3M™ E-A-Rfit™ Dual-Ear Validation System User Instructions

Warnings and Cautions

⚠ WARNING

To avoid the risk of electric shock, which if not avoided could result in serious injury or death:

- Do not immerse the 3M™ E-A-Rfit™ Dual-Ear Validation System in any liquid.
- Use indoors only.
- Route power cable away from traffic areas, sharp edges, moving parts and hot surfaces. Do not pull on power cable to move the device.
- Disconnect power cord before cleaning.
- Clean the exterior surface of the speaker with a clean anti-static cloth.
- Do not attempt to clean the interior components.
- There are no serviceable parts.
- **The 3M™ E-A-Rfit™ Dual-Ear Validation System must be returned to the manufacturer for repair.**

⚠ CAUTION

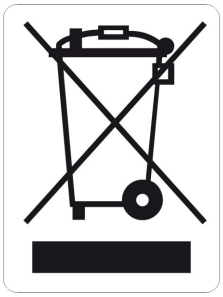
- Substitution of components may impair the accuracy of the instrument. Repairs should be performed by authorized service personnel only.
- To reduce the risk of tripping, or the device falling which could result in minor or moderate injury, route power cable away from traffic areas, sharp edges, moving parts and hot surfaces. Do not pull on power cable to move the device.
- Read the User Guide before operation.

⚠ CAUTION

To reduce the risks associated with hazardous voltage, tripping, falling, tipping and impact which, if not avoided, could result in minor or moderate injury:

- Route power cable away from traffic areas, sharp edges, moving parts and hot surfaces. Do not pull on power cable to move the device.

NOTE: Dispose of the 3M E-A-Rfit Dual-Ear Validation System according to applicable governmental regulations.



Introduction

This system is comprised of hardware and software that enables the operator to test and record the personal attenuation rating (PAR) of many 3M hearing protection products. (See Appendix B, “Model, Parts and Accessories” for details.) Software versions 5.9.1 and higher are compliant with ANSI/ASA S12.71-2018 American National Standard Performance Criteria for Systems that Estimate the Attenuation of Passive Hearing Protectors for Individual Users.

Getting Started

This product contains the components illustrated below. Please follow the illustrated quick set-up guide in the lid of the case to assemble your hardware.

Installing the Software

1) Insert the provided flash drive into your computer or download the latest version from the 3M website by visiting EARfit.3M.com.
2) Navigate to the software folder in your File Explorer window.
3) Run the **Setup.exe** file.
4) Follow the prompts in the application setup wizard.

Hardware Setup: Speaker Stand and Cable Connection

1) After removing the items from the case, lay the speaker down on a table and screw the stand post into the bottom of the speaker.
2) Attach the stand base to the stand post by screwing it in clockwise.
3) Set the unit on a table upright

1

2

3

4) Plug the power cord into the top socket on the back of the unit.
5) Plug the power adapter into a wall out. A green light will illuminate on the unit.

6) Insert the microphone assembly into the middle socket on the back of the unit. Take care to ensure the plug is properly aligned into the socket.

7) Hang both microphones by the integrated clips to the clip on the front of the unit.
8) Attach the USB cord to the bottom socket on the back of the unit.
9) Insert the free end of the USB cord into a USB port on your computer.

IMPORTANT NOTE

A device driver message may appear on your computer task bar. That is okay.

A red light will flash once the speaker has successfully connected.

Software Start-up

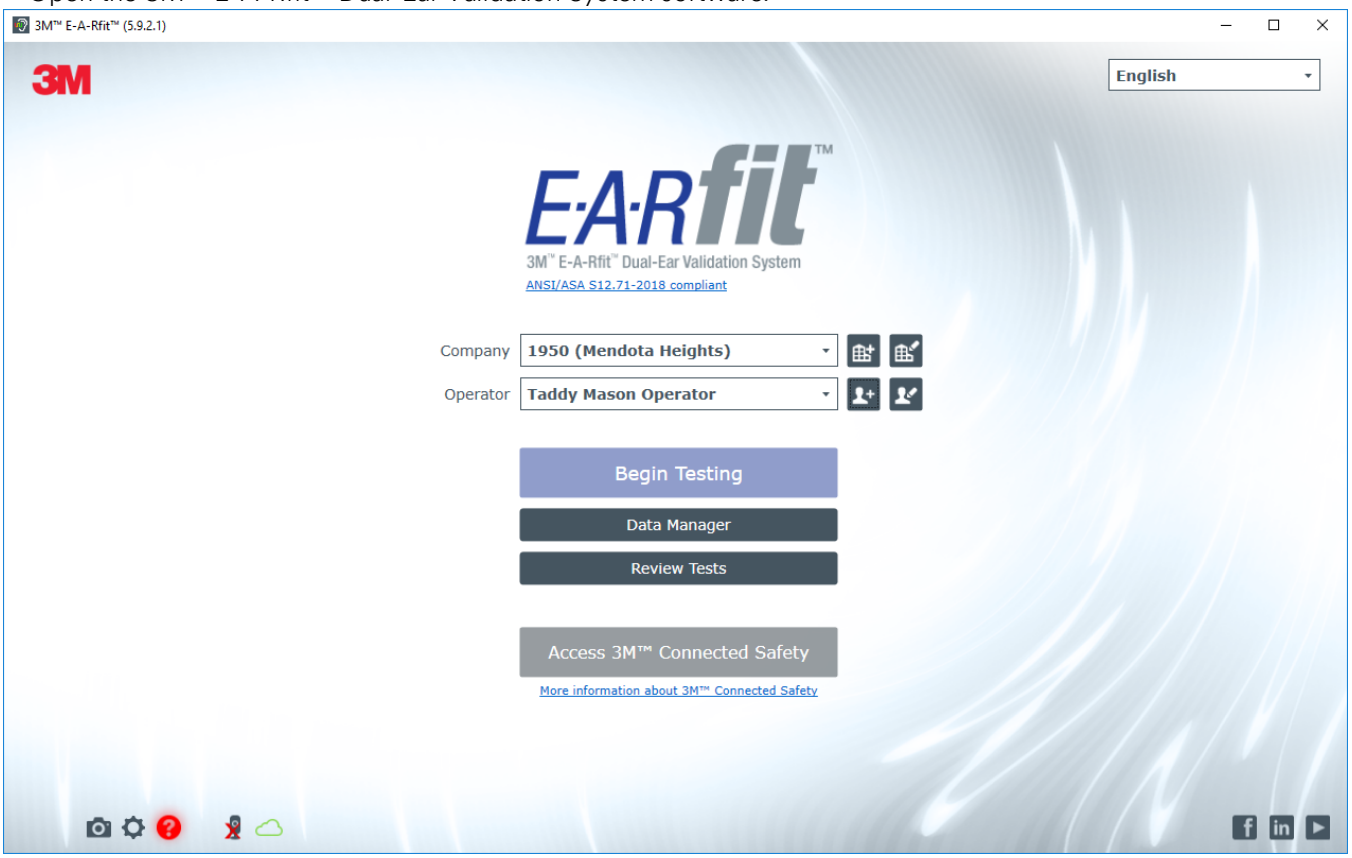
The start-up process includes the selection of the language, operator, and company. It may also be used to begin testing, review hearing protection fit-tests, and access the data manager (see following sections for details).

IMPORTANT NOTE

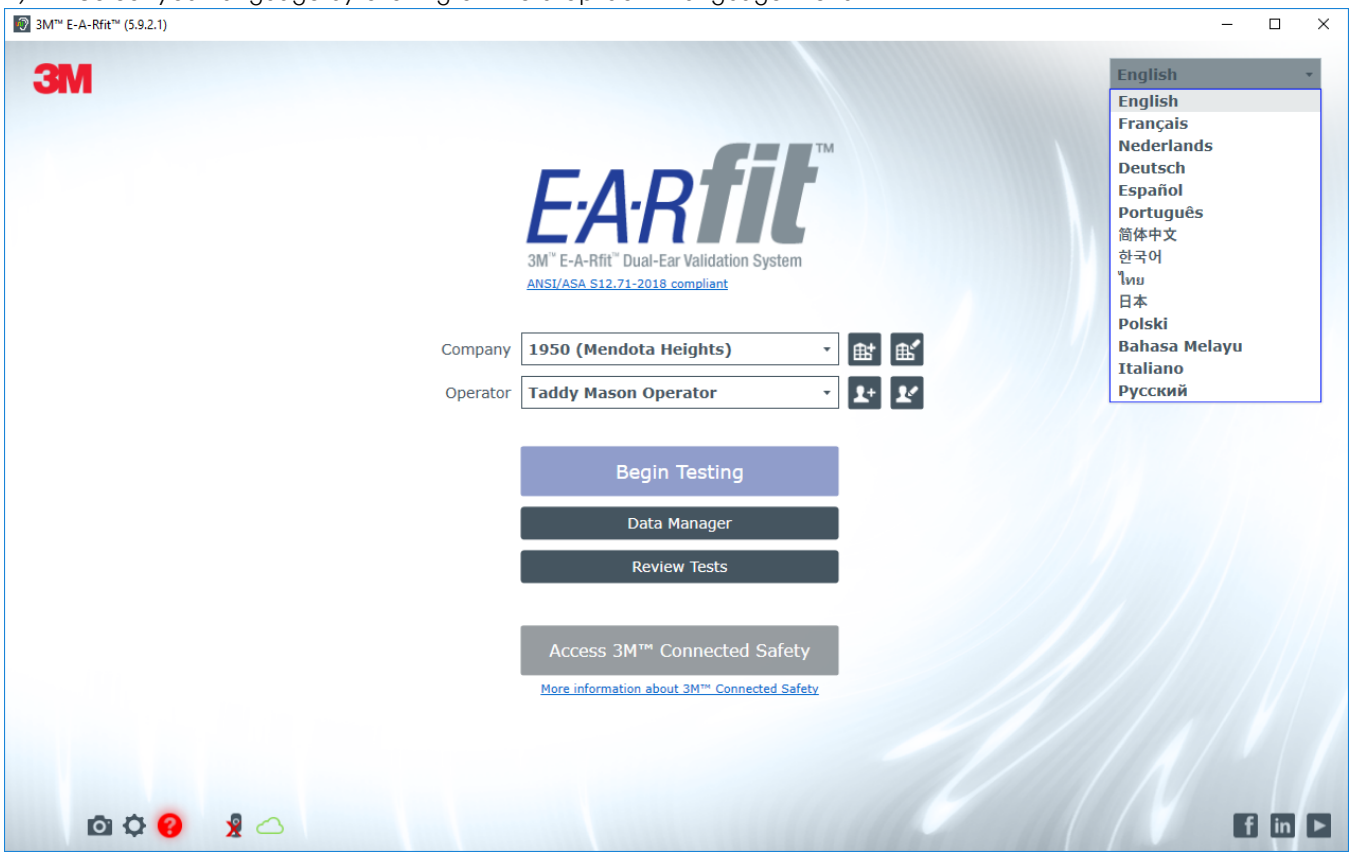
Clicking the **Home** icon or the E-A-Rfit™ logo will return you to the home screen.

Home Screen

1) Open the 3M™ E-A-Rfit™ Dual-Ear Validation System software.



2) Select your language by clicking on the drop-down language menu.



3) Select the Operator, which is the person conducting the test.

To add an Operator:

a) Click the **Add** button next to the Operator field.

b) Fill out the dialogue box that appears.

To edit an Operator:

a) Click the **Edit** button next to the Operator field.

b) Edit the dialogue box as needed.

4) Select your company. For more information on adding or editing a company, see section: Data Manager, Company.

5) Click on **Begin Testing** to start the testing process.

IMPORTANT NOTE

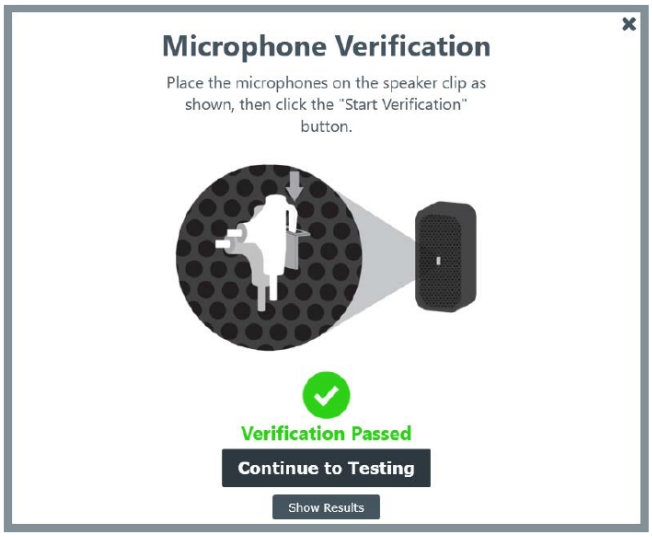
See the Data Manager section for information on these functions.

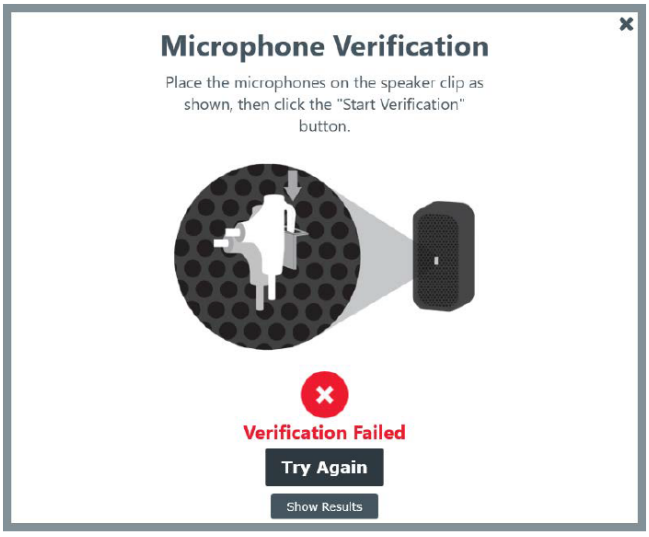
Microphone Verification

Microphone verification is necessary to assure the microphones and speaker are operating properly. A microphone verification is required each time the software is started. Re-verification is required after four (4) hours of use or after fifty (50) fit-test sessions, whichever comes first.

