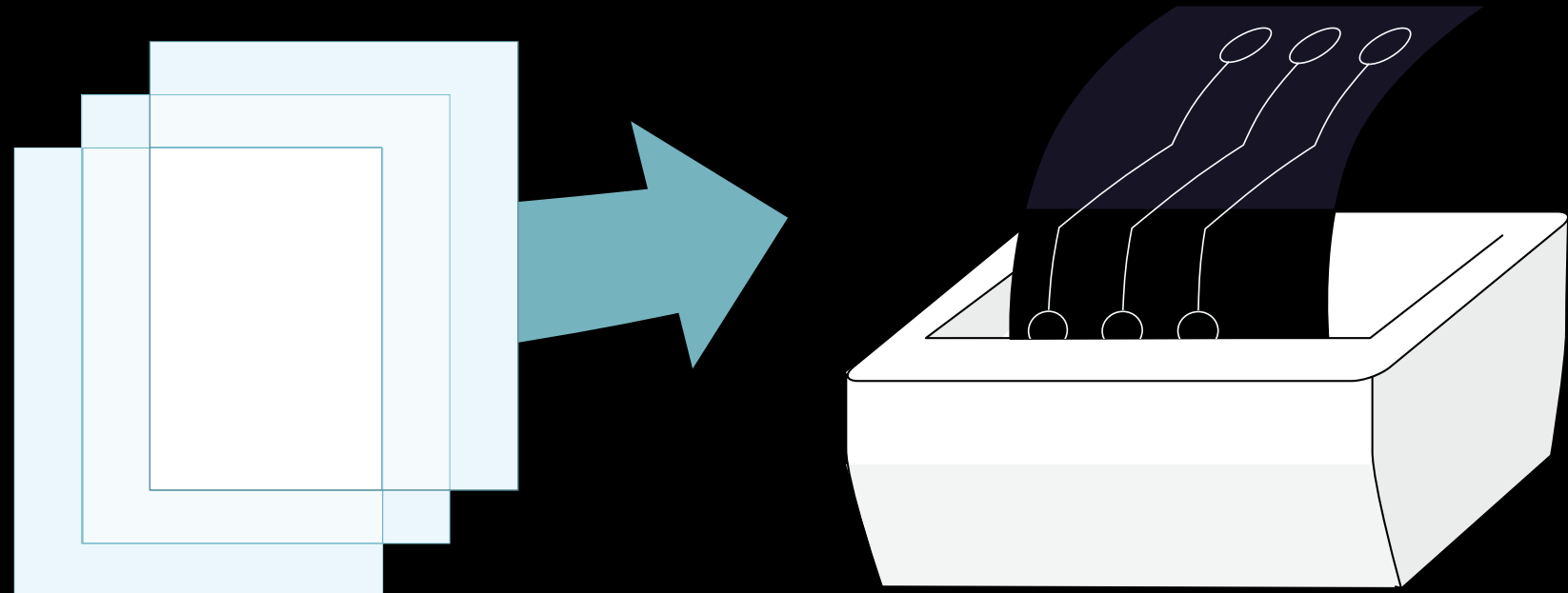
+ RINSE

## Step 1

### Create artwork.

BACK

NEXT



#### FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML

# NEGATIVE PROTOTYPING PROCESS

+ CREATE ARTWORK

+ EXPOSE

+ DEVELOP

+ RINSE

+ ETCH

+ RINSE

Print artwork on Transparency Film (MG Cat. No. 416-T) using a 600 dpi or higher resolution laser printer.

