



# <sup>63</sup>Nickel Electron Capture Detector Radioactive Leak Wipe Test Kit Instructions

Service Information

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# General

In the U.S., your ECD must be tested for leakage of radioactive material at least every 6 months. Customers outside of the U.S. should consult their local nuclear agency to determine the required frequency of wipe tests. Records of all tests and their results must be maintained for possible inspection by the NRC or your local "Agency." Under severe usage conditions, radioactivity leak tests during every column change will provide maximum security.

Although Agilent Technologies performs a wipe test on all ECDs prior to shipment, all further 6-month wipe tests are the responsibility of the end user. In addition, customer wipe tests are not performed by Agilent service engineers, are not included in any service contract, and are not part of any preventative maintenance carried out by Agilent Technologies.

We recommend that disposable gloves be worn when performing this test. If they are not used, wash your hands thoroughly when you are finished.

## WARNING

**$^{63}\text{Ni}$  is a low energy beta-emitter (maximum of 0.067 MeV). It is generally considered that greater than 0.07 MeV is required to penetrate the outer layer of skin. However,  $^{63}\text{Ni}$  may be injurious if ingested, implanted under the skin, or inhaled. Adequate measures should be taken while performing the wipe test to prevent internalizing the radionuclide. At a minimum, the use of disposal plastic gloves while taking wipe samples and thorough washing of the hands with soap and water upon completion of wipes is recommended.**

## Wipe Test Kit Contents

Refer to **Table 1** for Wipe Test Kit Contents.

**Table 1 Wipe Test Kit Contents**

Description	Part No.	Quantity	Item #
Kit	18713-60050	1	
Information Card	18713-90040	12	Item 1
Filter Paper no. 41	3150-0429	12	Item 2
Plastic Bag (4 x 8 in.)	9222-0307	12	Item 3
Service information	5950-3586	This document	

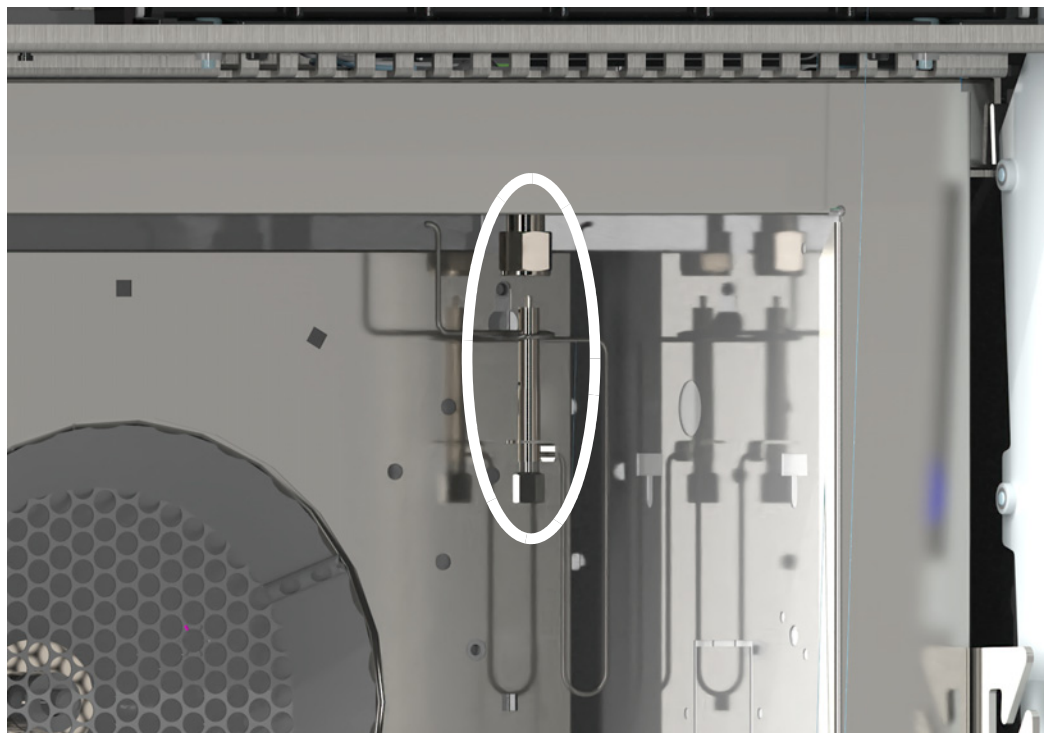
Each kit contains sufficient materials to perform up to six wipe tests. Extra wipe test kits can be purchased from Agilent Technologies, Inc. on the web at [www.agilent.com](http://www.agilent.com).