1) Slide the right (red) and left (blue) microphones into the speaker clips as illustrated on the software screen.

2) Click the **Start Verification** button.
   - If the microphones are functioning correctly, a green check mark will appear. Click **Continue to Testing** to proceed.
   - If verification does not pass, a red X will appear. Disconnect and reconnect the microphones and press **Try Again**.





Test Overview

How it Works

The 3M™ E-A-Rfit™ Dual-Ear Validation System encompasses a specially designed loudspeaker that allows for an accurate presentation of the test signal and real-time communication between the microphones, speaker and software. The dual-element microphones make it possible to measure the sound level simultaneously inside and outside the hearing protector.

The reference microphone measures the level of the test signal outside the ear. The measurement microphone is connected to one of the specially modified 3M probed test earplugs or earmuff cushions to allow measurement of the sound level inside the wearer's ear canal while the hearing protector is worn. The difference between the outside and inside microphone levels is used to calculate the personal attenuation rating (PAR) for each employee: the amount of noise reduction in decibels obtained by that individual with the specific model and size of hearing protector being worn. The PAR is an indication as to whether or not the standard version of that model of hearing protector, without the test probe attached, will provide sufficient attenuation for the noise exposure in the workplace.

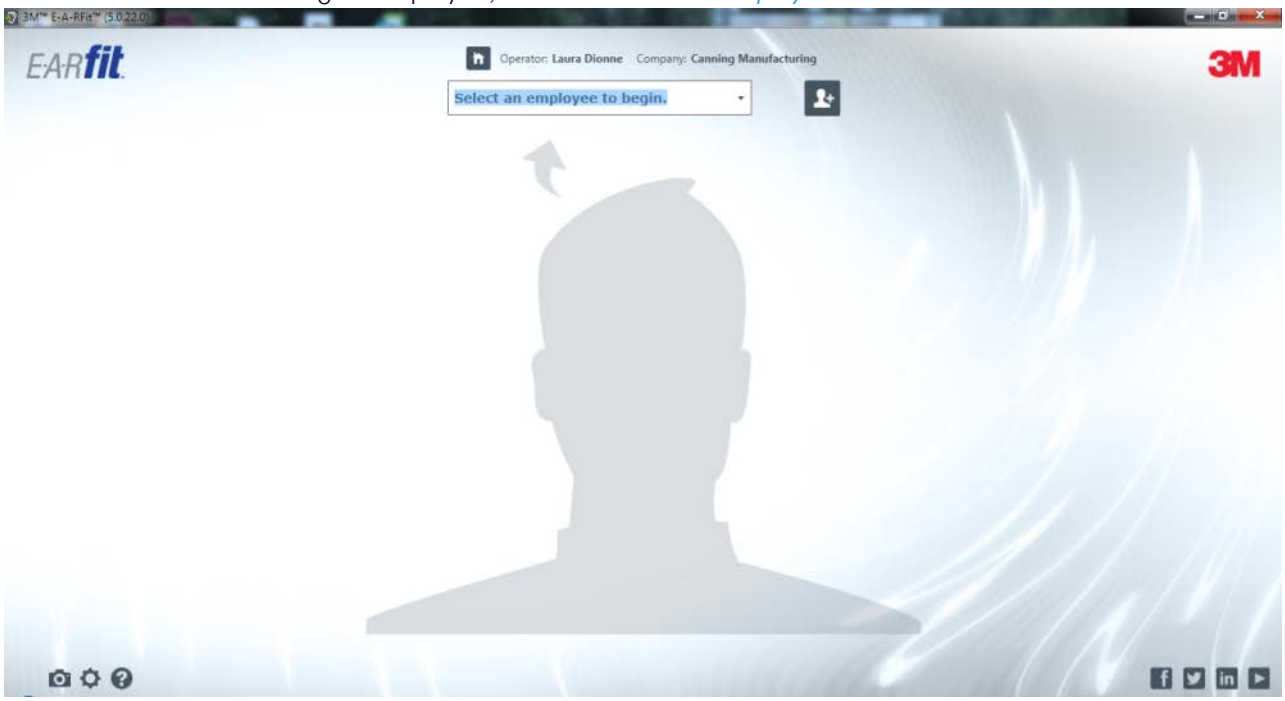
The 3M probed test earplugs and earmuff cushions are designed to be equivalent to the performance of the actual hearing protectors they represent. Attenuation differences between the probed and the non-probed products are accounted for in the PAR calculation by applying compensation factors which are derived from laboratory studies.

IMPORTANT NOTE

The use of fit testing cannot be assumed to meet all regulatory requirements. Follow all applicable regulations for determining hearing protector noise attenuation.

Test Procedure

1) Welcome the employee (test subject) to sit in a chair in front of the speaker. Explain the fit test process and select the appropriate model of probed test plugs or probed test earmuff cushions.
2) In the software, select the employee. You may type the employee name or select by using the drop-down menu. For information on adding an employee, see *Add or Edit an Employee*.



3) Click **Select Product** or **Change Product** to add or change a product for the employee being tested.

IMPORTANT NOTE

To determine which model of probed test plug should be used for the selected hearing protector, click on the icon with the probed plugs.

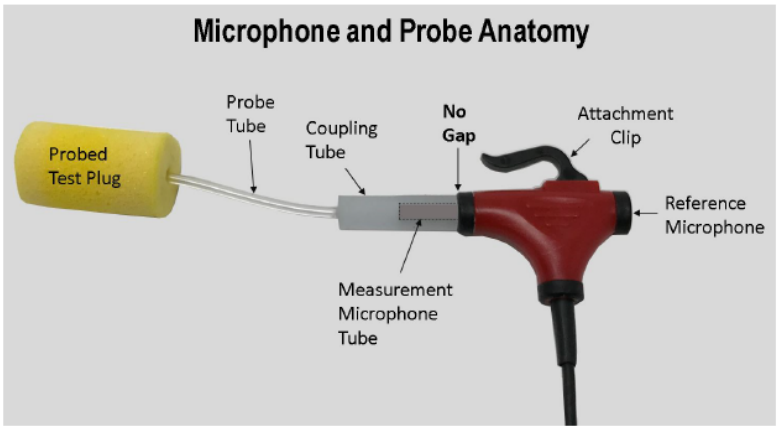
4) Have the test subject fit the test plugs or earmuffs themself using the insertion method specified by the User Instructions and/or Fitting Instructions provided with the hearing protector.

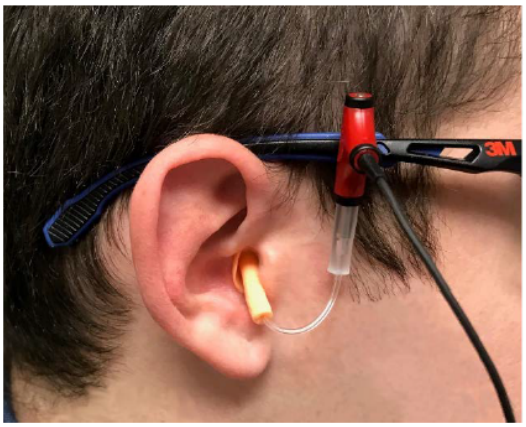
IMPORTANT NOTE

The presence of the probe tube may interfere with pressing on the end of the probed test plug stem. Instruct subjects who use this technique to pinch the probe tube and the end of the stem to achieve the same fit. See the image below.

If for any reason the test subject is unable to achieve normal insertion depth due to interference with the probe tube, be aware that the PAR test result may under-estimate the attenuation of the regular hearing protector when inserted to the correct depth.

5) After the test subject has inserted both probed test plugs or fitted the probed test earmuff, attach the microphones to each by inserting the metal probe tube on the microphone fully into the probe tube on the test plug. Then hang the microphones on the eyewear temple bars with the reference microphone pointing up. If the test subject does not wear eyewear, have the test subject put on the safety glasses provided with the product kit and hang the microphones as described.





6) With the employee positioned about twelve (12) inches away from the speaker, click Run Test. The speaker will produce a short test signal.
7) Once the test ends, the results will display the measured attenuation.
8) Once complete, click End Session.

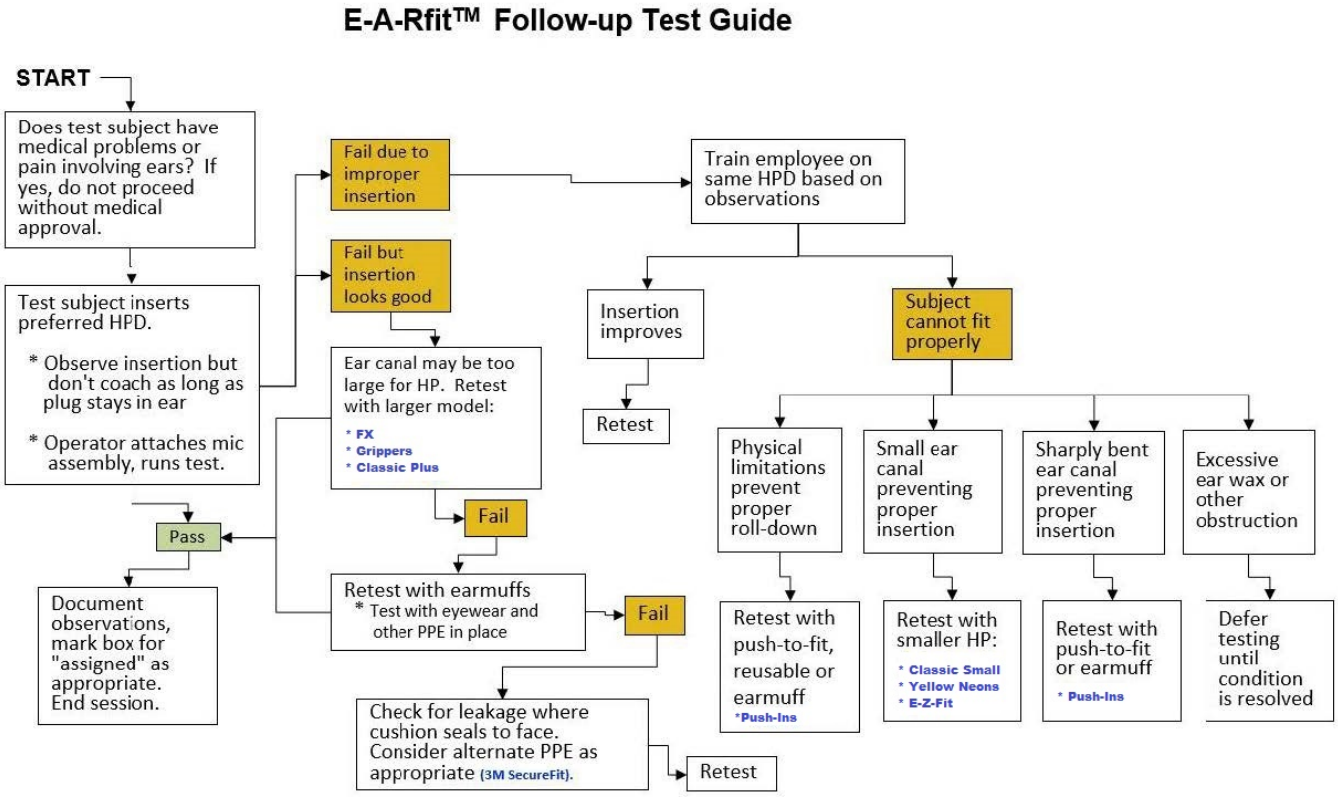
The session timer will start and stop during the following events:

- A different employee is selected
- The session is ended by the operator

– The software is closed

Probed test earplugs can be wiped clean with a damp cloth as needed between fittings. Do not attempt to wash test probes or allow liquid to enter the probe tube. Probed test earplugs should be discarded at the end of each test session. Probed earmuff cushions should be discarded after no more than 20 fit tests.

The results can be used to retrain the worker to wear hearing protection more effectively. If you have unexpected results, reference the process diagram below.



Test Results

The hearing protection fit-test results are displayed on the tabs entitled Quick View, Protection, Attenuation Graph, and Detail View. The indicator and action buttons are repeated in each tab and are identified in the tables below.

Visual Status Indicators

The following visual indicators are us throughout the Test Results section of the software.

Indicator Symbol	Description
Green Checkmark	The measurement passed, denoting the employee's binaural PAR minus the uncertainty is equal or above the target minimum attenuation (TMA). TMA is the employee's exposure minus the company exposure limit. For example, if the employee's exposure is 95 dBA and the company exposure limit is 80 dBA, then the TMA is 15 dB. The operator may mark the measurement that pass as a baseline and assign the hearing protector if desired.
Red "X"	The binaural PAR minus uncertainty failed to meet the target minimum attenuation. A failed measurement can be set as a baseline, but you will not be able to assign a hearing protector that has failed. Uncertainty is displayed in the *Detail View* Tab.
Yellow Caution	Three conditions trigger this warning and the software will alert the operator. The first condition is when the attenuation value is less than 10 dB at 125 Hz. The second condition is when there is a 15 dB or more difference between the left and right PAR measurements. The third condition occurs when octave-band attenuation values or PAR value exceed defined limits, which may indicate a blocked probe tube. In these cases, the pop-up will suggest that the hearing protector be retested after adjusting how it is worn or inspecting and possibly replacing the test probe. You may mark a cautioned measurement as a baseline, but you will not be able to assign a hearing protector when a caution symbol is present.
Grey Ellipses (dots)	The employee record does not have a noise exposure level included. Without an employee exposure value, protection sufficiency cannot be determined. You may mark a grey measurement as a baseline, but you will not be able to assign a hearing protector where protection sufficiency cannot be determined.