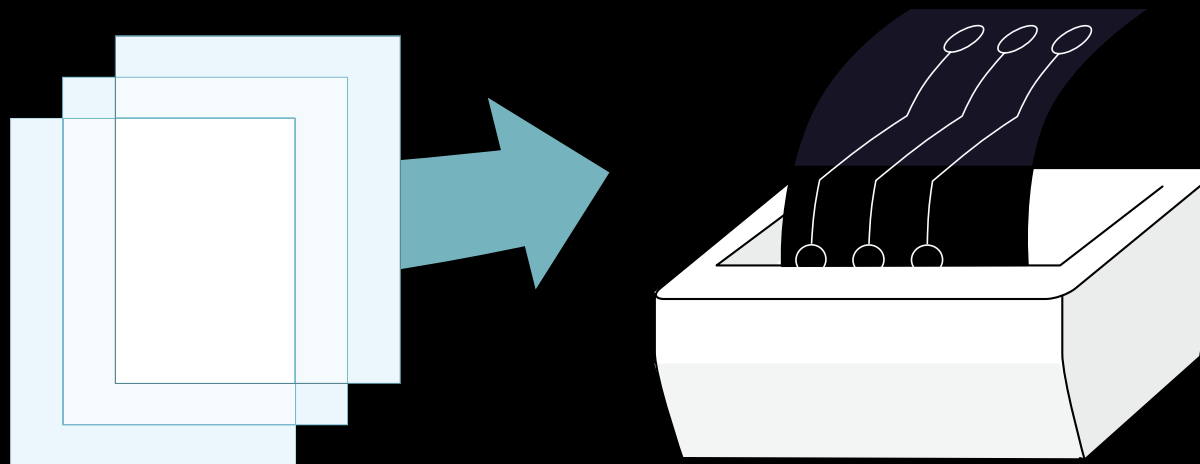
BACK

NEXT

## FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML



# NEGATIVE PROTOTYPING PROCESS

+ CREATE ARTWORK

+ EXPOSE

+ DEVELOP

+ RINSE

+ ETCH

+ RINSE

## Step2 Expose.

BACK

NEXT

### FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML

[www.mgchemicals.com](http://www.mgchemicals.com)





# NEGATIVE PROTOTYPING PROCESS

+ CREATE ARTWORK

+ EXPOSE

+ DEVELOP

+ RINSE

+ ETCH

+ RINSE

Expose artwork onto the presensitized copper clad board using Exposure Kit (M.G. Cat. No. 416-X) for 12 minutes.