## Radioactive Wipe Test

### 8890 and 8860 GC ECDs (contain a G2397A ECD)

The following are detailed instructions for performing the wipe test on Agilent ECDs.

- 1 Select two information cards (item 1), and fill them out completely.
- 2 Select two pieces of filter paper (item 2), and label them with a pencil as follows:  
Sample 1—Det. Entrance Fitting  
Sample 2—Det. Exit  
Local requirements for radioactive wipe test may vary; perform the wipe test at any other sample location specified by your local nuclear agency. For each additional location, fill out an information card (item 1) and label a piece of paper (item 2).
- 3 Cool all heated zones to  $< 40\text{ }^{\circ}\text{C}$ . After everything cools, turn off detector gas flows and set a low column purge flow. If using a flammable carrier gas, instead turn it off.
- 4 Disconnect the column from the ECD.
- 5 Wipe the outside and inside of the ECD entrance fitting (including column and adapter connections) with the piece of filter paper labeled "Sample 1—Det. Entrance Fitting." Immediately insert it and a filled-out information card into one of the plastic bags (item 3), and seal it closed.



- 6 Disconnect the exit tubing from the ECD vent tube. Wipe the side of the metal ECD exit tube and/or the inside of the exit tubing with the filter paper labeled "Sample 2—Det. Exit." Insert

it and a completed information card in a second plastic bag (item 3). If the ECD is installed in a GC, reconnect the tubing to the ECD vent and inspect the vent line to verify that it is attached securely and vented properly.



- 7 Perform the wipe test at any other sample location specified by your local nuclear agency and immediately insert it and a filled-out information card into one of the unused plastic bags (item 3) and seal it closed.
- 8 After completing wipe tests, wash your hands thoroughly with mild soap and water.
- 9 In the U.S., the "ECD Wipe Samples" must be analyzed by an NRC authorized company offering this service.

You will receive a written report of the results from the wipe test company. It is your responsibility to retain all wipe test results for possible inspection by your local "Agency."

## Intuvo 9000 GC ECDs (contain a G4597A ECD)

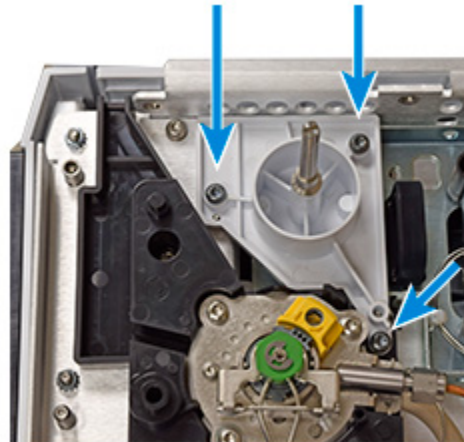
The following are detailed instructions for performing the wipe test on Agilent ECDs.

- 1 Select two information cards (item 1), and fill them out completely.
- 2 Select two pieces of filter paper (item 2), and label it with a pencil as follows:  
Sample 1 - Det. Tail  
Sample 2 - Det. Exit  
Local requirements for radioactive wipe test may vary; perform the wipe test at any other sample location specified by your local nuclear agency. For each additional location, fill out an information card (item 1) and label a piece of filter paper (item 2).
- 3 Cool all heated zones to  $< 40\text{ }^{\circ}\text{C}$ . After everything cools, turn off detector gas flows and set a low column purge flow. If using a flammable carrier gas, instead turn it off.

- 4 Remove the top cover, inlet cover, detector cover, and split vent trap cover. Remove the top cover screws in the order shown.

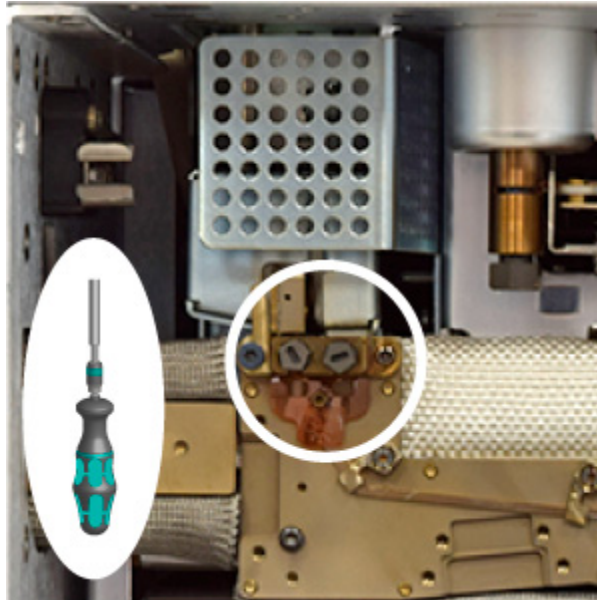


- 5 Remove the ALS support bracket.

