



Pannier Corporation

Health and Safety Handbook

Marking System Group



Hearing Conservation

Original Date:	Section:	Revision date:	Page:
7/2/2009	19	5/20/2013	1 of 13

Authority and Scope

Regulation: 29 CFR 1910.95, Hearing Conservation Program (HCP), and 29 CFR 1904.10, Recordkeeping

Scope: This program applies to all operations and work areas where employees and other personnel may be exposed to hazardous noise levels.

Policy Statement

It is the policy of Pannier Corporation to protect the hearing of all workers whose noise exposures equal or exceed an action level of 85 decibels (dB) for an 8-hour day. In accordance with this policy, this organization has established a Hearing Conservation Program. This program applies to all persons working in areas or with equipment that have noise levels of 85 decibels, A weighting (dBA) or higher.

Program Administration

Program Contact Information

Task	Name, job title, or department	Phone
Program Administrator	John Visconti	412-492-1400 ext. 310
Audiometric Testing Coordinator	Susie Shaginaw	412-492-1400 ext. 342
Training Coordinator	John Visconti	412-492-1400 ext. 310

Program Administrator. The Program administrator will:

- Administer the Hearing Conservation Program.
- Conduct and document noise surveys areas/activities where potential noise exposures may equal or exceed an 8-hour time-weighted average (TWA) of 85 dBA. or Coordinate the contracted service providers activities
- When notified by employee or employee supervisor, perform a sound-level survey in areas where a change in activity, process, equipment, or controls may have resulted in either an increase or a decrease in employee exposure.
- Identify noise hazard areas and post appropriate signs.
- Provide employees access to noise survey and dosimetry records.
- Notify supervisors and affected employees when monitoring indicates an exposure at or above action level, and participate in the Hearing Conservation Program when it becomes mandatory.
- Recommend appropriate engineering and/or administrative noise controls.
- Develop a training program and ensure annual training of employees enrolled in the HCP in hearing conservation issues and practices.



Pannier Corporation

Health and Safety Handbook

Marking System Group



Hearing Conservation

Original Date:	Section:	Revision date:	Page:
7/2/2009	19	5/20/2013	2 of 13

- Maintain access to sound-level meters, noise dosimeters, and field calibration equipment in accordance with manufacturers' instructions and perform or provide for required calibrations in accordance with the requirements of 29 CFR 1910.95.

- Maintain records of all noise monitoring and instrument calibration.

Audiometric Testing Coordinator. The testing coordinator will:

- Conduct baseline audiograms and annual audiometric testing on employees enrolled in the hearing conservation program.
- Notify **Quality Manager** of employee complaints of potential noise hazard exposures.
- Ensure the proper selection and fit of hearing protection devices (HPDs.)
- Ensure appropriate certification of those responsible for audiometric testing, interpretation of audiometric results, selection and fit of HPDs, and employee hearing conservation training.
- Identify employees with Standard Threshold Shift (STS), subsequent retesting, employee notification, management of those employees with STS, and possible referrals.
- Assist as needed with the annual training of employees in the Hearing Conservation Program.
- Maintain audiometric testing equipment in accordance with manufacturers' instructions and perform or provide for required machine calibrations in accordance with the requirements of 29 CFR 1910.95, Appendix E.
- Maintain records of audiometric test results (audiograms), employee training, and noise monitoring results for the duration of employment for each employee plus 30 years.

Supervisor. The supervisor will:

- Notify the Quality Manager of potential noise hazard areas.
- Evaluate the feasibility of engineering and/or administrative noise controls.
- Identify employees exposed to sound levels equaling or exceeding the action level, and report such information to **the Program Administrator**.

Employees. Employees will:

- Wear HPDs when entering or working in identified noise hazard areas in accordance with the posted warning.
- Report potential noise hazard exposures to the supervisor.
- Comply with Hearing Conservation Program requirements when identified as being exposed to sound levels equaling or exceeding the action level.

Employees who do not comply with the provisions of this program will be disciplined in accordance with our company policy of progressive discipline.

Program Review and Update

This program will be reevaluated:

- Annually.
- Whenever there is a change in production, process, equipment, or controls that might have questionable noise levels.



Pannier Corporation

Health and Safety Handbook

Marking System Group



Hearing Conservation

Original Date:	Section:	Revision date:	Page:
7/2/2009	19	5/20/2013	3 of 13

Definitions

Action Level—A sound level equaling an 8-hour time-weighted average (TWA) of 85 decibels on an A-weighted level (dBA), or equivalently a noise dose of 50 percent, as specified in the OSHA regulation at 29 CFR 1910.95.

Audiogram—A chart, graph, or table that results from an audiometric test. An audiogram shows an individual’s hearing threshold level as a function of frequency (hertz).

