



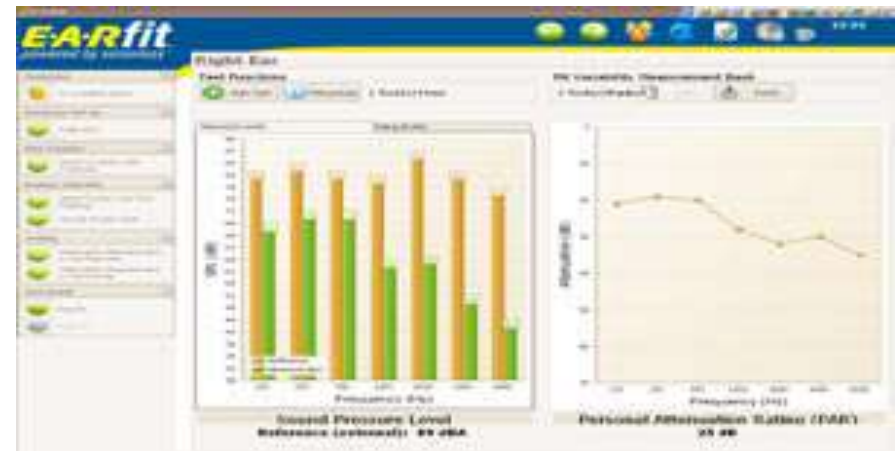
# Leading the Advancement of Hearing Conservation

Richard Beardsley



## What is the system?

- A quick and accurate method of obtaining in-ear attenuation for a given fitting of a pair of earplugs
- Designed and built to be an integral part of a comprehensive workplace hearing conservation program.
- It may be used for basic program auditing, follow-up evaluation of standard-threshold-shifts, full training and evaluation etc.



## EARfit™ Validation System

The specially probed earplugs (pictured below) allow testing to be performed in approx 8 seconds.



- Provides data at the standard test frequencies from 125Hz – 8kHz.
- Personal Attenuation Rating (PAR) – The PAR is calculated individually for each person (more details on next slide)
- Incorporates a single small dual element microphone and associated proprietary technology.
- One section of the dual-element microphone couples through the earplug to pick up the sound pressure levels in the ear canal, and the other section measures the external sound environment.