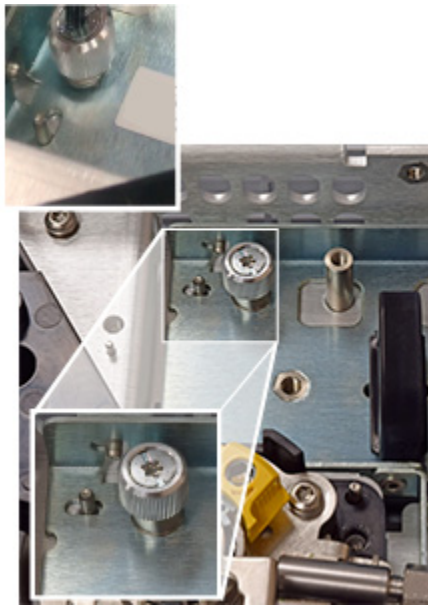


- 6 Remove the left side compression bolt from the D1 bus fitting.  
a Open the GC front door.  
b Open the bus door 90 °, then lift and remove.

c Remove the left side compression bolt from the bus D1 fitting.

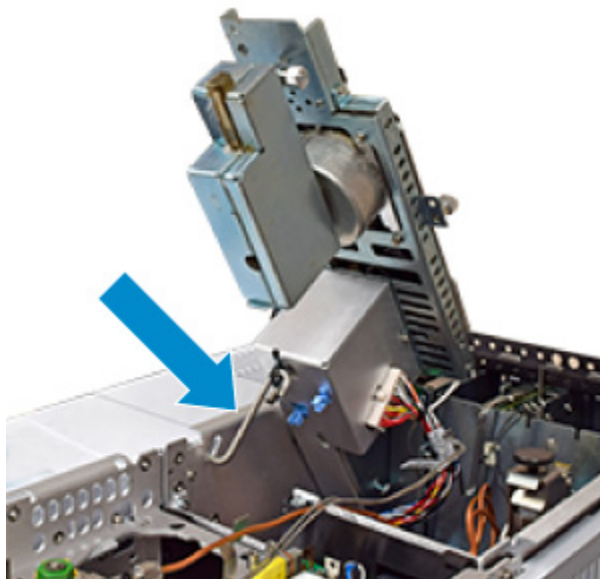


7 Loosen the thumbscrews that secure the detector module.



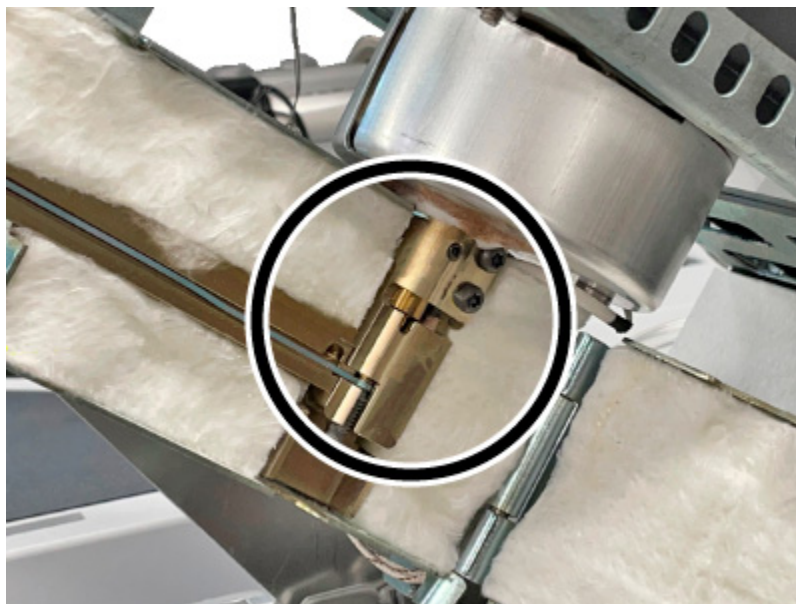
8 Using the black handle, slide the detector module forward until it stops (about 3 mm)

- 9 Raise the detector module and secure in place using the S-hook.