Action Button Key

Throughout the Test Results section, there are various action buttons and checkboxes. See the table below for more information on these options.

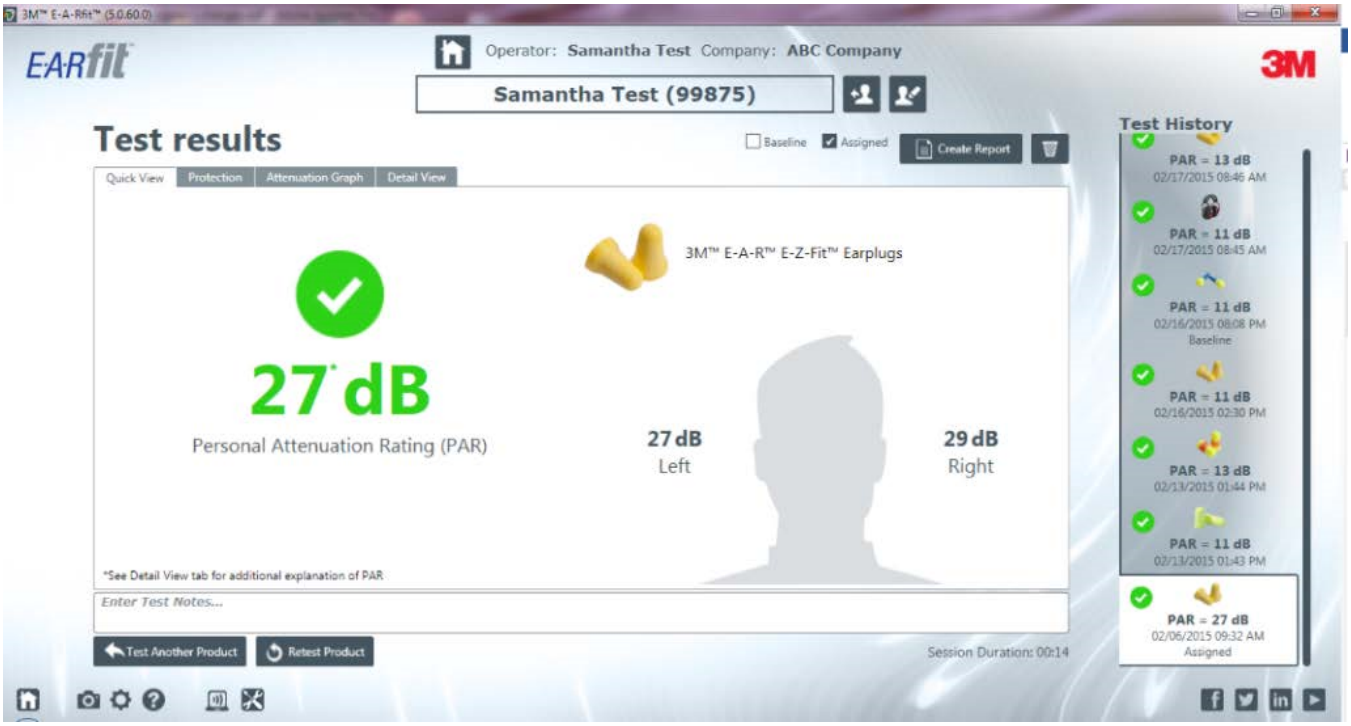
Button/Checkbox	Description
End Session	Session Duration is the total test time for each employee including each fit-tested hearing protector (if more than one is tested). The session timer will start and stop when a different employee is selected, or the session is ended by the operator, and/or when the software is closed.
Retest Product	Immediately run a new test of the same product

Button/Checkbox	Description
Test Another Product	Opens the product selector to allow testing of another product
Baseline	Will set a benchmark when the employee is first tested. Once checked, the baseline will be stored in the history column.
Assigned	When employee achieves adequate hearing protection and a tested product is assigned to employee for use while working in noise. Once checked, assigned products will appear in the history column and be stored in the database as the primary hearing protector.
Create Report	Allows the creation of an *Employee Report* and *Company Report*
Delete (trashcan icon)	Used to delete a fit-test when it is selected in the test history column
Change/Edit Employee (two buttons next to Employee field)	Change/Edit Employee (two buttons next to Employee field)
Notes	The note field allows an operator to enter any notes related to the employee displayed. Notes will be displayed on *Company Report* and stored in the software.

Quick View

The Quick View tab details personal attenuation rating (PAR) results from the fit test, the values in the left and right ear, the type of hearing protector, Baseline and Assigned check boxes, the Session Duration, and the Test History column.

When on this tab, the Baseline and Assigned checkboxes may be assigned or selected. The Baseline is typically used to denote that it was the first measurement taken on a given protector for a given employee. It may be used as a benchmark or target of the measurement. The Assigned checkbox may be used when the employee achieves adequate hearing protection, and the operator recommends wearing this hearing protector while working in a noise environment. If these are assigned, this information will appear in the test history column with the hearing protection product, the PAR value, and the date and time of the test. It will also appear on the company and employee reports.



Personal Attenuation Rating

The personal attenuation rating (PAR) is displayed for both the left and right ears as well as a binaural value. The values have the uncertainty subtracted and displayed on this tab. The binaural PAR is calculated using the lowest attenuation value per octave band for each ear.

IMPORTANT NOTE

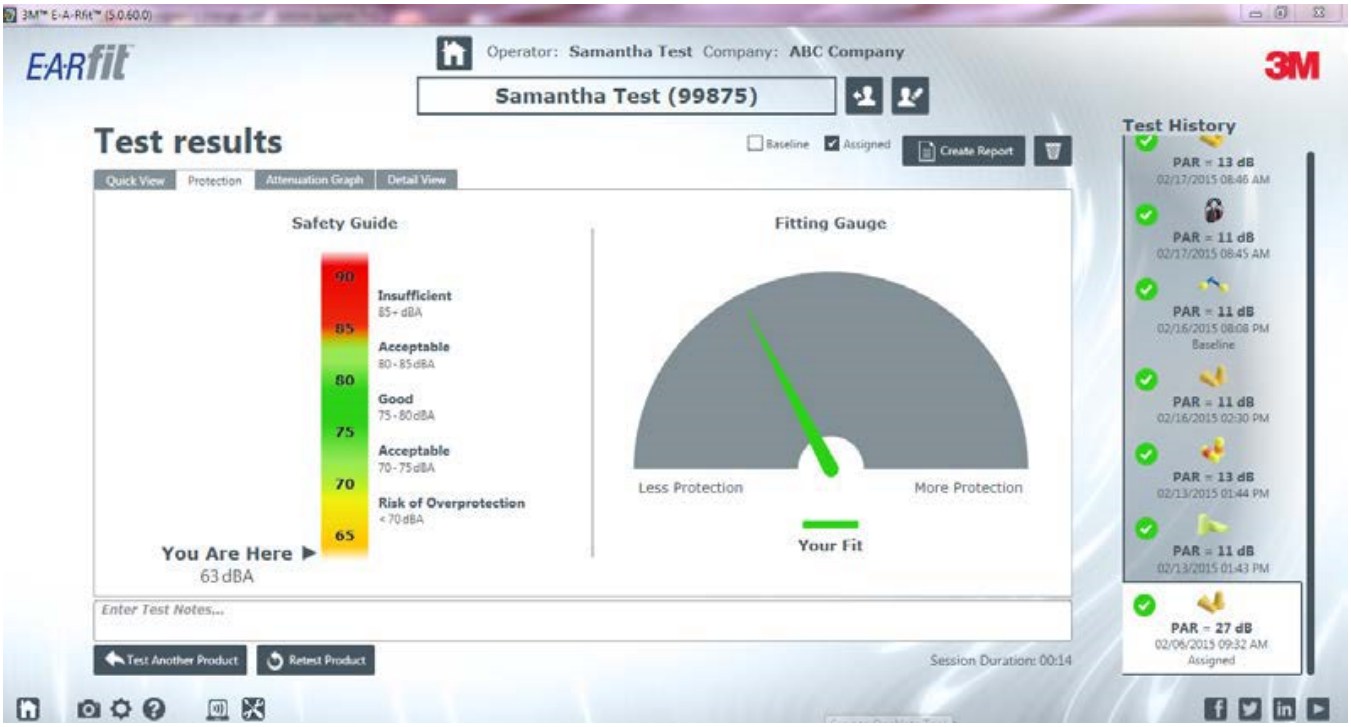
3M uses PAR minus the uncertainty value to calculate user protection. Calculated uncertainty includes user fitting variability, variability in the user's noise spectrum, and the measurement of variability itself.

Left and Right Values

The left and right values are the computed results from the fit test for each ear with the uncertainty value subtracted. See for additional details.

Protection

The Protection tab shows the employee's protected exposure in a similar manner to the guidance in the European guidance document EN 458 and the Canadian hearing protection standard CSA Z94.2. The protected exposure is calculated by subtracting the binaural PAR (minus the uncertainty) from the employee's exposure.



Safety Guide

The Safety Guide indicates where the employee fit-test results are located on a risk spectrum.

Fitting Gauge

The Fitting Gauge is an estimate of where the employee PAR value compares to what can be achieved with the hearing protector tested.

IMPORTANT NOTE

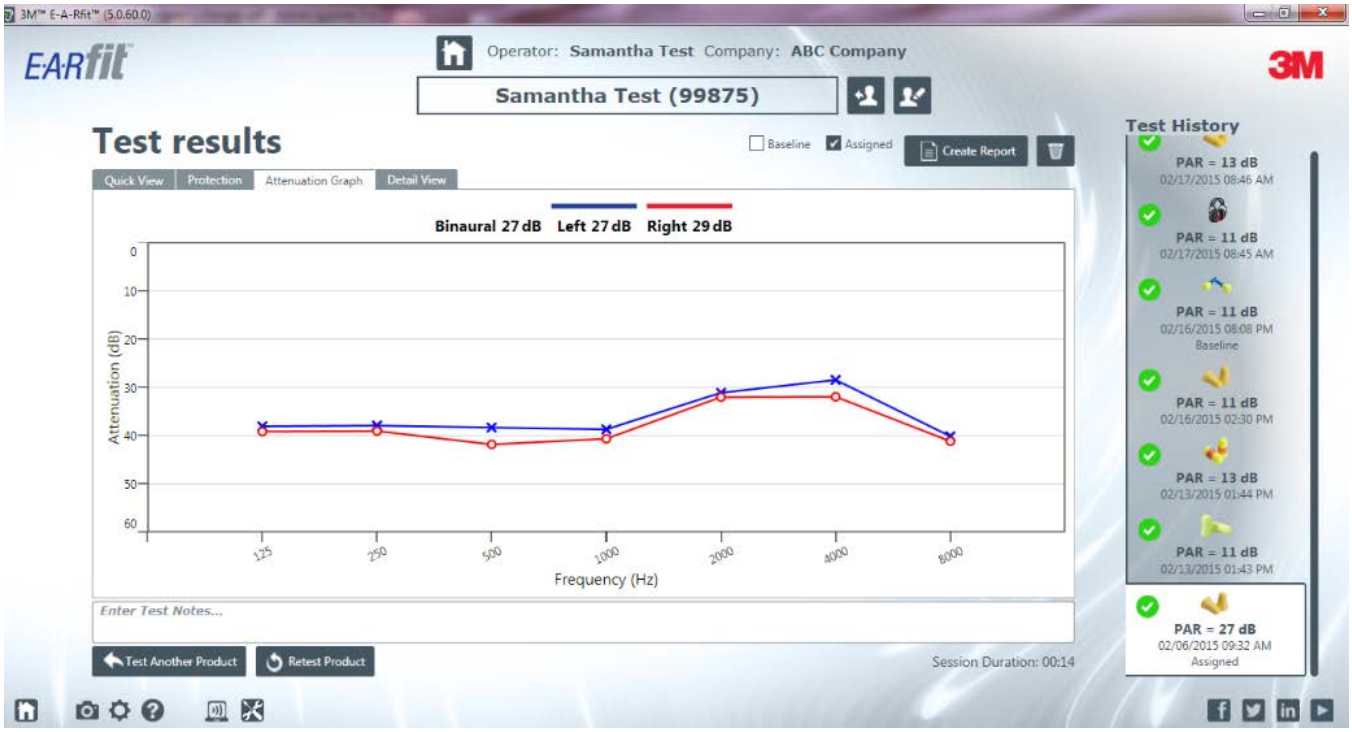
Hover your mouse over the Fitting Gauge needle to see how the PAR results compare to others who were tested on the same model. You may also hover your mouse over *Your Fit* to see the PAR value.

Attenuation Graph

The Attenuation Graph tab plots the attenuation at each of the seven octave bands for the left ear (blue) and the right ear (red). The PAR values for left, right, and binaural are values carried over from the Quick View tab. This information allows the operator to analyze the shape of the curve and look for abnormalities.