BACK

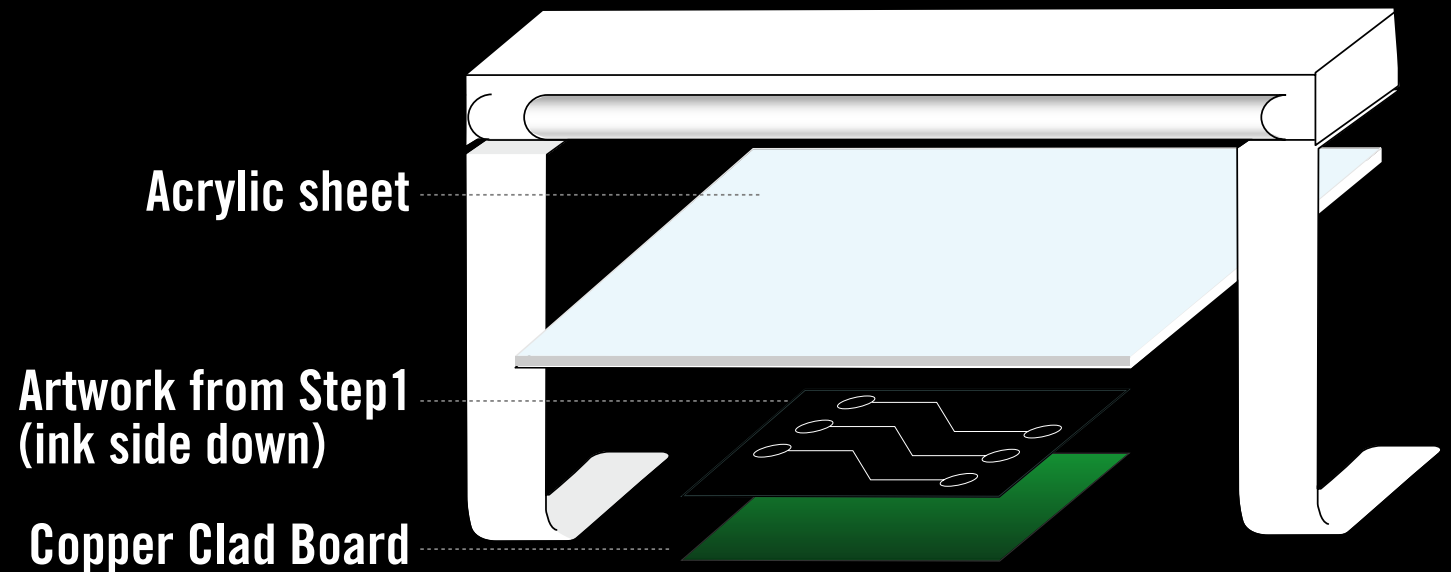
NEXT

## FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML

[www.mgchemicals.com](http://www.mgchemicals.com)