Audiologist—A professional specializing in the study and rehabilitation of hearing who is certified by the American Speech-Language-Hearing Association or licensed by a state board of examiners.

Baseline Audiogram—Reference audiogram against which future audiograms are compared.

Decibel (dB)—Unit of measurement of sound level.

dBA (decibels on an A-weighted level)—A measurement of noise intensity obtained using a sound-measuring instrument commonly used to define degrees of auditory risk. The A-weighting is a measurement that closely parallels the auditory characteristics of normal human hearing.

Dosimetry—A technique of sound measurement that integrates cumulative noise exposure over time and directly indicates a noise dose.

Hearing Conservation Program (HCP)—An annual audiometric testing and hearing conservation training program for employees exposed to sound levels equaling or exceeding the action level.

Hearing Protection Device (HPD)—Personal protective equipment worn by an individual for the purpose of reducing noise exposure, including reusable and disposable earplugs, ear muffs, and similar noise attenuating devices.

Noise dose—A measure of the noise exposure to which a person is subjected in the workplace.

Standard Threshold Shift (STS)—A change in hearing threshold, relative to the baseline audiogram, of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear, taking into account any changes due to presbycusis (age-related hearing loss).

Time-Weighted Average (TWA)—Noise exposure averaged over a designated period of time (example: 8-hour TWA).

Engineering and Administrative Controls

When noise exposure levels exceed the permissible limits, Pannier Corporation will implement engineering controls as the primary mechanism to attenuate noise emissions. The following engineering controls will be or have been implemented:

- Install controls on vibrating surfaces.
- Enclose machinery.
- Install barriers or insulation between noise sources and operators.

The following administrative controls will be implemented in conjunction with engineering controls to limit the amount of time that an employee works in areas where the 8-hour TWA equals or exceeds 90 dBA:

- Employee rotation
- Scheduling equipment operation

Administrative controls will neither be used as a substitute for nor replace applicable requirements for a Hearing Conservation Program.



Pannier Corporation

Health and Safety Handbook

Marking System Group



Hearing Conservation

Original Date:	Section:	Revision date:	Page:
7/2/2009	19	5/20/2013	4 of 13

Hearing Conservation Program

Monitoring

A noise survey will be conducted to identify the areas where employee noise exposure may exceed an 85 dB 8-hour TWA.

Workers will be monitored in questionable areas with a calibrated audio dosimeter that will measure all continuous, intermittent, and impulsive sound levels between 80–130 decibels on the “A-weighted” scale (slow response).

Each employee will be notified of the monitoring results if exposed at or above the 85 dB TWA. Additional monitoring will be conducted if changes in production, equipment, processes, or controls suggest that noise exposures may have increased. Employees identified with exposure levels at or above an 8-hour TWA of 85 dB will be notified with the results of the monitoring and will be required to enroll in the Hearing Conservation Program.

Below is the table of permissible noise exposures.

Table G-16 (29 CFR 1910.95(a))

Hours per Day	Permissible sound level dBA
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
0.25 or less	115

Note on Table G-16: When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. If the sum of the fractions $C(1)/T(1) + C(2)/T(2) + C(n)/T(n)$ exceeds unity, the mixed exposure should be considered to exceed the limit value. Cn indicates the total time of exposure at a specified noise level, and Tn indicates the total time of exposure permitted at that level. Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level.

See below for the [Noise Exposure Computation Appendix](#) to the Hearing Conservation Program rule.

Audiometric Testing

Baseline audiogram. Audiometric tests will be preformed by a licensed or certified audiologist, otolaryngologist, qualified physician, or qualified technician responsible to the audiologist or physician. A baseline audiogram (i.e., hearing test) will be obtained for all employees with noise exposures equal to or greater than an 85 dB TWA. The baseline audiogram will be obtained within 6 months of an employee’s first exposure to noise above the action level. In the case that a mobile van is used for testing, the audiogram will be obtained within 1 year. Employees will use hearing protection 6 months after their first exposure until a baseline audiogram is obtained.

Both a preemployment and termination audiogram will be obtained for all employees. Workers will be informed that baseline audiometric testing must be preceded by at least 14 hours without exposure to noise levels above 80 dB. Workers may use hearing protection to meet this requirement.

All audiometric testing and evaluation will be provided free of charge to our employees.



Pannier Corporation

Health and Safety Handbook

Marking System Group



Hearing Conservation

Original Date:	Section:	Revision date:	Page:
7/2/2009	19	5/20/2013	5 of 13

Annual audiogram. Annual audiograms are required for all workers with noise exposures equal to or greater than an 85 dB TWA. An annual audiogram may be substituted for the baseline audiogram when the audiologist or physician evaluating the program declares:

- An STS is persistent, *or*
- The hearing threshold in the annual audiogram indicates a significant improvement over the baseline audiogram.