IMPORTANT NOTE

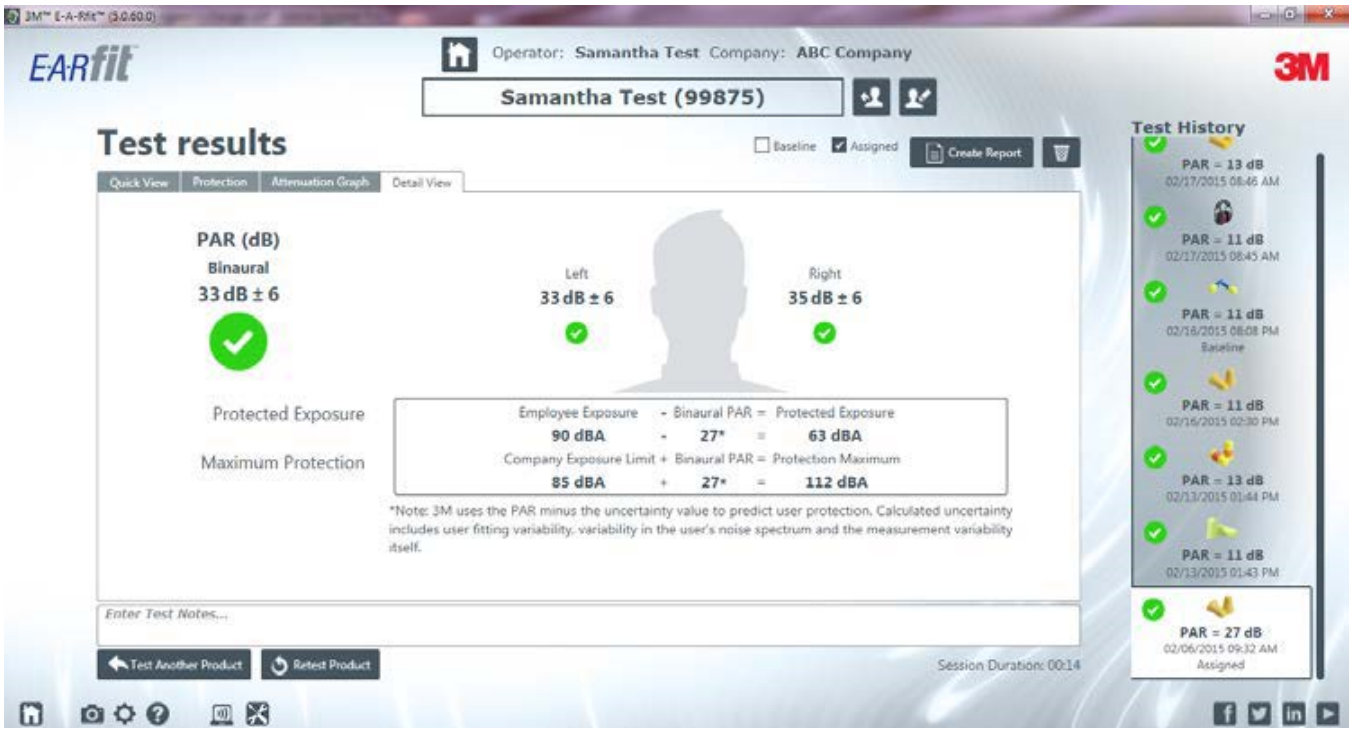
Low attenuation values in the lower frequencies might indicate a poor seal.



Detail View

In the Detail View Tab Results, the full value of the PARs are displayed for left, right, and binaural along with associated uncertainty values.

In the middle of the screen, the formula for the protected exposure is displayed and calculated providing the results for the recommended user protected exposure.

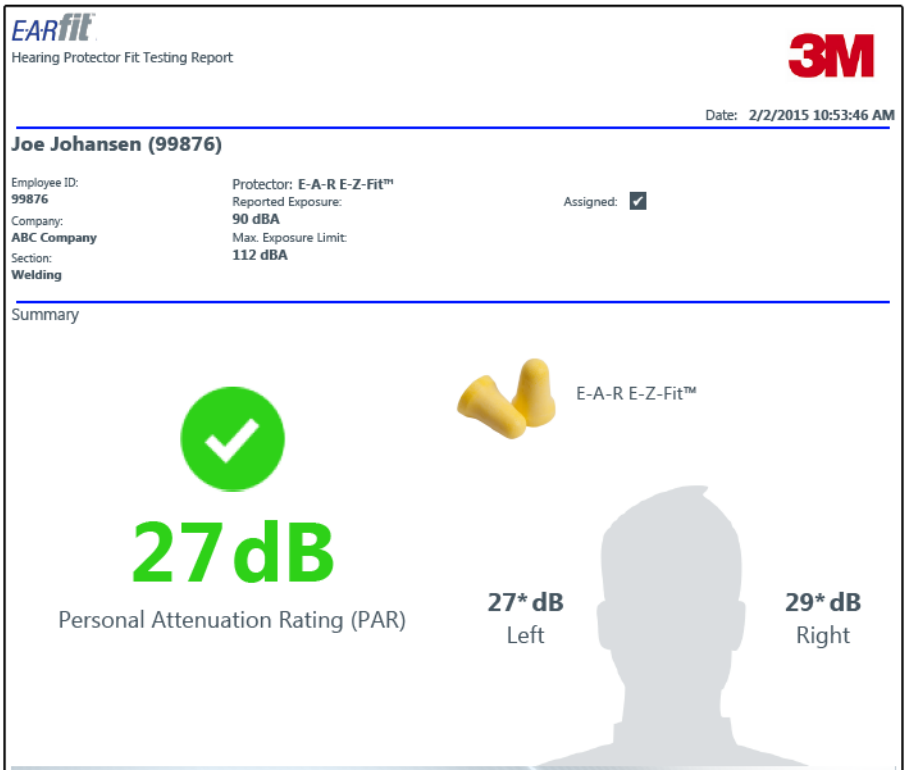


Reports

This product offers two different report options. Reports can be viewed in the program, saved as a file, or printed.

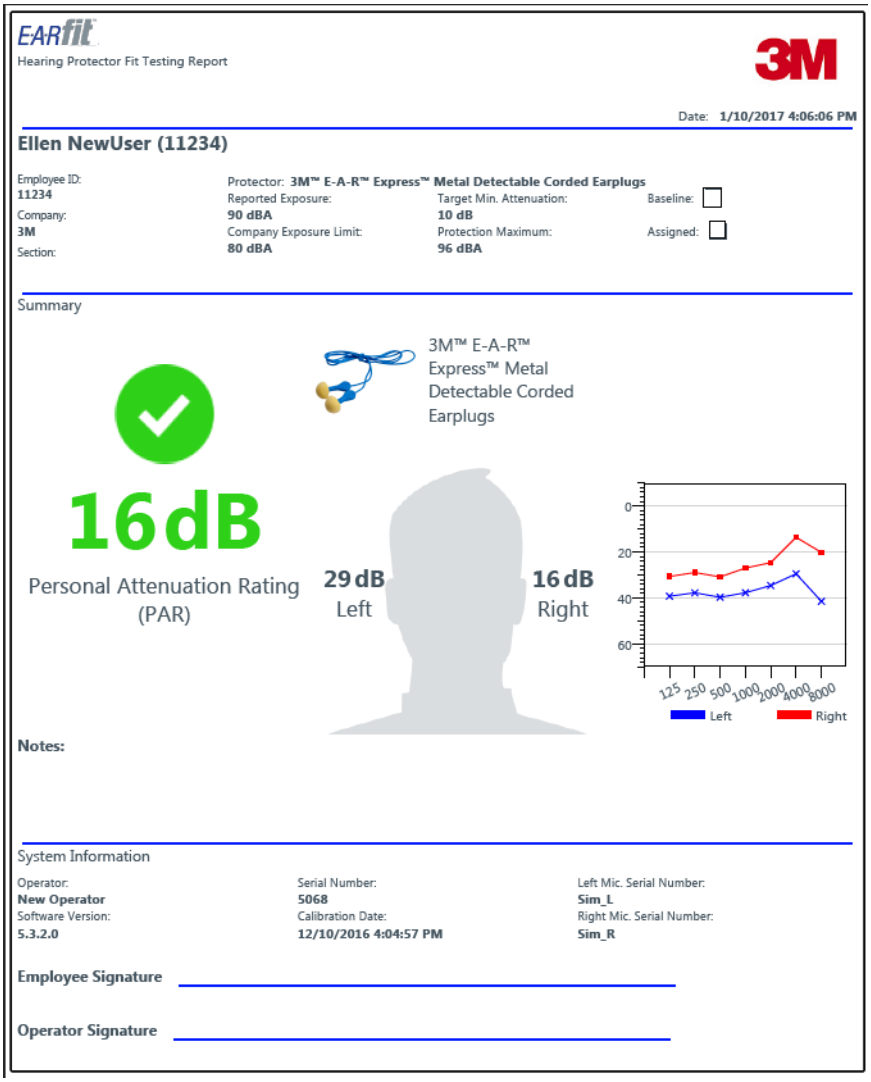
Employee Report

The employee report provides a basic personalized fit-test report.



Company Report

The company report provides additional fit test detail desired for company record-keeping. A signature line is available for companies who wish to have employees sign after they have been tested.



EARfit
Hearing Protector Fit Testing Report

3M

Date: 1/10/2017 4:06:06 PM

Ellen NewUser (11234)

Employee ID: 11234
Company: 3M
Section:

Protector: **3M™ E-A-R™ Express™ Metal Detectable Corded Earplugs**
Reported Exposure: **90 dBA**
Company Exposure Limit: **80 dBA**
Target Min. Attenuation: **10 dB**
Protection Maximum: **96 dBA**
Baseline: ☐
Assigned: ☐

Summary

3M™ E-A-R™ Express™ Metal Detectable Corded Earplugs

16 dB
Personal Attenuation Rating (PAR)

29 dB Left
16 dB Right

0
20
40
60
125 250 500 1000 2000 4000 8000
Left Right

Notes:

System Information

Operator: **New Operator**
Software Version: **5.3.2.0**
Serial Number: **5068**
Calibration Date: **12/10/2016 4:04:57 PM**
Left Mic. Serial Number: **Sim_L**
Right Mic. Serial Number: **Sim_R**

Employee Signature _____

Operator Signature _____

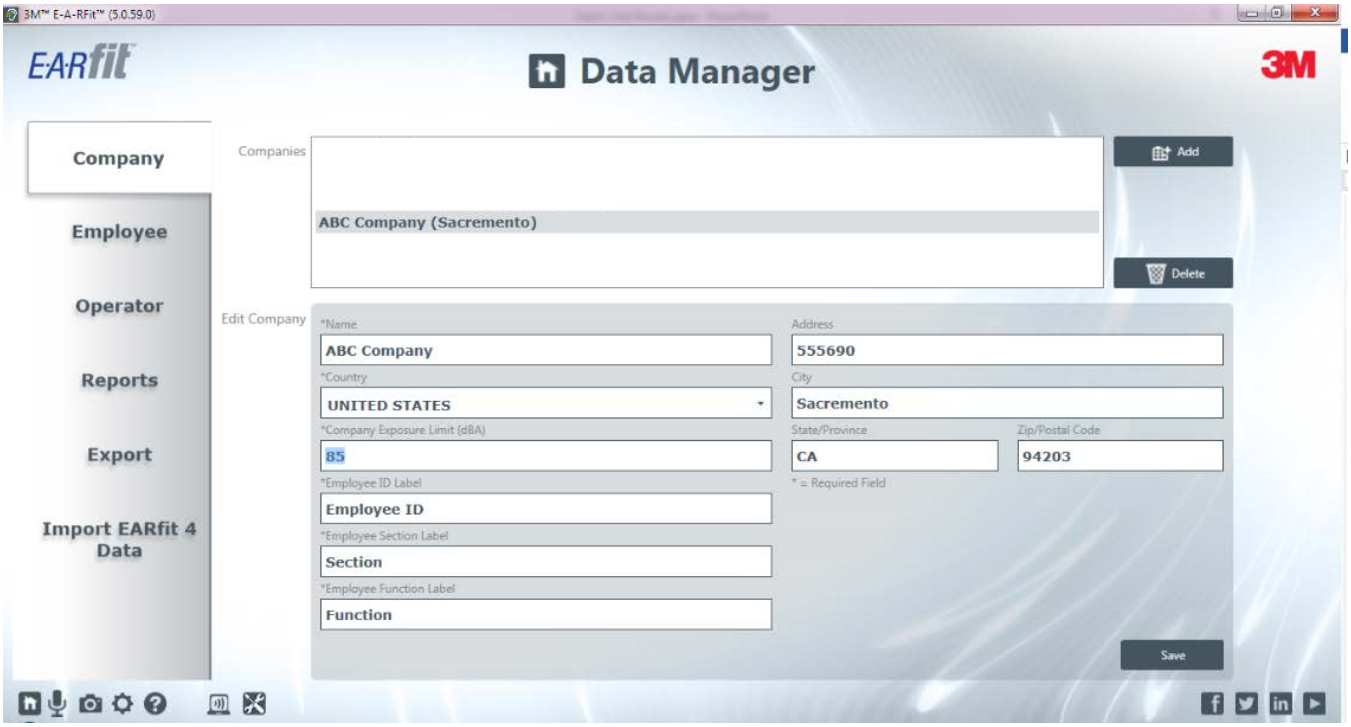
Data Manager

The data manager is used as a support portal to manage the company, employee, and operator data without having to have hardware connected. Additionally, reports can be generated, fit-test data can be exported, and data from the 3M™ E-A-Rfit™ Dual-Ear Validation System 4 database files can be imported.

Company

The Company tab may be used to modify, add, or delete company data or records. The required fields are noted by an asterisk which include the name, country and company exposure limit.

The company exposure limit is a required value and is used to compute the target minimum attenuation, the protected exposure and protection maximum value.



IMPORTANT NOTE

Purchaser is solely responsible for complying with all privacy and security-related laws and regulations applicable to the collection, storage, use, import and export of all data (personally-identifiable or otherwise) entered into, or generated by, the 3M™ E-A-Rfit™ Dual-Ear Validation System. Access to the 3M E-A-Rfit Dual-Ear System is not password-controlled. Purchaser should implement all necessary administrative, physical and technical safeguards it determines are necessary to ensure the integrity, confidentiality and security of the data against both internal (e.g., access by unauthorized personnel, misuse of data) and external threats (e.g., "hacking").

Adding or Editing a Company

In the Company screen, there are three optional Label fields which allow you to customize the name that appears in the software and in the reports. The fields include the Employee ID, Employee Section, and the Employee Function. For example, if the company you are working with has “Departments” instead of “Sections”, you may add the alternative name, and it will appear in the Employee records and in the reports.

Company Exposure Limit pertains to the maximum sound level an employee may be exposed to as a time-weighted average over their work shift. This may be a regulatory limit or a lower limit established by the employer. Input the appropriate exposure limit within the range of 80 to 90 dBA.