# NEGATIVE PROTOTYPING PROCESS

+ CREATE ARTWORK

+ EXPOSE

+ DEVELOP

+ RINSE

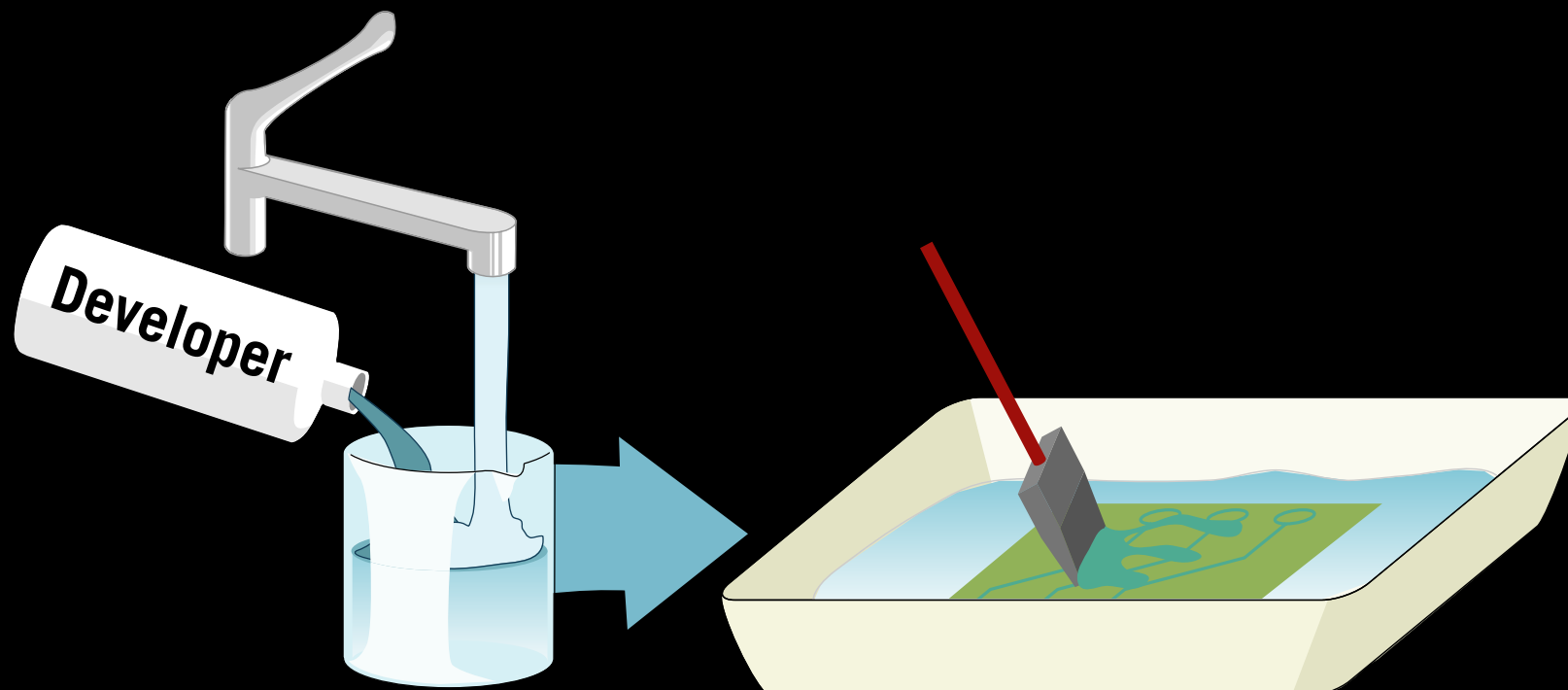
+ ETCH

+ RINSE

## Step 3 Develop.

BACK

NEXT



### FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML

# NEGATIVE PROTOTYPING PROCESS

+ CREATE ARTWORK

+ EXPOSE

+ DEVELOP

+ RINSE

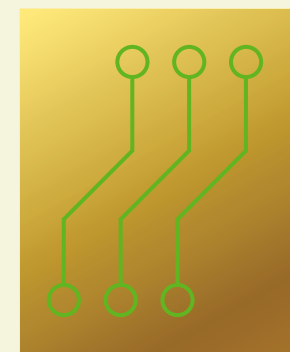
+ ETCH

+ RINSE

Peel the second protective covering from board before submerging into solution. Mix developer with room temperature water at 1:10 ratio. Brush board lightly with foam brush in developer solution. Develop board in solution for approximately 1-2 minutes. Monitor visually.