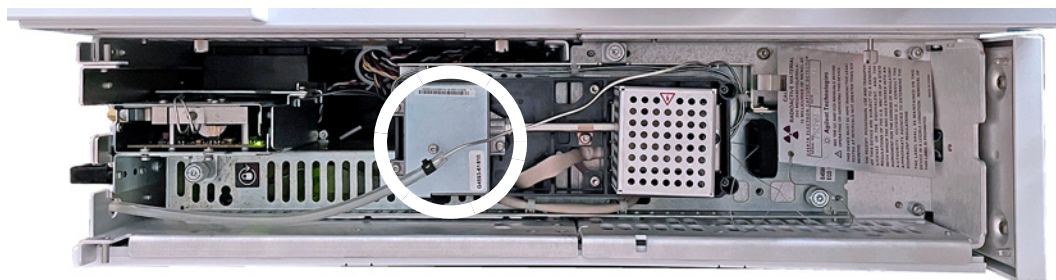
- 10 Open the detector tail housing.

- 11 Wipe the outside of the connection between the ECD capillary adapter fitting and the detector tail with the piece of filter paper labeled "Sample 1 - Det. Tail" and immediately insert it and a filled-out information card into one of the plastic bags (item 3) and seal it closed.



- 12 Disconnect the exit tubing from the ECD vent tube. Wipe the side of the metal ECD exit and /or the inside of the exit tubing with the filter paper labeled "Sample 2 -- Det. Exit". Insert it and a completed information card in a second plastic bag. If the ECD is installed in a GC, reconnect the tubing to the ECD vent and inspect the vent line to verify that it is attached securely and vented properly. The photo below shows the location of the exit tubing for D2 configuration. The D1 configuration is similar.





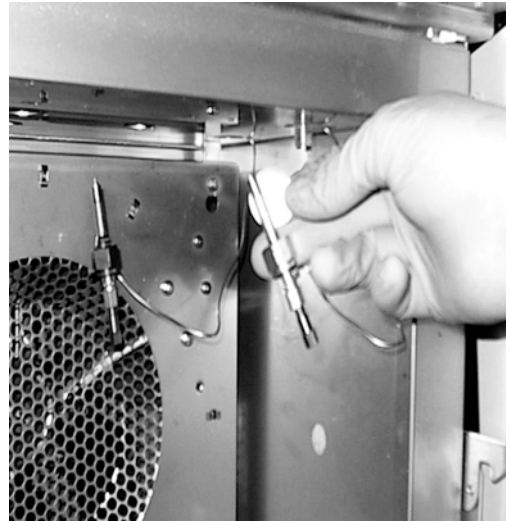
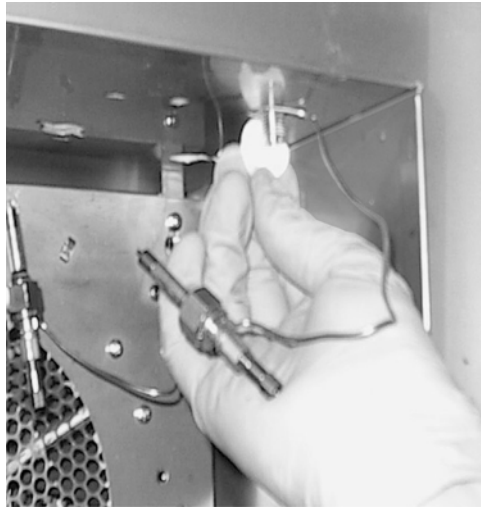
- 13 Perform wipe test at any other sample location specified by your local nuclear agency and immediately insert it and a filled-out information card into one of the unused plastic bags (item 3) and seal it closed.
- 14 After completing the wipe test, wash your hands thoroughly with mild soap and water.
- 15 In the U.S., the “ECD Wipe Sample” must be analyzed by an NRC authorized company offering this service.
- 16 You will receive a written report of the results from the wipe test company. It is your responsibility to retain all wipe test results for possible inspection by your local “Agency.”