Standard Threshold Shift (STS). If a comparison of the annual audiogram with the baseline audiogram indicates that an STS has occurred, a retest within 30 days will be conducted, and the second test may be considered the annual audiogram. If an STS is confirmed, the employee will be:

- Informed in writing within 21 days of the determination
- Referred to an audiologist, otolaryngologist, or qualified physician for further evaluation
- Provided with both the baseline and the most recent audiogram of the employee and the required records on the audiometer and the audiometric test room
- Fitted or refitted with adequate hearing protectors, shown how to use them, and required to wear them

Unless the audiologist or physician determines that the STS is not work-related or aggravated by noise exposures in the workplace, the worker will be required to use suitable hearing protection. For workers exposed to noise levels below 90 dB TWA, the use of hearing protection will continue until subsequent audiometric testing indicates that the STS is not permanent.

Audiometers. The requirements for the types and calibration of audiometers and the background noise levels allowed in audiometric test rooms are specified in Appendices C, D, and E of the OSHA Noise Standard (29 CFR 1910.95). The records of the firm we plan to use for audiometric testing should be checked to confirm that they are complying with OSHA standards.

Hearing Protection

Hearing protectors will be provided at no cost to employees, and a variety of suitable types will be available for their selection. Hearing protectors will be evaluated for their ability to adequately reduce the noise exposures in the workplace to a 90 dB TWA or below (or an 85 dB TWA for those workers who have experienced an STS).

Hearing protectors will be required and provided for all employees with noise exposure:

- Greater than a 90 dB TWA; *or*
- Equal to or greater than an 85 dB TWA and who have experienced an STS; *or*
- Equal to or greater than an 85 dB TWA for 6 months or more and who have not obtained a baseline audiogram.

Hearing protectors will be available to all employees for use with noise exposures between an 85 and 90 dB TWA who have not experienced an STS.

See below for a copy of the *Methods for Estimating the Adequacy of Hearing Protector Attenuation* appendix to the Hearing Conservation Program rule.

Training

Workers included in the Hearing Conservation Program will receive noise protection training that covers the following topics:

- The effects of noise on hearing
- The purpose of hearing protectors



Pannier Corporation

Health and Safety Handbook

Marking System Group



Hearing Conservation

Original Date:	Section:	Revision date:	Page:
7/2/2009	19	5/20/2013	6 of 13

- The advantages, disadvantages, and noise reduction capabilities of the various types of hearing protectors
- Instructions on the selection, fitting, use, and care of hearing protectors
- The purpose of audiometric testing and an explanation of the test procedures

Employees not using hearing protectors must be fitted with them, trained in their use and care, and required to use them. Employees already using hearing protectors and who have experienced an STS must be refitted and retrained in their use and be provided with hearing protectors offering greater attenuation if necessary.

The Quality Manager will make copies of the noise exposure regulations available to affected employees and any informational materials related to the regulations that are supplied to the employer by OSHA and post a copy in the workplace.

Annual Refresher Training

The training program will be repeated annually for each employee included in the Hearing Conservation Program. Information provided in the training program will be updated to be consistent with changes in protective equipment and work processes.

Training Records

Pannier Corporation will maintain all records of employee training at **1130 Old Butler Plank Road** for **3 Years**.

Recordkeeping

Injury and Illness Log

An STS of 10 dB or greater will be recorded on the OSHA 300 log if caused or aggravated by exposure to occupational noise.

Records Maintenance

Hearing Conservation Program records will be maintained in the office and are available on request to our employees or an OSHA representative. All audiometric test records will be retained for the duration of each worker's employment. Each record will include:

- Audiogram with the name and job classification of the worker, date of the audiogram, and the examiner's name
- Measurements of the noise levels in the audiometric test booth and the date of the last acoustic or exhaustive calibration of the audiometer
- Employee's most recent noise exposure measurement

Noise exposure records will be retained for at least 2 years.

Transfer of Records

If Pannier Corporation ceases to do business, all Hearing Conservation Program records will be transferred to its successors or agents. The records of a new employee who formerly worked in a noise hazardous location will be kept in his or her current file. A copy of a new employee's audiometric records, particularly if he or she is to work in a noise hazardous area, will be transferred to the new record.

Noise Exposure Computation

29 CFR 1910.95, Appendix A

I. Computation of Employee Noise Exposure



Pannier Corporation

Health and Safety Handbook

Marking System Group



Hearing Conservation

Original Date:	Section:	Revision date:	Page:
7/2/2009	19	5/20/2013	7 of 13

(1) Noise dose is computed using Table G-16a as follows:

(i) When the sound level (L) is constant over the entire work shift, the noise dose (D), in percent, is given by $D=100 C/T$ where C is the total length of the workday, in hours, and T is the reference duration corresponding to the measured L, as given in Table G-16a or by the formula shown as a footnote to that table.