IMPORTANT NOTE

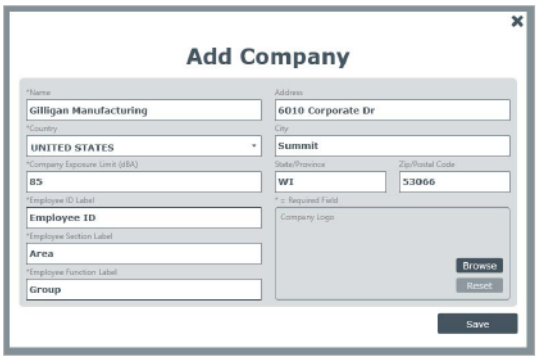
Label fields will appear in the software screens and in generated reports.

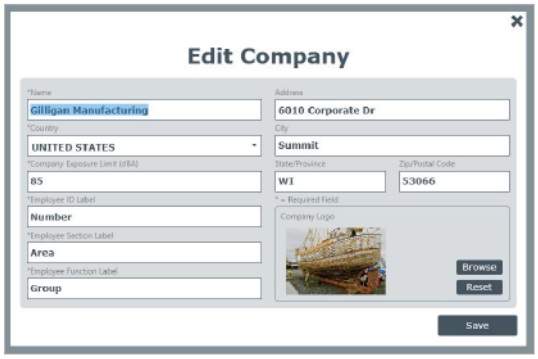
To add a company record:

1) Click the **Add** button next to the Company field.
2) Enter in the company information as needed. Any field with an asterisk is required.

To edit a company record:

1) Click the **Edit** button next to the Company field.
2) Edit the company information as needed. Any field with an asterisk is required.



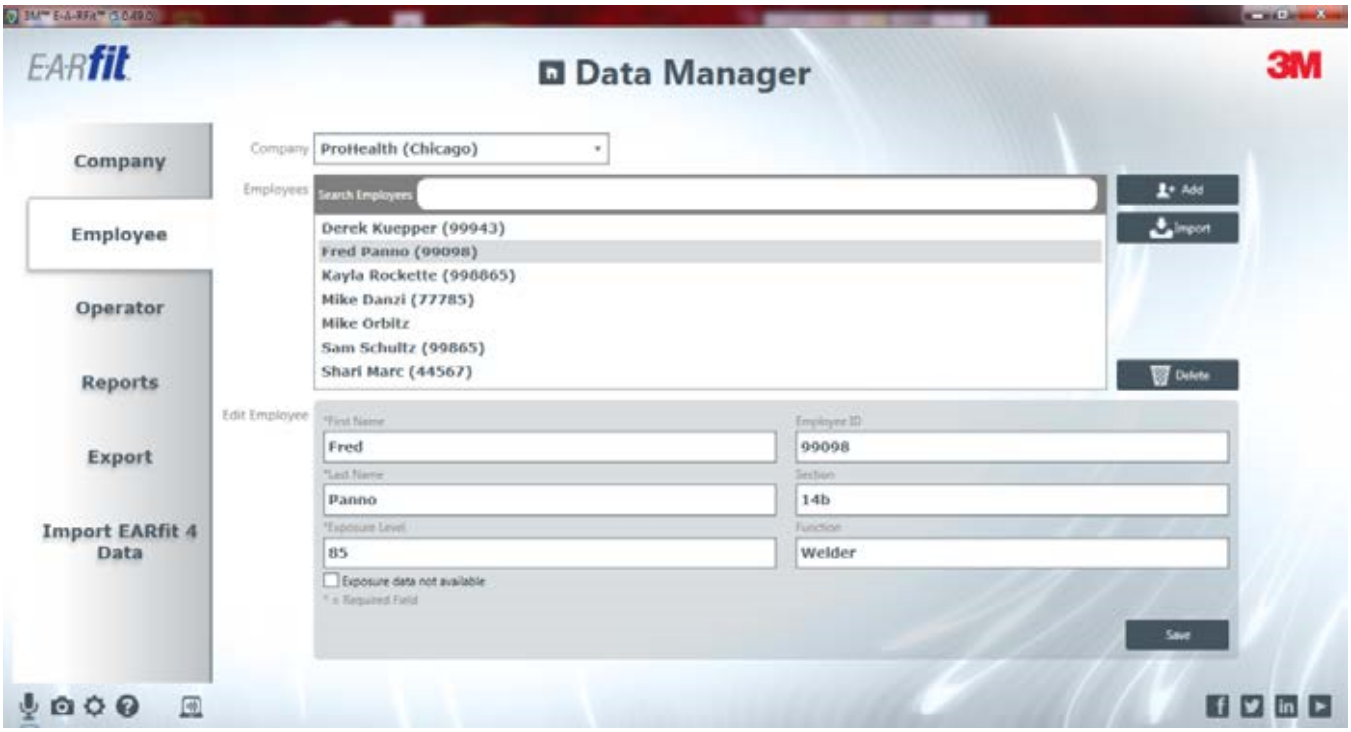


Delete a Company

1) Select a company from the Company field.
2) Click the **Delete** button.

Employee

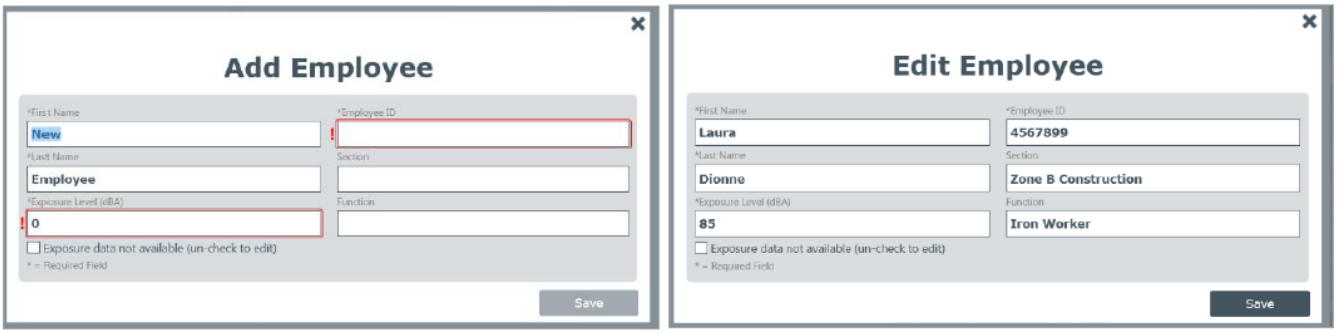
The Employee tab of the data manager page may be used to add, edit, delete, and import employees into the software database. The first name, last name, country and the employee's exposure level, and employee ID are the required fields when completing these records. If there is no employee's exposure level available, you may click the "exposure data not available" check box. However, if not selected, this will affect the protected exposure results displayed in the Detail View of the Test Results page.



Add or Edit an Employee

To add an employee:

1) Click the **Add** button next to the employee field.
2) Enter the employee information. Any field with an asterisks is required.
3) Click **Save** to add the employee



When an employee's hearing exposure level is unknown, check the box labeled *Exposure data not available*.

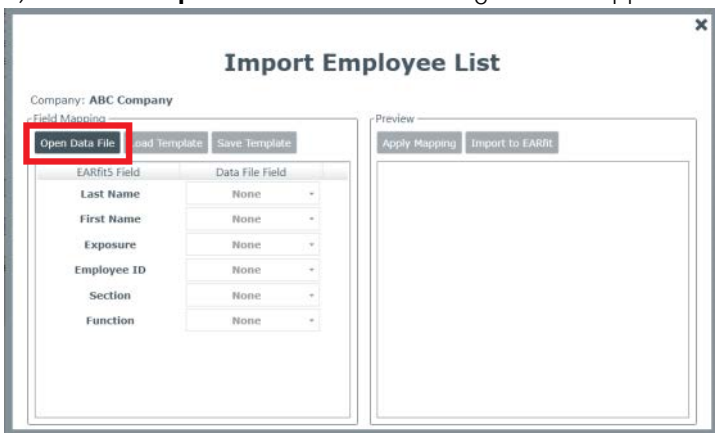
See the table below for more information on each field in the Add/Edit Employee Screen

Field	Description
Exposure Level	Employee A-weighted sound pressure level (dBA) or the employee A-weighted exposure level over an eight (8) hour period (also noted as TWA) if applicable
Employee ID	Employee company ID (employees cannot have identical ID numbers)
Section	Employee section or department
Function	Employee work position or job function

Importing Employee Data

The Import feature enables an administrator to import the company's employees that will be fit tested with an existing Excel spreadsheet. Once the employee data is imported to corresponding fields, you have the option to map the Excel file fields to the software database.

1) Click the **Import** on the Employee tab.
2) Select **Open Data File** in the dialog box that appears.



3) Find the file on your computer or network and select **Open**.

IMPORTANT NOTE

The software will automatically assign the first row of the spreadsheet as headers.

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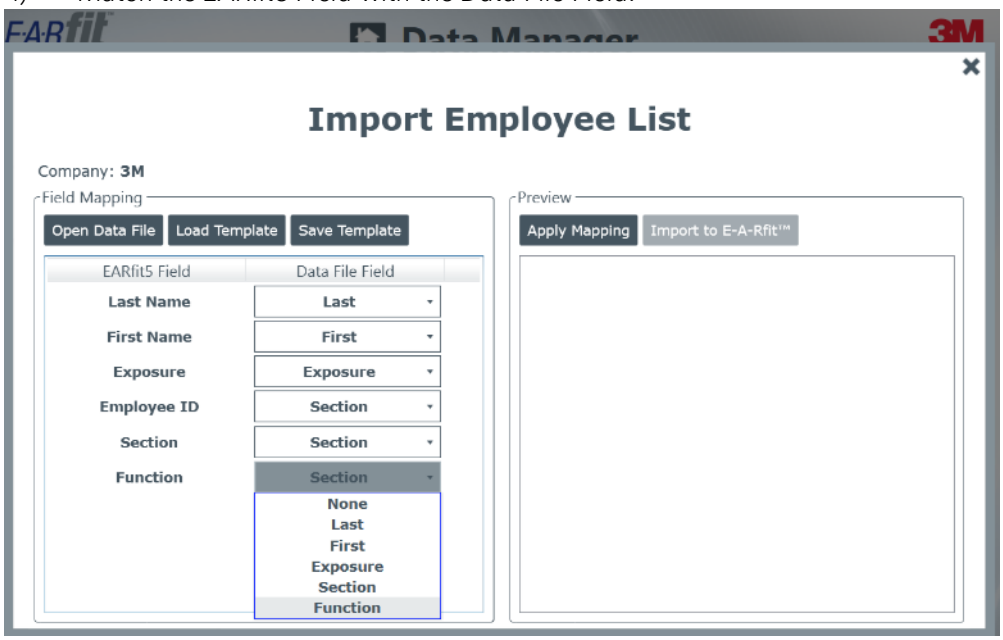
4) Match the *EARfit5 Field* with the *Data File Field*.



5) When finished, click the **Apply Mapping** button.

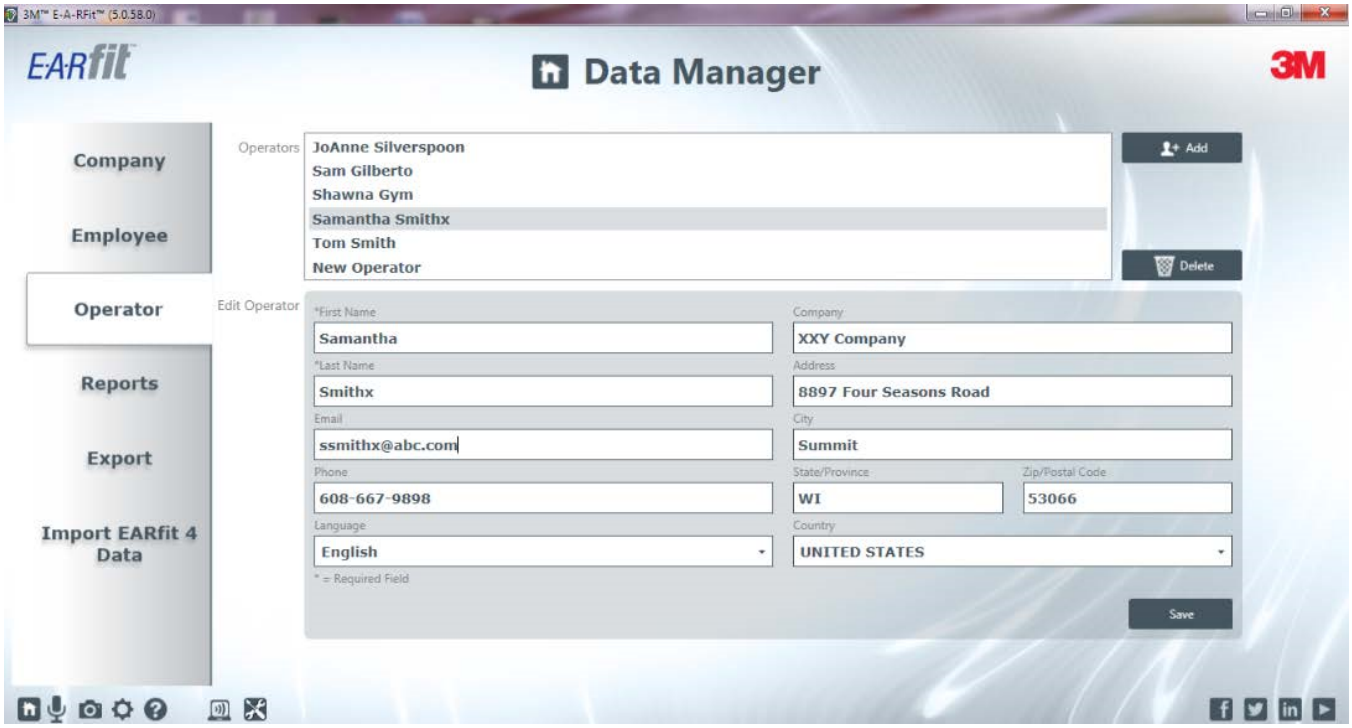
A preview of the import data will appear. You may edit the Field Mapping until you have the correct matches. You may also select **Save Template** if you need to upload multiple spreadsheets.