## 7890, 7820A, 6890, and 6850 GC ECDs (contain a G2397A or G1533A ECD)

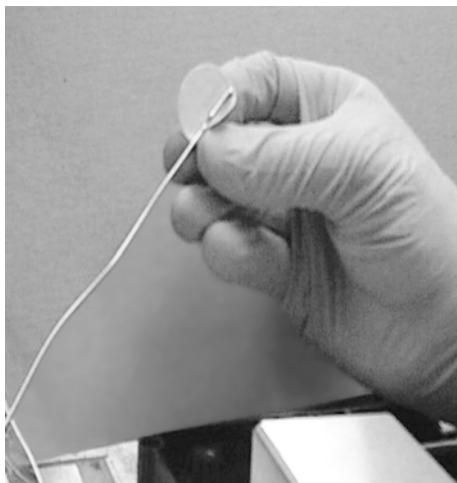
- 1 Select two information cards (item 1), and fill them out completely.
- 2 Select two pieces of filter paper (item 2), and label them with a pencil as follows:  
Sample 1—Det. Entrance Fitting  
Sample 2—Det. Exit  
Local requirements for radioactive wipe test may vary; perform the wipe test at any other sample location specified by your local nuclear agency. For each additional location, fill out an information card (item 1) and label a piece of filter paper (item 2).
- 3 Cool all heated zones to < 40 °C. After everything cools, turn off detector gas flows and set a low column purge flow. If using a flammable carrier gas, instead turn it off.
- 4 Disconnect the column from the ECD.
- 5 Wipe the outside and inside of the ECD entrance fitting (including column and adapter connections) with the piece of filter paper labeled “Sample 1—Det. Entrance Fitting.”



Immediately insert it and a filled-out information card into one of the plastic bags (item 3), and seal it closed.



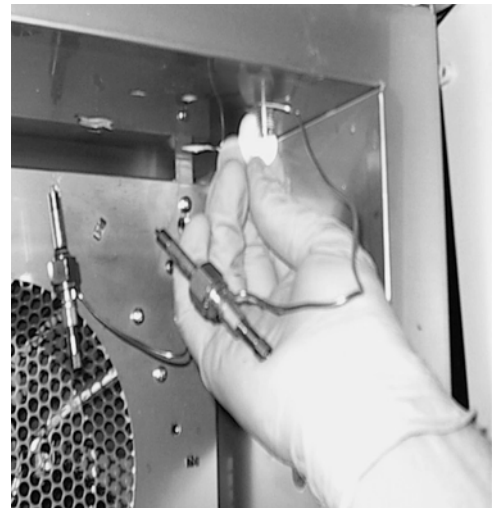
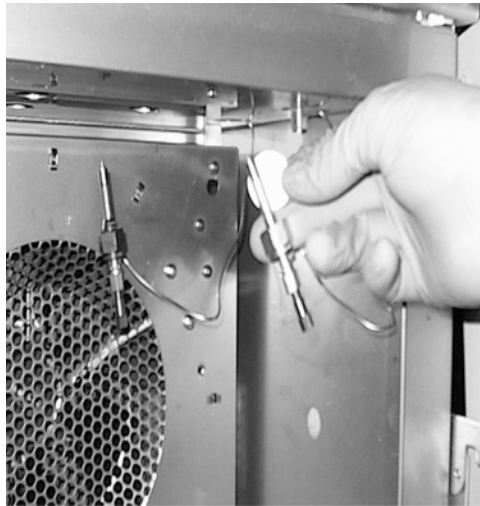
- 6 Disconnect the exit tubing from the ECD vent tube. Wipe the side of the metal ECD exit tube and/or the inside of the exit tubing with the filter paper labeled "Sample 2—Det. Exit." Insert it and a completed information card in a second plastic bag. If the ECD is installed in a GC, reconnect the tubing to the ECD vent and inspect the vent line to verify that it is attached securely and vented properly.