BACK

NEXT

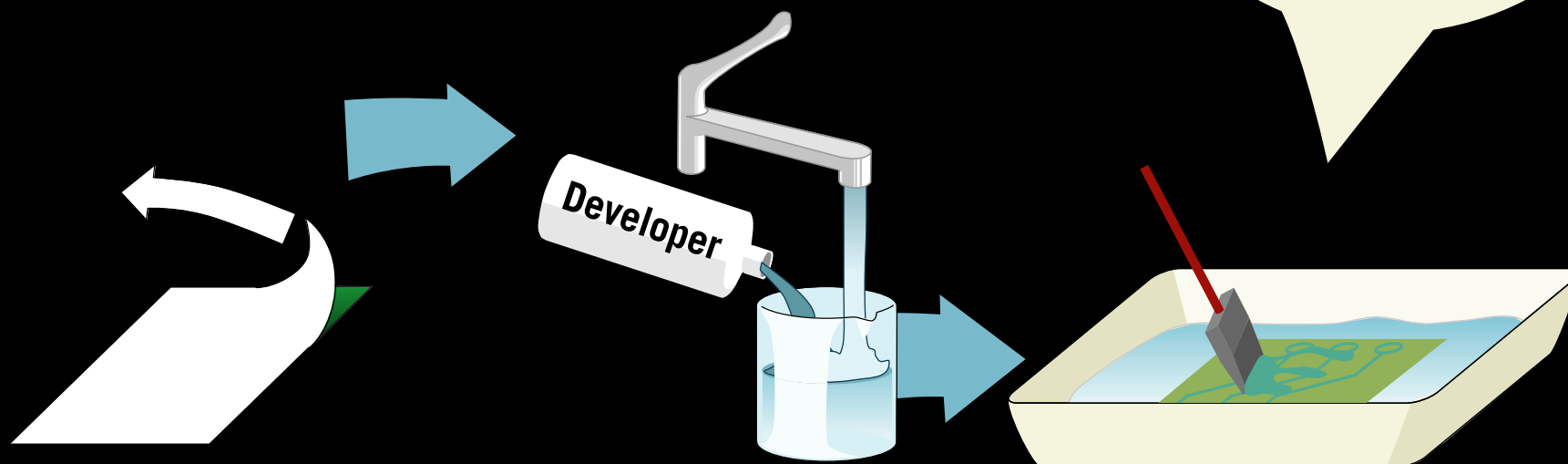


Developed Board

## FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML





# NEGATIVE PROTOTYPING PROCESS

+ CREATE ARTWORK

+ EXPOSE

+ DEVELOP

+ RINSE

+ ETCH

+ RINSE

## Step4 Rinse.

BACK

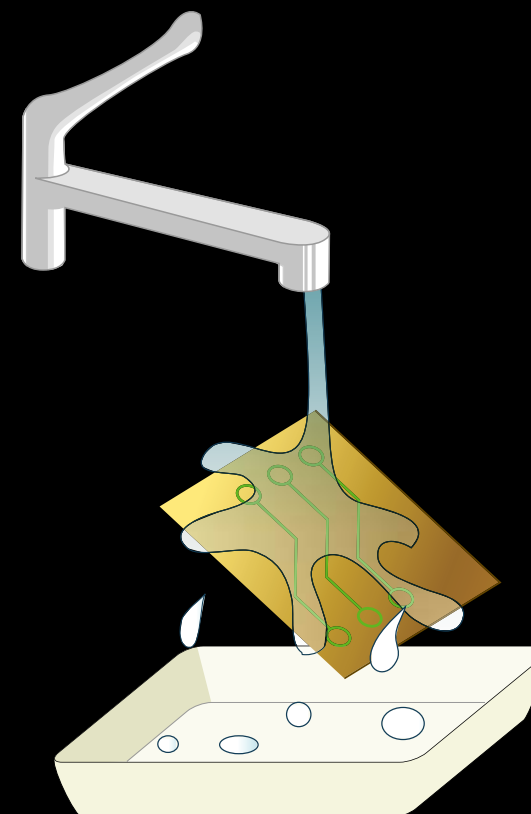
NEXT

### FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML

[www.mgchemicals.com](http://www.mgchemicals.com)



# NEGATIVE PROTOTYPING PROCESS

+ CREATE ARTWORK

+ EXPOSE

+ DEVELOP

+ RINSE

+ ETCH

+ RINSE

Rinse with cold tap water. It is important that the board is rinsed thoroughly.

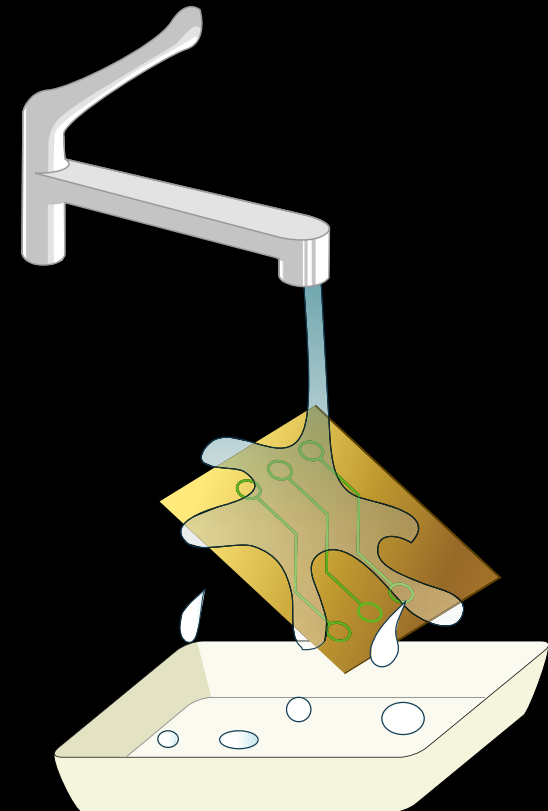
BACK

NEXT

## FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML



+ CREATE ARTWORK

+ EXPOSE

+ DEVELOP

+ RINSE

+ ETCH

+ RINSE

Step 5  
Etch.