6) Click **Import to E-A-Rfit™** to finalize.

7) Click the "X" on the top right corner to close the window.

Operator

In the Operator tab in the Data Manager, you may add, edit, and delete operator/safety personnel information. The operator information is saved and is presented in *System Information* section of the *Company* Report.



Add an Operator

1) Click the **Add** button next to the Operator field.
2) Enter the operator information. Any field with an asterisks is required.
3) Click **Save** to add the new operator.

Edit an Operator

1) Select an operator from the Operator field.
2) Edit any information as needed. Any field with an asterisks is required.
3) Click the **Save** button.

Delete an Operator

1) Select an operator from the Operator field.
2) Click the **Delete** button.

Reports

In the Reports Tab of the data manager, you can generate the hearing protector fit test reports.

1) Select a company from the drop-down menu.
2) Select a radio button from Employee Selection.

IMPORTANT NOTE

You may chose individual fit tests by using the checkboxes on the table that appears. Any selected row will appear in the generated report.

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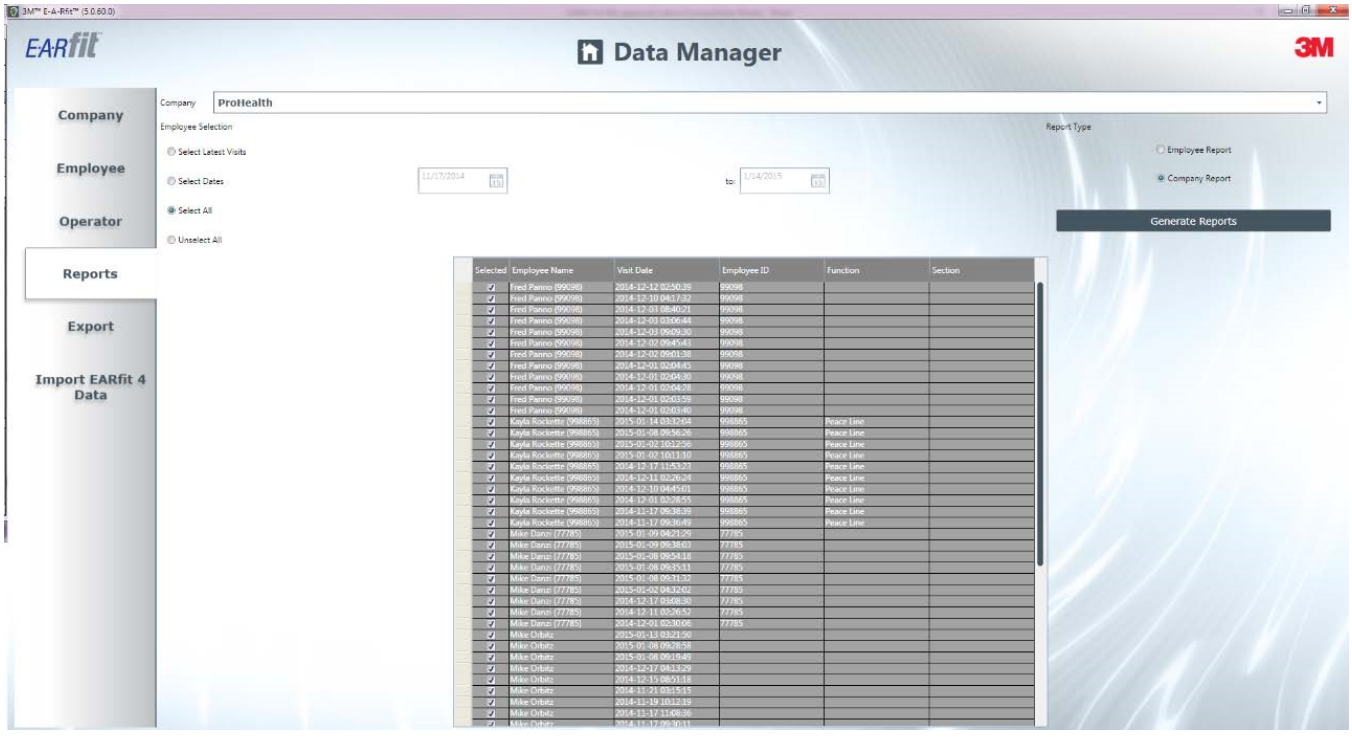
3) Select either *Employee Report* or *Company Report* on the right side of the window.
4) Click **Generate Report**.



Export

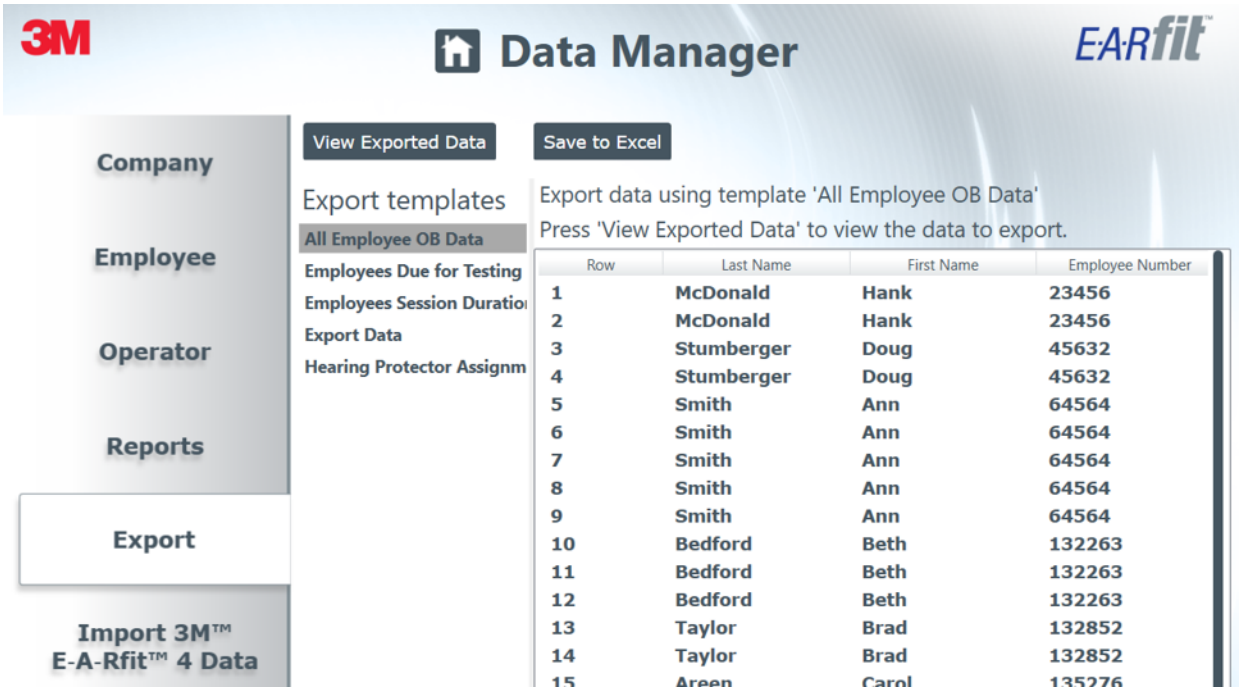
In the Export Tab, you may run an export or data query of the stored fit-test data.

There are four export options:

- *Octave Band Data*
- *Employees Due for Testing*
- *Employee Session Duration*
- *Export Data*
- *Hearing Protector Assignment*

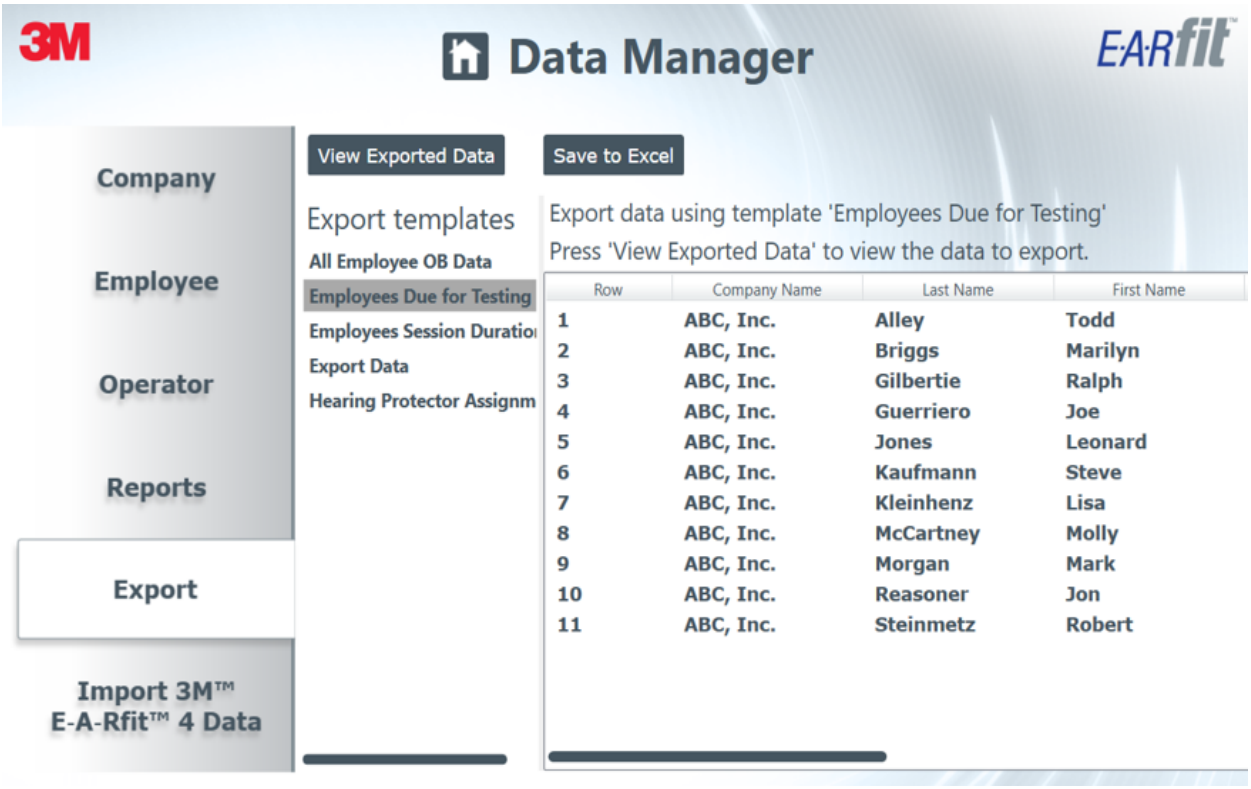
Octave Band Data

This data query will provide a table of octave band (OB) attenuation values and PAR results for the selected tests. Note that all values in the OB export are “raw” meaning they are not corrected for uncertainty. The query can be filtered by a selected cut-off date parameter.



Employees Due for Testing

The data query will provide a list of employees due for testing for a given company. The query can be filtered by a selected cut-off date parameter. The query results will display the employee name, the employee ID, their function and section, and the last known test date.

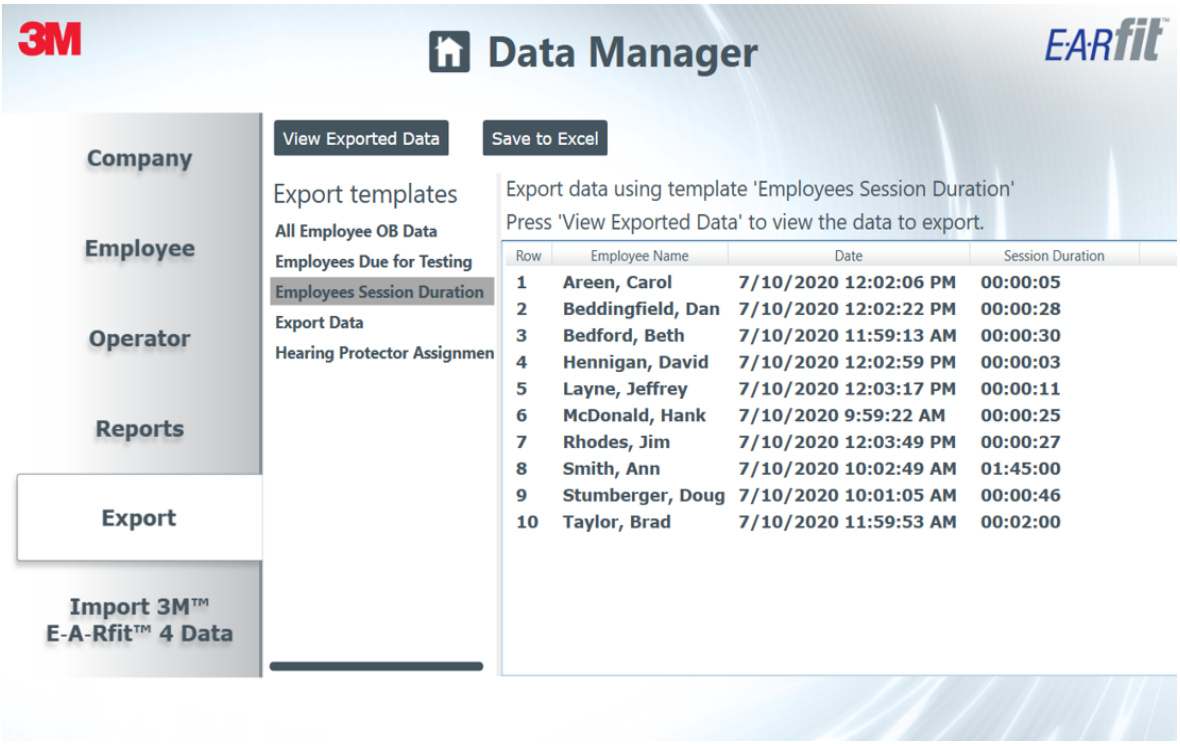


To run this export:

1) Double click on *Employees Due for Testing*.
2) Select the company and date.
3) Click the **Accept** button.