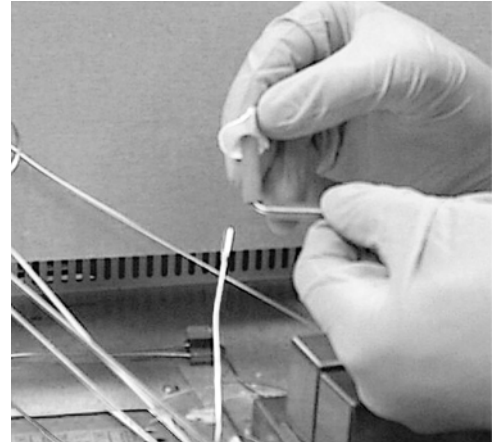
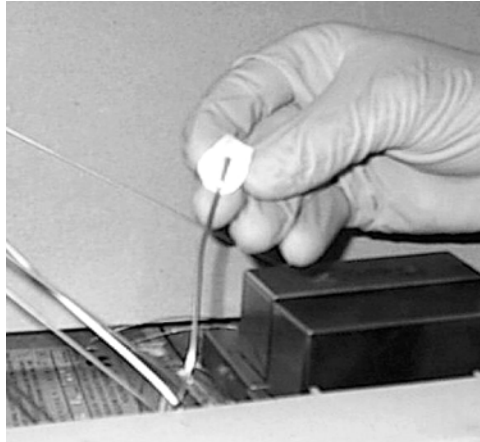
- 7 Perform the wipe test at any other sample location specified by your local nuclear agency and immediately insert it and a filled-out information card into one of the unused plastic bags (item 3) and seal it closed.
- 8 After completing wipe tests, wash your hands thoroughly with mild soap and water.
- 9 In the U.S., the "ECD Wipe Samples" must be analyzed by an NRC authorized company offering this service.
- 10 You will receive a written report of the results from the wipe test company. It is your responsibility to retain all wipe test results for possible inspection by your local "Agency."

## 5890 GC ECD (contain a G1223A, G1224A, 19233, or 19235 ECD)

- 1 Select two information cards (item 1), and fill them out completely.
- 2 Select two pieces of filter paper (item 2), and label them with a pencil as follows:  
Sample 1—Det. Entrance Fitting  
Sample 2—Det. Exit  
Local requirements for radioactive wipe test may vary; perform the wipe test at any other sample location specified by your local nuclear agency. For each additional location, fill out an information card (item 1) and label a piece of filter paper (item 2).
- 3 Cool all heated zones to < 40 °C. After everything cools, turn off detector gas flows and set a low column purge flow. If using a flammable carrier gas, instead turn it off.
- 4 Disconnect the column from the ECD.
- 5 Wipe the outside and inside of the ECD entrance fitting (including column and adapter connections) with the piece of filter paper labeled "Sample 1—Det. Entrance Fitting." Immediately insert it and a filled-out information card into one of the plastic bags (item 3), and seal it closed.



- 6 Disconnect the exit tubing from the ECD vent tube. Wipe the side of the metal ECD exit tube and/or the inside of the exit tubing with the filter paper labeled "Sample 2—Det. Exit." Insert it and a completed information card in a second plastic bag. If the ECD is installed in a GC, reconnect the tubing to the ECD vent and inspect the vent line to verify that it is attached securely and vented properly.



- 7 Perform the wipe test at any other sample location specified by your local nuclear agency and immediately insert it and a filled-out information card into one of the unused plastic bags (item 3) and seal it closed.
- 8 After completing wipe tests, wash your hands thoroughly with mild soap and water.
- 9 In the U.S., the "ECD Wipe Samples" must be analyzed by an NRC authorized company offering this service.
- 10 You will receive a written report of the results from the wipe test company. It is your responsibility to retain all wipe test results for possible inspection by your local "Agency."

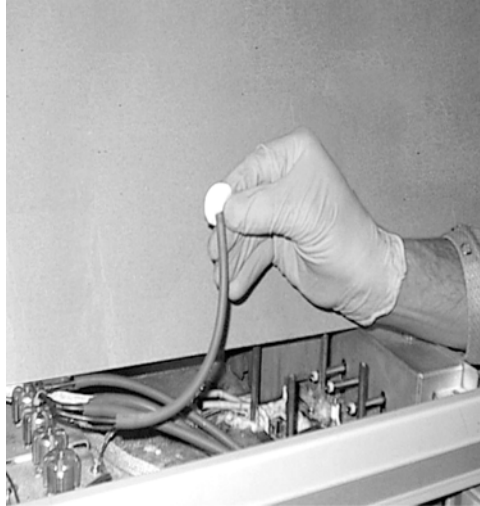
## 5880 GC ECD (contain a G1223A, G1224A, 19303, or 19312 ECD)

- 1 Select two information cards (item 1), and fill them out completely.
- 2 Select two pieces of filter paper (item 2), and label them with a pencil as follows:  
Sample 1—Det. Entrance Fitting  
Sample 2—Det. Exit  
Local requirements for radioactive wipe test may vary; perform the wipe test at any other sample location specified by your local nuclear agency. For each additional location, fill out an information card (item 1) and label a piece of filter paper (item 2).
- 3 Cool all heated zones to  $< 40$  °C. After everything cools, turn off detector gas flows and set a low column purge flow. If using a flammable carrier gas, instead turn it off. Disconnect the column from the ECD.
- 4 Wipe the outside and inside of the ECD entrance fitting (including column and adapter connections) with the piece of filter paper labeled "Sample 1—Det. Entrance Fitting."