BACK

NEXT

**CHOOSE AN ETCHANT.**

**AVAILABLE ETCHING KITS.**

## FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML



# NEGATIVE PROTOTYPING PROCESS



+ CREATE ARTWORK

+ EXPOSE

+ DEVELOP

+ RINSE

+ ETCH

+ RINSE

## FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML

[www.mgchemicals.com](http://www.mgchemicals.com)

Available Etching Kits

**Economy Etching Kit (Cat. No. 416-ES)**

**Professional Etching Process Kit  
(Cat. No. 416-E)**

BACK

NEXT

## CHOOSE AN ETCHANT.

### Ferric Chloride

Ready to use solution.  
42° Baume.

### Ammonium Persulphate

Not compatible with etch resist pens.  
Dilution required.

### Sodium Persulphate

Dilution required.

# NEGATIVE PROTOTYPING PROCESS

+ CREATE ARTWORK

+ EXPOSE

+ DEVELOP

+ RINSE

+ ETCH

+ RINSE

Etch for 10 - 30 minutes (heat solution to 45°C/113°F). Wear gloves, eyegear, and protective clothing.

The tank fits two 8" x 9" double sided Copper Clad Boards. The kit is ideal for students and hobbyists.

BACK

NEXT

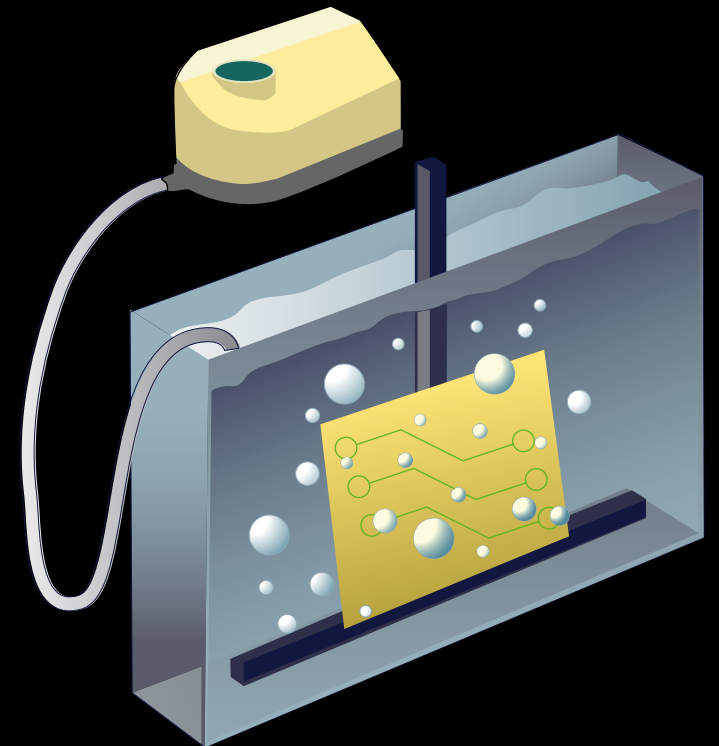
**ECONOMY  
ETCHING PROCESS  
KIT**

**Cat. No. 416-ES**

## FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML



# NEGATIVE PROTOTYPING PROCESS

+ CREATE ARTWORK

+ EXPOSE

+ DEVELOP

+ RINSE

+ ETCH

+ RINSE

Etch for 10 - 30 minutes (heat solution to 45°C/113°F). Wear gloves, eyegear, and protective clothing.

The tank fits two 8" x 12" double sided Copper Clad Boards. The kit is ideal for professional use.