Employee Session Duration

The data query will display the date and session duration of all fit-tested employees when filtered by company, operator, start date, and end date.

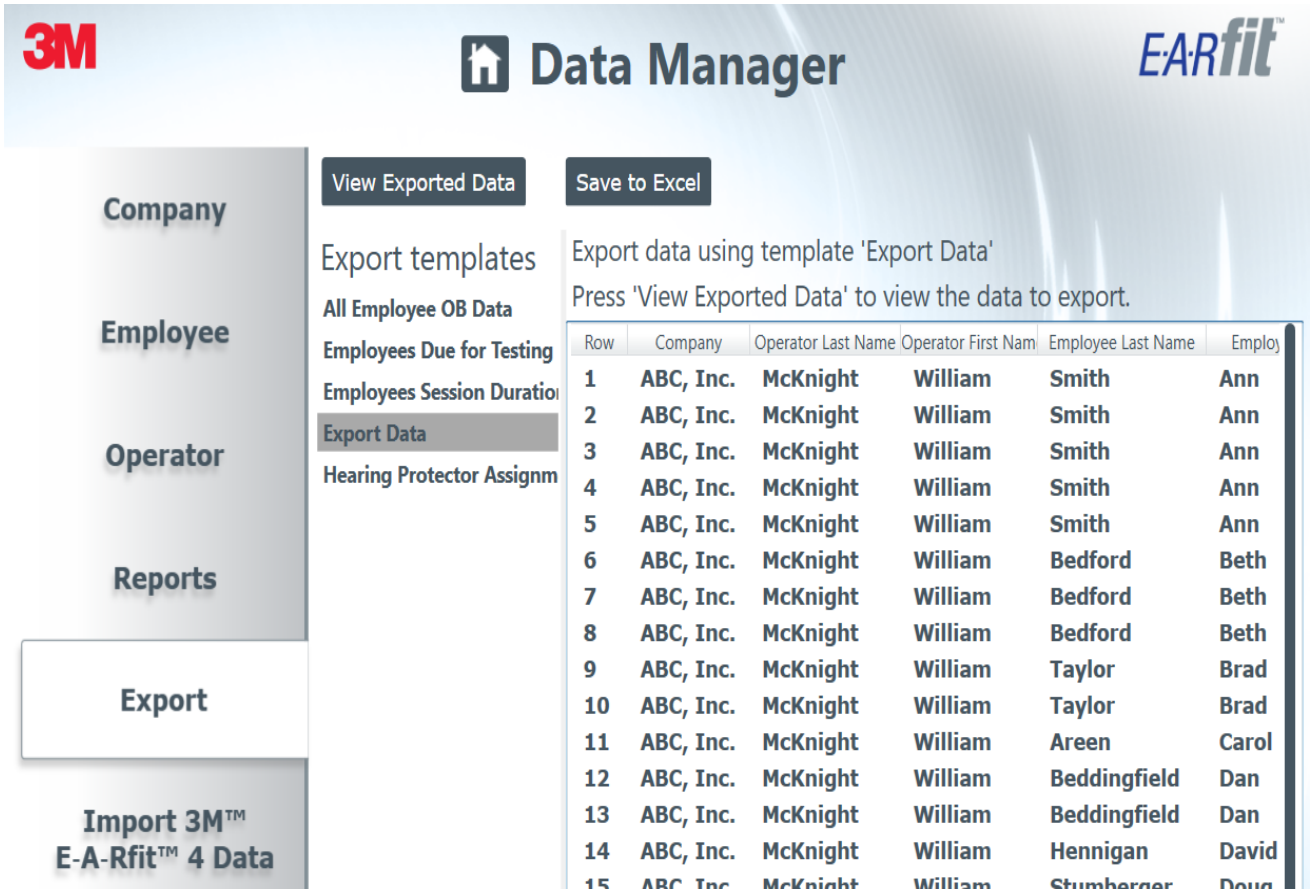


To run this export:

1) Double click on *Employee Session Duration*.
2) Select the company, operator, start date, and end date.
3) Click the **Accept** button.

Export Data

The data query will provide all fit-test data information when filtered by company, by all employees or by specific employee.



To run this export:

1) Double click on *Export Data*.
2) Select the range, employees, company, employee, and date parameters.
3) Click the **Accept** button.

Hearing Protector Assignment

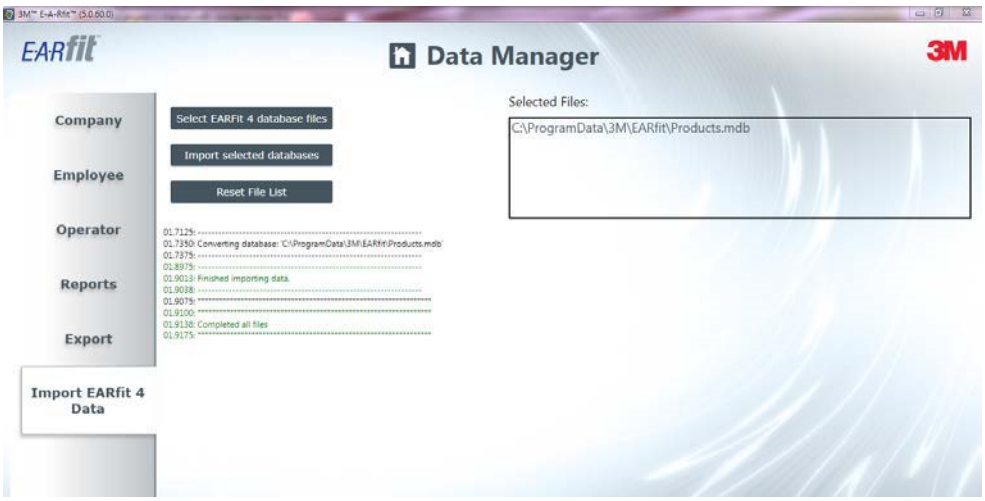
The data query filters by company and will display the company, all employees fit-tested, the fit-test visit dates, the product tested, and the left PAR, the right PAR, and the Binaural PAR values.

To run this export:

1) Double click on *Hearing Protector Assignment*.
2) Select the company.
3) Click the **Accept** button.

Import EARfit 4 Data

This feature is used to import 3M™ E-A-Rfit™ Dual-Ear Validation System 4 data into the 3M™ E-A-Rfit™ Dual-Ear Validation System software.



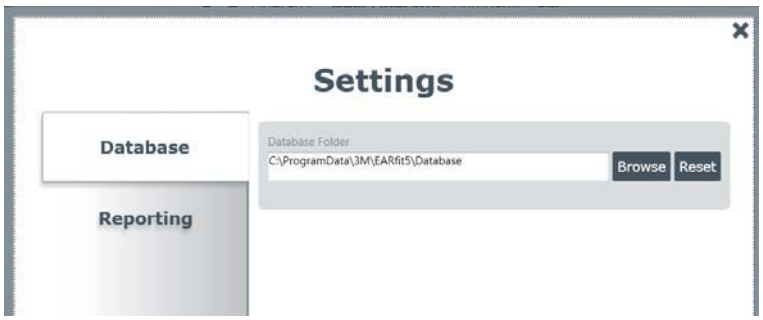
To import data:

1) Click **Select EARfit 4 database files**.
2) Select the files on your computer or network and click **Open**.
3) Click **Import selected database**.

Settings

Database

In the Database tab, you can determine where test result files will be stored. The default path is C:\ProgramData\3M\EARfit5\Database\Results. The results database can be changed to a folder on a shared drive or server. Users will then be able to access the data from any number of PCs running EARfit software, providing they have read/write access rights to the server. This is often done to facilitate automatic backup. An important limitation is that the EARfit database does not permit access by more than one PC at a time. The EARfit database currently does not support use on Sequel or SQL servers, which are designed to manage multiple users simultaneously.



To change the Database Folder location:

1) Click **Browse**.
2) Select a folder on your computer.
3) Click **Ok**.

IMPORTANT NOTE

You may click **Reset** to revert the Database Folder back to the default location selected during installation.

Service URL

Service URL should not be changed by 3M™ E-A-Rfit Dual-Ear Validation System users except as directed by 3M.

Software Updates

Software update messages will appear on the bottom of the home screen. This banner will only appear if you are connected to the Internet.

To update your software:

1) Click the link on the *Home* screen. This will prompt a download to your system.
2) Close the current 3M™ E-A-Rfit™ Dual-Ear Validation System window.
3) Open the download and follow the prompts in the install wizard.

User Support

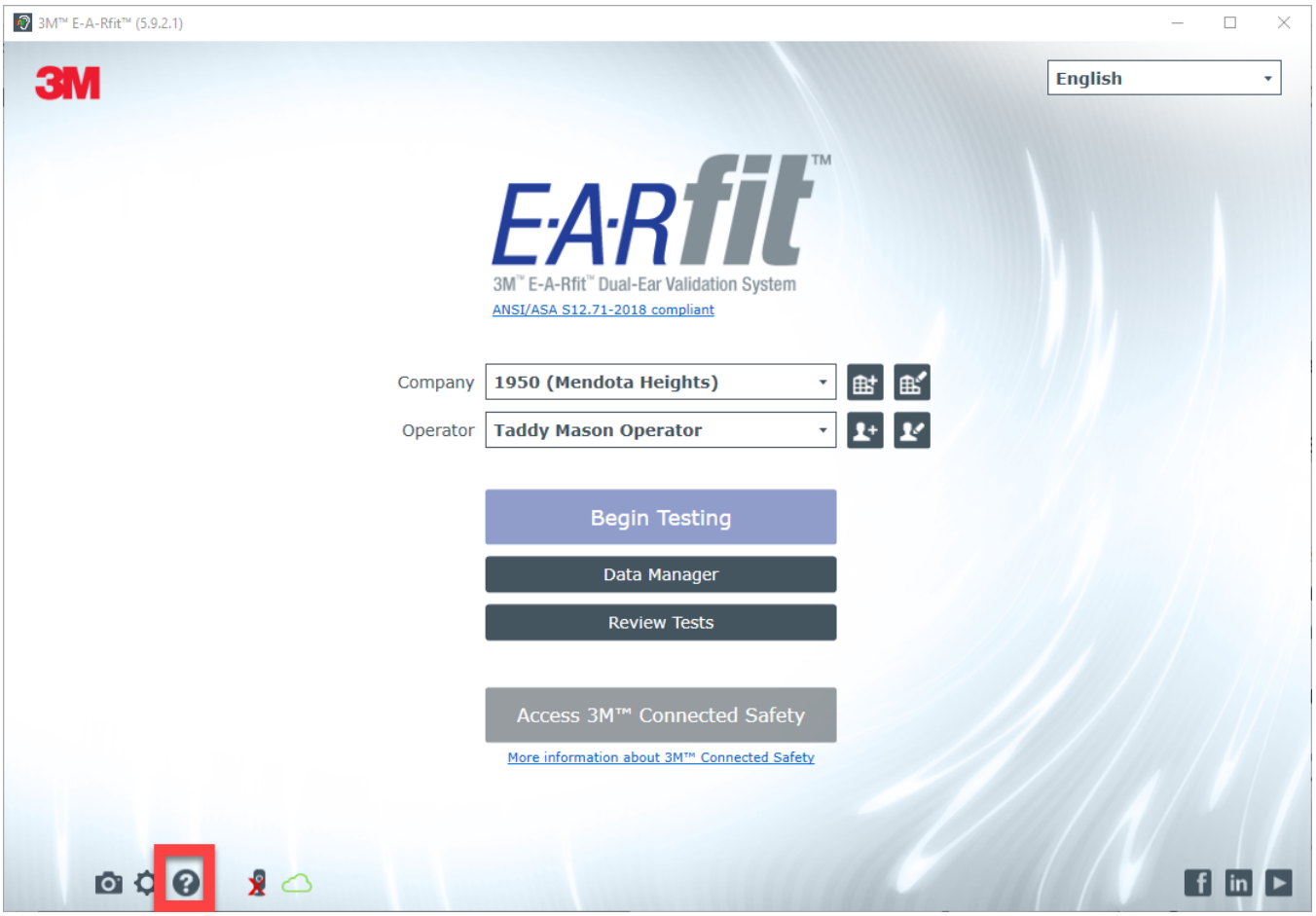
The User Support section is used for the following:

- View Resources (e.g., User Guide, training videos, etc.)
- View Version Information
- View System Details
- Request Technical Assistance
- Check for Updates

To access the User Support section, click the Question Mark icon on the Home screen.