Immediately insert it and a filled-out information card into one of the plastic bags (item 3), and seal it closed.



- 5 Disconnect the exit tubing from the ECD vent tube. Wipe the side of the metal ECD exit tube and/or the inside of the exit tubing with the filter paper labeled "Sample 2—Det. Exit." Insert it and a completed information card in a second plastic bag. If the ECD is installed in a GC, reconnect the tubing to the ECD vent and inspect the vent line to verify that it is attached securely and vented properly.



- 6 Perform the wipe test at any other sample location specified by your local nuclear agency and immediately insert it and a filled-out information card into one of the unused plastic bags (item 3) and seal it closed.
- 7 After completing wipe tests, wash your hands thoroughly with mild soap and water.
- 8 In the U.S., the "ECD Wipe Samples" must be analyzed by an NRC authorized company offering this service.
- 9 You will receive a written report of the results from the wipe test company. It is your responsibility to retain all wipe test results for possible inspection by your local "Agency."

## Send for analysis

Insert the completed information cards and sample bags into a standard mailing envelope and mail to a service company that is capable of analyzing for removable  $^{63}\text{Ni}$  and which operates per your local nuclear regulatory agency's regulations for wipe tests. No special postal handling is necessary. Below is a list of a few companies that provide this service. Please note that the listing of Wipe Test Companies is only provided as a courtesy to our customers and Agilent Technologies is not associated with and does not specifically endorse any one of these companies. You may choose to use any of these companies or any other authorized company. Customers outside of the U.S., please contact your local nuclear regulatory agency for an authorized company. We suggest that you contact the company for cost of testing, turnaround times, and payment arrangements

### **Wipe test companies**

Nuclear Radiation Developments Inc.  
2937 Alt Boulevard  
Grand Island, New York 14072  
716-773-7634

National Leak Test Center  
P. O. Box 1400  
North Tonawanda, New York 14120  
716-693-0550

QSA Global Inc.  
6765 Langley Drive  
Baton Rouge, Louisiana 70809  
225-751-5893

Detector Service Center, Inc.  
9423 Chapel Hill Road  
Cary, North Carolina 27513  
919-469-0259

Spencer Scientific  
13309 SE 159th Place  
Renton, WA 98058-7802  
425-204-6167

## High wipes

If the radioactive leak test indicates leakage of 0.005 microcuries or greater, you must take the ECD out of service immediately and notify the NRC or the appropriate State agency within 5 days.



## Wipe test conversion formulas

When you receive your wipe test results, they will be defined as CPMs, DPMs, microcuries or Becquerels. For your convenience, some conversion formulas and examples to put these numbers in perspective are found below.

C = Wipe in CPMs (counts per minute)

D = Wipe in DPMs (disintegrations per minute)

E = Efficiency of the liquid scintillation counter (LSC) for that day

F = Wipe in microcuries ( $\mu\text{Ci}$ )

B = Wipe in Becquerels (Bq)

$D = C/E$

$F = D/(2,220,000)$

$B = (D)/60$

1 Curie (Ci) =  $3.7 \times 10^{10}$  Becquerels (Bq) = 37,000 MBq

1 Curie (Ci) = 1,000 mCi (millicuries)

1 Curie (Ci) = 1,000,000  $\mu\text{Ci}$  (microcuries)

1 Curie (Ci) = 1,000,000,000 nCi (nanocuries)

1 Curie (Ci) = 1,000,000,000,000 pCi (picocuries)

For example, if you had a wipe of 9,435 CPM and the efficiency of the count is 85%, you would convert the value to DPMs and microcuries as follows:

$(9,435 \text{ CPMs})/(0.85) = 11,100 \text{ DPMs}$

$(11,100 \text{ DPMs})/(2,220,000) = 0.005 \mu\text{Ci} = 5 \text{ nCi}$

$(11,100)/(60) = 185 \text{ Bq}$

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