BACK

NEXT

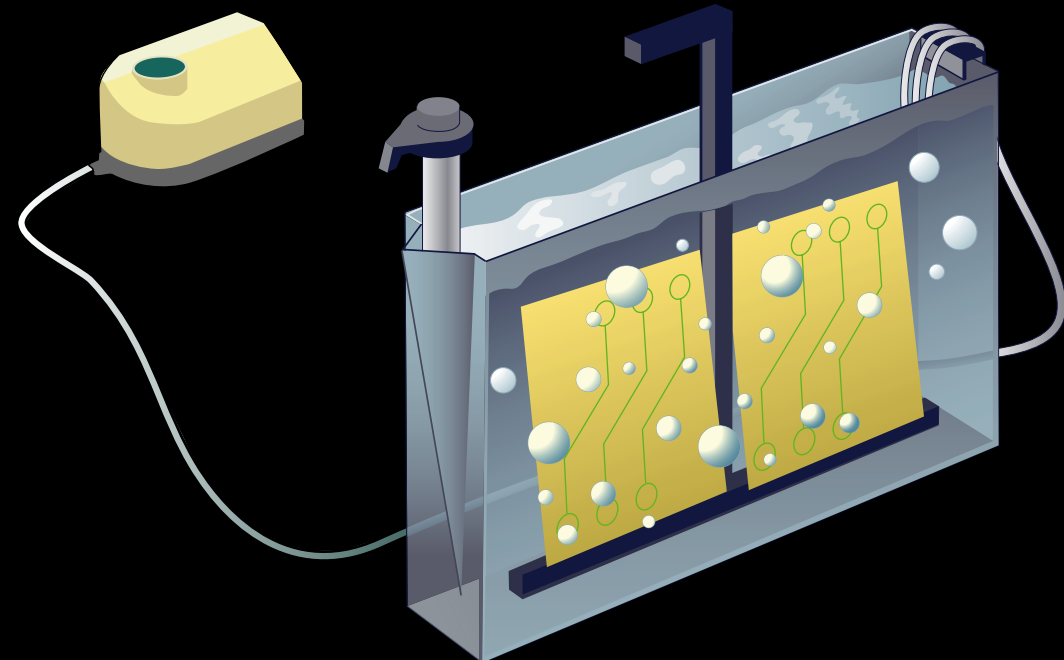
PROFESSIONAL  
ETCHING PROCESS  
KIT

Cat. No. 416-E

## FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML



# NEGATIVE PROTOTYPING PROCESS

+ CREATE ARTWORK

+ EXPOSE

+ DEVELOP

+ RINSE

+ ETCH

+ RINSE

End result of a etched board after the etching process.

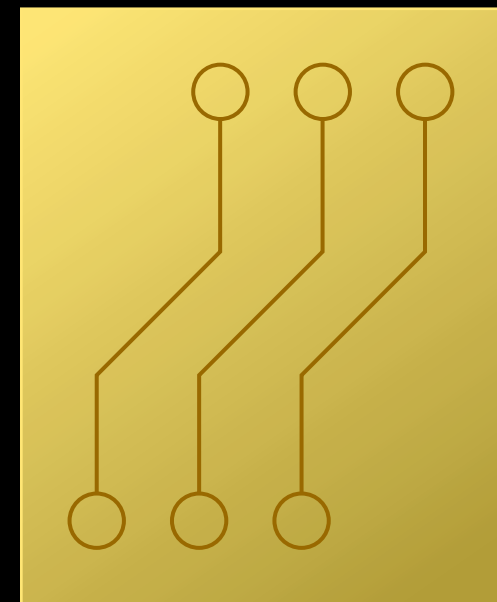
BACK

NEXT

## FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML





# NEGATIVE PROTOTYPING PROCESS

+ CREATE ARTWORK

+ EXPOSE

+ DEVELOP

+ RINSE

+ ETCH

+ RINSE

## Step 6 Rinse.

BACK

NEXT

### FEATURED PRODUCTS

Negative Dry Film Resist  
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Negative Developer  
Cat. No. 4170-500ML

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# NEGATIVE PROTOTYPING PROCESS

+ CREATE ARTWORK

+ EXPOSE

+ DEVELOP

+ RINSE

+ ETCH

+ RINSE

## FEATURED PRODUCTS

Negative Dry Film Resist  
Cat. No. 416DFR-5

Negative Developer  
Cat. No. 4170-500ML

[www.mgchemicals.com](http://www.mgchemicals.com)

Rinse with cold tap water thoroughly and dry board. The board is now ready for use.

BACK

FINISH