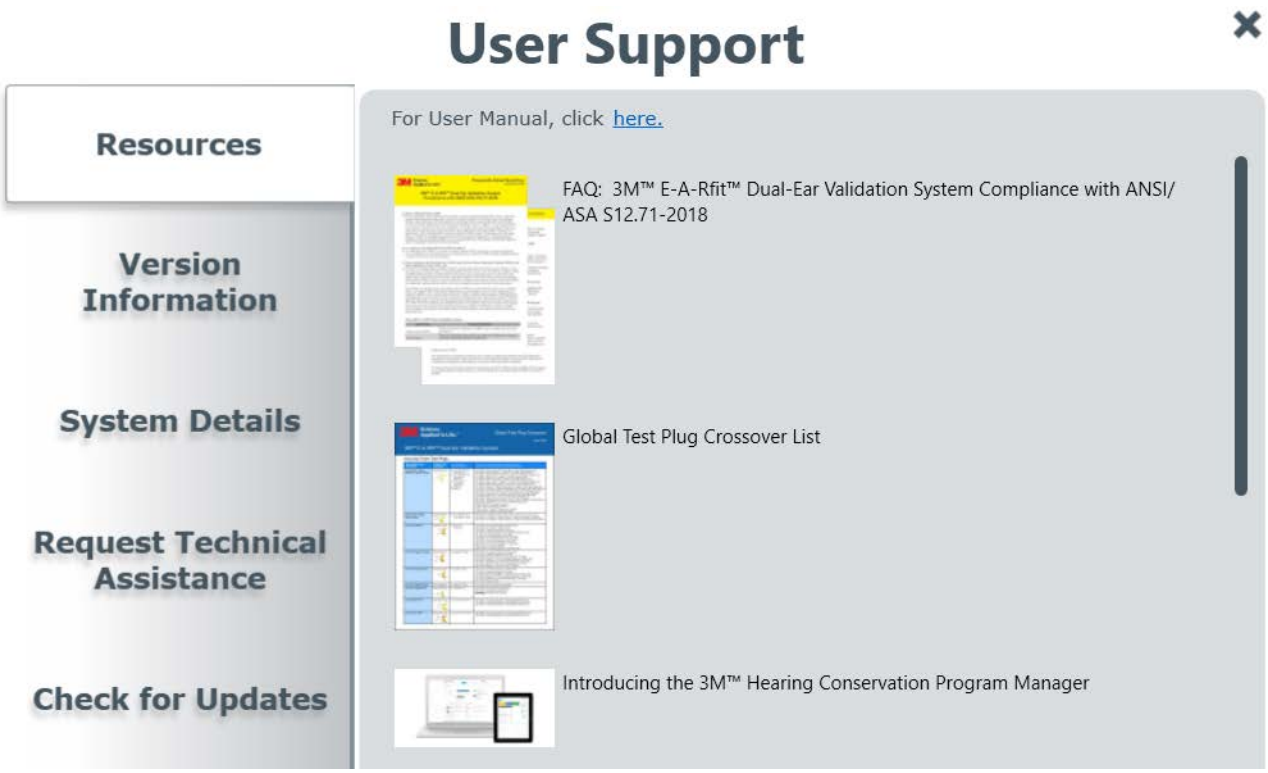
IMPORTANT NOTE

An internet connection may be required to access the User Support features.



Resources

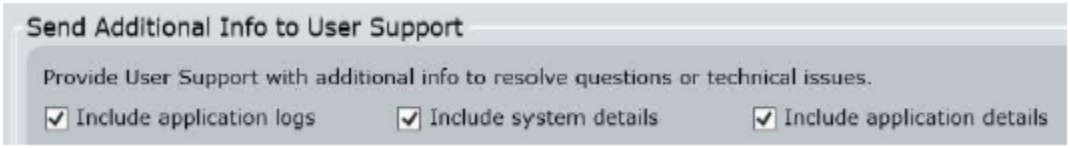
The Resources screen may be used to view and access the user manual, view live fit test video, view testing set-up for banded protectors and/or earmuffs and various other training videos.



Request Technical Assistance

The Request Technical Assistance support page may be used to contact Technical Service with an 3M™ E-A-Rfit™ Dual-Ear Validation System question. It is recommended to check the three boxes on the request form for: Include application logs, Include system details and Include application details.

Fill out the form to request assistance.



Check for Updates

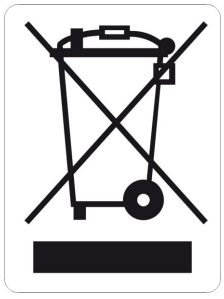
The Check for Updates support page is used to view and upload the most current software version.

Appendix A: Specifications and Performance Statement

Standards/Directives

- ANSI/ASA S12.71-2018. “Performance Criteria for Systems That Estimate The Attenuation of Passive Hearing Protectors for Individual Users (The 3M™ E-A-Rfit™ Dual-Ear Validation System is compliant to this standard starting with software version 5.9.1).
- IEC 61010-1:2010. "Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements (3rd edition)". International Electrotechnical Commission.
- EN 61326-1:2013. "Electrical equipment for measurement, control, and laboratory use - EMC requirements - Part 1: General requirements". European Committee for Standardization.
- Code of Federal Regulations (CFR): Title 47 CFR Part 15 Subpart B - Unintentional Radiators. Federal Communications Commission.
- RoHS Directive 2011/65/EU. European Parliament and the Council of the European Union.
- Low Voltage Directive (LVD) 2014/35/EU. European Parliament and the Council of the European Union.
- Electromagnetic Compatibility (EMC) Directive 2014/30/EU. European Parliament and the Council of the European Union.

Note: This product contains electrical and electronic components and must not be disposed of using standard refuse collection. Please consult local directives for disposal of electrical and electronic equipment.



References

- EN 458:2016. "Hearing protectors - Recommendations for selection, use, care and maintenance - Guidance document". European Committee for Standardization.
- CSA Z94.2-14. "Hearing protection devices - Performance, selection, care, and use". Canadian Standards Association.

Measurements Computed

Octave band data computed in:	125 Hz, 250 Hz, 500 Hz, 1000 Hz, 2000 Hz, 4000 Hz, 8000 Hz
PAR	Personal attenuation rating
Frequency weighting	A

Mechanical Specifications

Speaker housing	Aluminum, black material
Speaker size	6.5 in (16.5 cm) long; 3.75 in (9.5 cm) width; 6 in(15.2 cm) depth
Speaker weight	3.1 lb (1,406 g)
Speaker Status Indicators (LEDs)	Red blinking - USB not connected, will stop blinking when connected; Green - unit is on

Power Supply and Operating Conditions

Voltage	120 - 240 VAC
Frequency	50 - 60 Hz
Current	250 mA

Environmental Operating Conditions

Operating temperature	5° C to 40° C (41° F to 140° F)
Relative humidity	80% for temperatures up to 31° C (87.8° F); decreasing linearity to 50% at 40° C (140° F)
Voltage range	12 Volts DC
Transient overvoltage	Impulse withstand (overvoltage) category II. Rated pollution degree 2.

User Interface Requirements: Ports and Connectors

- AC/DC output (power)
- 2 LED indicators
- USB connector
- Power connector

System Requirements

- 1GHz or faster processor
- Microsoft Windows 10 (32-bit and 64-bit), Windows 8 (32-bit and 64-bit), Windows 7 Professional (32-bit and 64-bit), or Microsoft .NET Framework (Net4Full 4.0.30319.1, Net4Client)
- 1GB of RAM (32-bit) or 2GB of RAM (64-bit)
- 100MB of available hard-disk space
- 1024x768 display resolution (minimum)
- USB port
- Pointing device or mouse
- Internet connection (for User Support materials)

Performance Statement (per ANSI/ASA S12.71-2018)

The information in this table is provided to meet compliance requirements for Field Attenuation Estimation Systems (fit test systems) that report a PAR according to ANSI/ASA S12.71-2018 *American National Standard Performance Criteria for Systems that Estimate the Attenuation of Passive Hearing Protectors for Individual Users.*

ANSI/ASA S12.71-2018. "Performance Criteria for Systems That Estimate The Attenuation of Passive Hearing Protectors for Individual Users (starting with version 5.9.1). The principal change required by the new ANSI/ASA standard applies to how the uncertainty value is handled. By default, the 3M™ E-A-Rfit™ Dual-Ear Validation System has always taken a conservative approach by displaying the PAR minus uncertainty value as the overall PAR result. Any change to the uncertainty will automatically be incorporated in the PAR reported by the 3M™ E-A-Rfit™ Dual-Ear Validation System. The resulting PAR value is not expected to differ more than the typical test variability. Changes to uncertainty calculations will not apply to test results conducted with prior versions.

Specification	Descriptor
A. Manufacturer	3M™ Company
B. FAES brand name	3M™ E-A-Rfit™ Dual-Ear Validation System
C. System requirements	See *System Requirements*
D. HPDs supported	See *Appendix B: Model, Parts, and Accessories*
E. FAES test method	Field-Microphone in Real Ear (F-MIRE) with surrogate HPD
F. FAES type	Physical using surrogate HPD
G. Recommended regular physical calibration	Every two years (3M factory calibration)
H. Recommended periodic verification procedure	Verify microphone function daily on startup and repeat after every four hours of use and/or 50 test sessions.
I. Maximum permissible ambient noise	85 dBA or 91 dBC
J. Operator Noise Exposure	< 80 dB L_{A8hn} (sound level normalized to an 8-hour shift)
K. Minimum and maximum measurable attenuation values	Able to measure PARs ranging from 1 to 43 dB
L. Fit-Test Output	Octave band attenuation (125 -8000 Hz), PAR (an overall NRS_A-like value), and its associated uncertainty; binaural or monaural values.

Specification	Descriptor
M. FAES measurement uncertainty (+/-)	Roll-down (disposable) foam earplugs: 4 dB; Reusable (pre-molded) earplugs: 4 dB; Push-to-fit foam earplugs: 4 dB; Banded earplugs: 3 dB; Earmuffs: 2 dB
N. Listener requirements	No requirements. All listeners can participate regardless of hearing ability.

Appendix B: Model, Parts, and Accessories

Kit Components

3M ID

- 70-0716-7411-6

3M™ E-A-Rfit™ Dual-Ear Validation System Kit Components

- Enclosure Speaker Assembly (073-783)
- Dual-Ear Microphone/Cable Assembly (073-781)
- Dual-Ear 1/4”-20 to 5/8”-27 Speaker Stand Adapter (073-096)
- Test plug kit (693-1000)
- 3M™ SecureFit™ Protective Eyewear (70-07164-7682)
- Microphone stand (393-0003)
- USB cable (393-0007)
- Power cord/supply (053-825)
- 3M™ EAR™ Roll Model (319-1003)
- 3M™ Eargage (85099-00000)
- Tweezers (073-092)
- USB flash drive with software install and User Guide (093-411)
- Antistatic bag (293-0008)
- Removable microphone clip (2 per SKU) (073-100)
- Carrying case assembly (073-784)

3M Probed Test Hearing Protector Accessories

Please see the 3M™ E-A-Rfit™ Dual-Ear Validation System Global Test Plug Crossover Guide for the most up-to-date offerings. 3M Hearing Protector Test Probes may be purchased through a 3M distributor.

Contact 3M

Within the United States

Should your 3M equipment need to be returned for repair or for factory calibration, please contact the one of the following in the United States:

- Technical Service: 1 (800) 243-4630
- Customer Service: 1 (800) 246-0779
- Direct Government Orders: 1 (800) 752-3623
- User Support Website: EARfit.3M.com

Guidelines for calibration/repair return:

1) Contact Customer Service at the phone number above
2) Package the unit(s) in accordance with the shipping guidelines
3) Once the shipment is received, the Service Center will complete the requested calibration or diagnostic analysis

Shipping Guidelines

1) All material must be packaged in an appropriate container that will ensure undamaged delivery. Options include double corrugated cardboard boxes or shipment in original system case.
2) Ensure all parts within the box are packed in such a way to prevent movement within the box.
3) Speakers returned for calibration that include a microphone clip fastened to the grill must be protected with an appropriate wrapping for protection (if not returned in the original system case).

IMPORTANT NOTE

Contact the Customer Service number above if additional assistance is needed.

For more information, refer to the 3M™ E-A-Rfit™ Repair Service Guide.

Outside the United States

Please contact your local 3M Technical Service person to coordinate the service or repair.

Legal and Regulatory Information

FCC/IC

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CAN ICES-3(A)/NMB-3(A)

IMPORTANT NOTE

Modifications to this device shall not be made without the written consent of 3M Company. Unauthorized modifications may void the authority granted under Federal Communication Rules permitting the operation of this device.

Calibration

A calibration once every two years is recommended.

Warranty

3M warrants our 3M™ E-A-Rfit™ Dual-Ear Validation System instruments to be free from defects in materials and workmanship for one (1) year under normal conditions of use and service. We will replace or repair (at our option) defective instruments at no charge, excluding batteries, abuse, misuse, alterations, physical damage, or instruments previously repaired by other than 3M.

- For warranty for United States customers, contact 3M at 1-800-245-0779
- For warranty outside the United States, service will be provided by the local 3M Service Laboratory (contact the local 3M authorized sales agent for details)

THIS WARRANTY STATES OUR TOTAL OBLIGATION IN PLACE OF ANY OTHER WARRANTIES EXPRESSED OR IMPLIED. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE. OUR WARRANTY DOES NOT INCLUDE ANY LIABILITY OR OBLIGATION DIRECTLY RESULTING FROM ANY DEFECTIVE INSTRUMENT OR PRODUCT OR ANY ASSOCIATED DAMAGES, INJURIES, OR PROPERTY LOSS, INCLUDING LOSS OF USE OR MEASUREMENT DATA.

Responsibility for Data Privacy and Security

Purchaser is solely responsible for complying with all privacy and security-related laws and regulations applicable to the collection, storage, use, import and export of all data (personally-identifiable or otherwise) entered into, or generated by, the 3M™ E-A-Rfit™ Dual-Ear Validation System. Access to the 3M™ E-A-Rfit™ Dual-Ear Validation System is not password-controlled. Purchaser should implement all necessary administrative, physical and technical safeguards it determines are necessary to ensure the integrity, confidentiality and security of the data against both internal (e.g., access by unauthorized personnel, misuse of data) and external threats (e.g., "hacking").

Limitation of Liability

3M takes no responsibility and shall bear no liability for use or misuse of individual or personally identifiable data. All responsibility for such data resides with the purchaser and/or employer.

3M WILL NOT BE LIABLE FOR ANY LOSS OR DAMAGE ARISING FROM THE 3M PRODUCT, WHETHER DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL (INCLUDING, BUT NOT LIMITED TO, LOST PROFITS OR BUSINESS OPPORTUNITY), REGARDLESS OF THE LEGAL OR EQUITABLE THEORY ASSERTED, INCLUDING, BUT NOT LIMITED TO, WARRANTY, CONTRACT, NEGLIGENCE, OR STRICT LIABILITY.

Personal Safety Division
3M Center
Building 235-2W-70
St. Paul, MN 55144-1000

In the United States of America
Technical Service: 1 (800) 243-4630
website: 3M.com/workersafety
In Canada
Technical Service: 1 (800) 267-4414
website: 3M.ca/safety