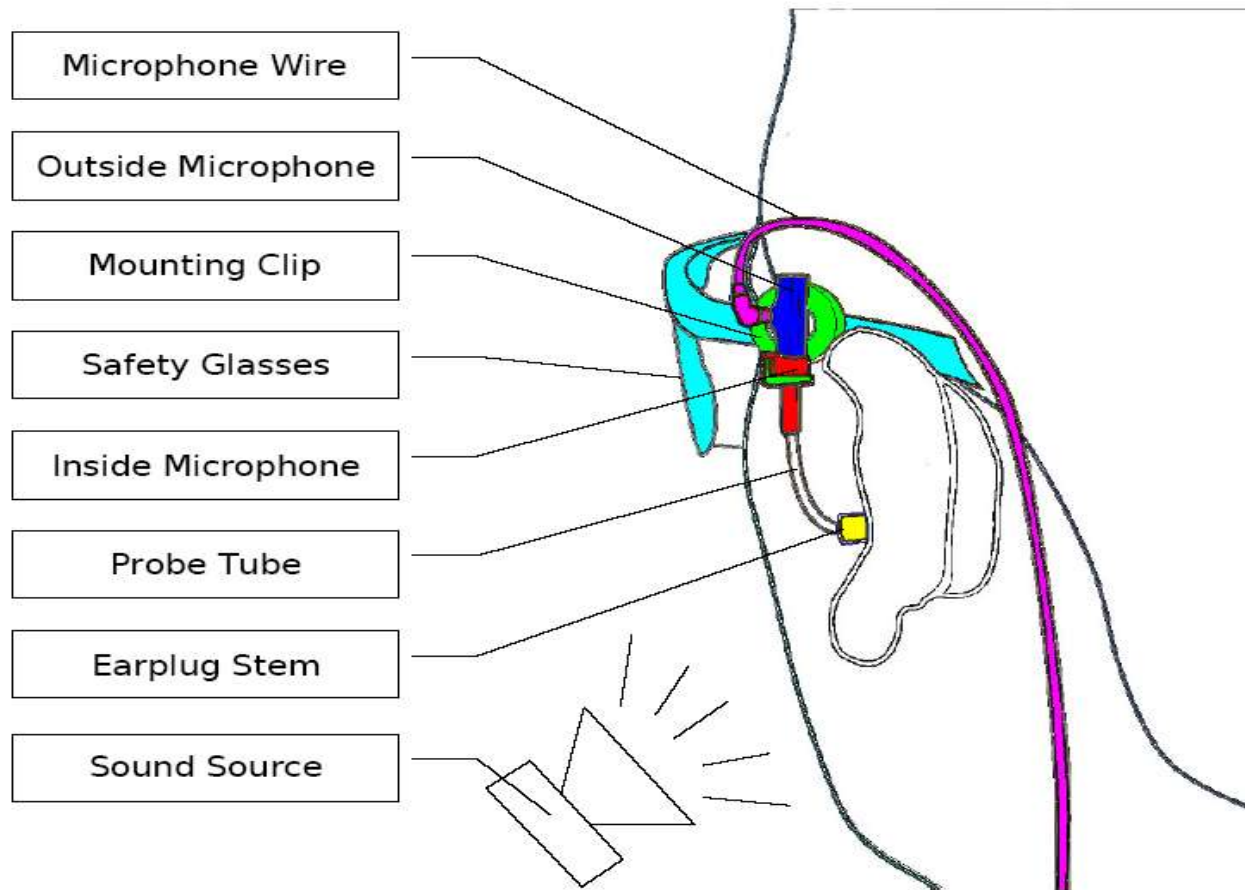


## What is PAR?

- The PAR is a 'Personal Attenuation Rating' for a given hearing protector.
- PAR can be used to estimate the noise attenuation achieved by the individual for whom it has been measured on that particular day with that particular plug
- It can be directly subtracted from an A-weighted sound pressure level to predict that person's protected noise level or exposure.
- The PAR is a value that is computed for a single fit.
- Both left-ear and right-ear PAR's are individually computed.

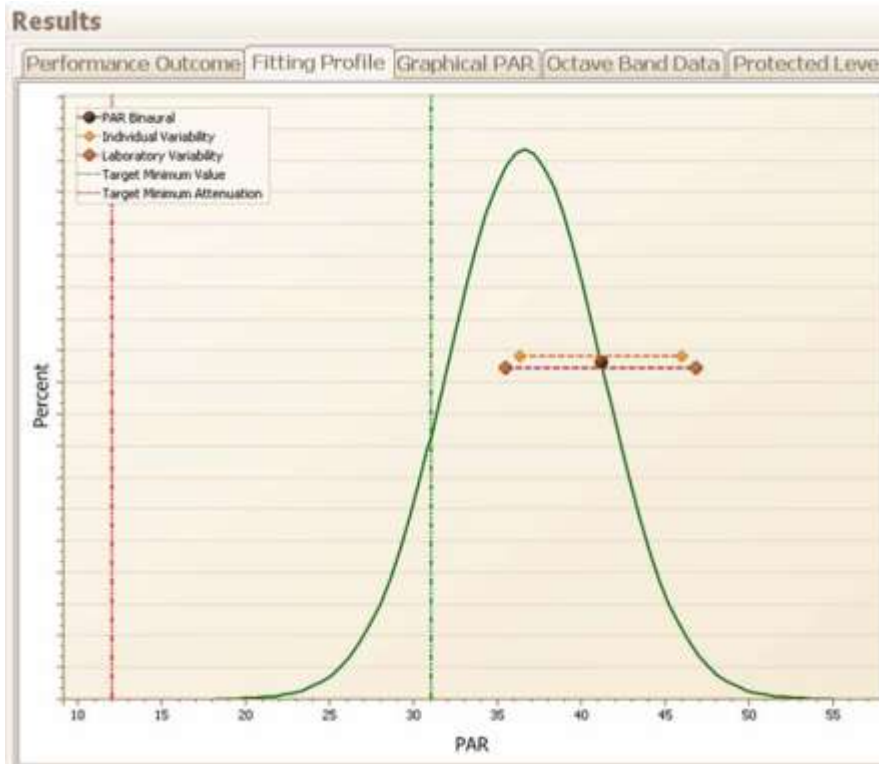


# EARfit™ Validation System



# EARfit™ Validation System

Below shows an example of the PAR Value for a particular earplug fitting based on measurement, fit and spectral.



After 8 seconds, you can get your PAR values...

You and your company know what is your real attenuation.

You now have an employee file with personal data.





### Left Ear

#### Test Functions



**Summary**

49 available tokens

#### Hardware Set-Up

Calibration:

Visit Creation:

Product Selection:

Select Product and Test Eligibility

Choose Product Size

#### Testing

Attenuation Measurement on the Right Ear:

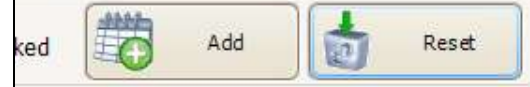
Attenuation Measurement on the Left Ear:

#### Visit Result

Results:

Reports:

#### Measurement Bank



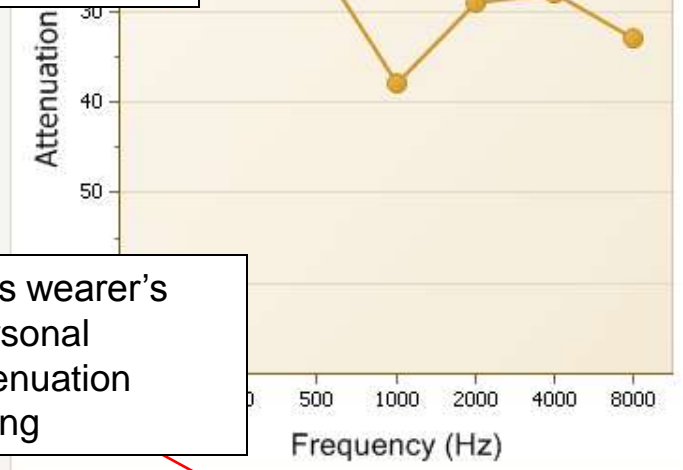
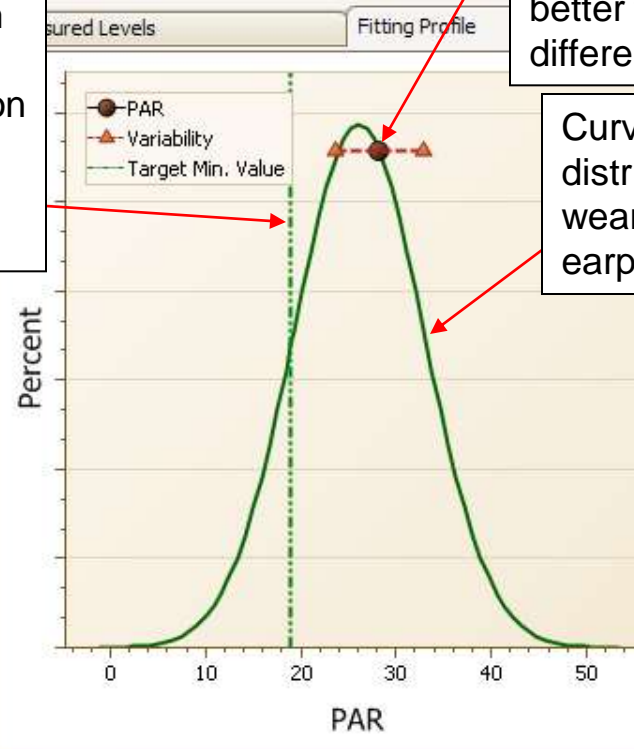
Absolute minimum necessary for adequate protection for this worker in their noise environment

This test with expected variation shows wearer how well they are fitting the plug – whether they should perhaps work on a better fit or a different earplug.

Curve indicates distribution for wearers of this earplug

Captures data at seven different frequencies


This wearer's personal attenuation rating



Sound Pressure Level	Personal Attenuation Rating (PAR)
Reference (external): 95 dBA	28 dB
Measurement (protected): 72 dBA	

# Validation Document





**STANDARD REPORT**

Employee Name: Marc Santoro  
 Test Date: 5/11/2009 3:21:15 PM  
 Company: 3M  
 5, Indpls, IN, UNITED STATES, 46268

**TECHNICIAN INFORMATION**

Last Name	First Name	Code	Software Version
Santoro	Marc	SANT0235	3.2.1.5
Serial number :	5008	Last Calibration :	13/06/08

**EXPOSURE LEVEL**

A-Weighted Exposure Level (dB)	C-Weighted Exposure Level (dB)
Not Available	Not Available

**NOTES**

**TEST INFORMATION**

	Left Ear	Right Ear	Binaural
Product	E-AR® Push-Ins™	E-AR® Push-Ins™	
Size	Regular	Regular	
PAR (dB)	13	13	
Protection Sufficiency	No Noise Data	No Noise Data	No Noise Data
Protected Exposure Level 20% (dBA)	-	-	Not Available
Protected Exposure Level 80% (dBA)	-	-	Not Available

The manufacturer of this attenuation measurement system recommends that an annual calibration be performed.

1

Personal Attenuation Rating for each ear separately and in total

If noise exposure level is input, this will indicate if protection is sufficient for wearer



## Implementation into a Company

### Option 1 - Audit Mode

- Provides important information on the performance of a wearer's hearing protection.
- Improves measurement certainty.
- Improves the ability of the wearer to attain superior performance.



## Implementation into a Company

### Option 2 - Fit & Train Mode

- Provides fit training with repeat measurements
- Can identify wearers who need additional training
- Provides confirmation that improved fitting and protection has been achieved.
- If not then wearer can be guided to select another suitable alternative.
- Provides valuable information on wearers ability to consistently fit the plug correctly.



## Implementation into a Company

### Option 3 - Ultimate EARfit™ Usage Mode

- A motivational Value tool – to shape behaviour
- More measurements taken the better fit the individual will receive.
- Consistency is the key !
- Provides education to the employee by repeat fittings
- Provides an understanding of how to protect themselves correctly!
- More importantly what they are doing wrong.



## Feedback

- Enjoyed trying different types of protection
- Helpful information
- Everyone should do the test
- Very Interesting
- Great information
- Very helpful
- Very easy



# The Total Hearing Solution from 3M

Noise Measurement

Hearing Protection

Training Support

Fit Validation



OAS



Quest Suite



3M Occupational Health & Environmental Safety Division  
Your new tool for noise assessment and hearing protection in your company.



**EARfit**



# Thank you

For further information contact 3M helpline

UK	0870 60 800 60
Ireland	1 800 320 500

Web [www.3M.co.uk/ohes](http://www.3M.co.uk/ohes)