(ii) When the work shift noise exposure is composed of two or more periods of noise at different levels, the total noise dose over the workday is given by:

$D=100(C1/T1+C2/T2+Cn/Tn)$, where Cn indicates the total time of exposure at a specific noise level, and Tn indicates the reference duration for that level as given by Table G-16a.

(2) The 8-hour time-weighted average (TWA) sound level, in decibels (dB), may be computed from the dose, in percent, by means of the formula $TWA=16.61 \log_{10} (D/100)+90$. For an 8-hour work shift with the noise level constant over the entire shift, the TWA is equal to the measured sound level.

(3) A table relating dose and TWA is given in Section II.

Table G-16a

A-weighted sound level, L (decibel)	Reference duration, T (hour)
80	32
81	27.9
82	24.3
83	21.1
84	18.4
85	16
86	13.9
87	12.1
88	10.6
89	9.2
90	8
91	7.0
92	6.1
93	5.3
94	4.6
95	4
96	3.5
97	3.0
98	2.6
99	2.3
100	2
101	1.7
102	1.5
103	1.3



Pannier Corporation

Health and Safety Handbook

Marking System Group



Hearing Conservation

Original Date:	Section:	Revision date:	Page:
7/2/2009	19	5/20/2013	8 of 13

104	1.1
105	1
106	0.87
107	0.76
108	0.66
109	0.57
110	0.5
111	0.44
112	0.38
113	0.33
114	0.29
115	0.25
116	0.22
117	0.19
118	0.16
119	0.14
120	0.125
121	0.11
122	0.095
123	0.082
124	0.072
125	0.063
126	0.054
127	0.047
128	0.041
129	0.036
130	0.031

In the above table, the reference duration, T, is computed by $T = 8 / 2^{(L-90)/5}$ where L is the measured A-weighted sound level.

II. Conversion between "dose" and "8-Hour Time-Weighted Average" Sound Level Compliance with paragraphs (c)--(r) of this regulation (29 CFR 1910.95) is determined by the amount of exposure to noise in the workplace. The amount of such exposure is usually measured with an audio dosimeter, which gives a readout in terms of dose. In order to better understand the requirements of the amendment, dosimeter readings can be converted to an 8-hour TWA sound level.

In order to convert the reading of a dosimeter into a TWA, see Table A-1, below. This table applies to dosimeters that are set by the manufacturer to calculate dose or percent exposure according to the relationships in Table G-16a. For example, a dose of 91 percent over an 8-hour day results in a TWA of 89.3 dB, and a dose of 50 percent corresponds to a TWA of 85 dB.

If the dose as read on the dosimeter is less than or greater than the values found in Table A-1, the TWA may be calculated by using the formula $TWA = 16.61 \log_{10} (D/100) + 90$ where TWA=8-hour time-weighted average sound level and D=accumulated dose in percent exposure.

Table A-1

Conversion from Percent Noise Exposure or "Dose" to "8- Hour Time-Weighted Average (TWA) Sound Level"

Dose or percent noise	TWA
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Pannier Corporation

Health and Safety Handbook

Marking System Group



Hearing Conservation

Original Date:	Section:	Revision date:	Page:
7/2/2009	19	5/20/2013	9 of 13

exposure	
10	73.4
15	76.3
20	78.4
25	80.0
30	81.3
35	82.4
40	83.4
45	84.2
50	85.0
55	85.7
60	86.3
65	86.9
70	87.4
75	87.9
80	88.4
81	88.5
82	88.6
83	88.7
84	88.7
85	88.8
86	88.9
87	89.0
88	89.1
89	89.2
90	89.2
91	89.3
92	89.4
93	89.5
94	89.6
95	89.6
96	89.7
97	89.8
98	89.9
99	89.9
100	90.0
101	90.1
102	90.1
103	90.2
104	90.3
105	90.4
106	90.4
107	90.5
108	90.6



Pannier Corporation

Health and Safety Handbook

Marking System Group



Hearing Conservation

Original Date:	Section:	Revision date:	Page:
7/2/2009	19	5/20/2013	10 of 13

109	90.6
110	90.7
111	90.8
112	90.8
113	90.9
114	90.9
115	91.1
116	91.1
117	91.1
118	91.2
119	91.3
120	91.3
125	91.6
130	91.9
135	92.2
140	92.4
145	92.7
150	92.9
155	93.2
160	93.4
165	93.6
170	93.8
175	94.0
180	94.2
185	94.4
190	94.6
195	94.8
200	95.0
210	95.4
220	95.7
230	96.0
240	96.3
250	96.6
260	96.9
270	97.2
280	97.4
290	97.7
300	97.9
310	98.2
320	98.4
330	98.6
340	98.8
350	99.0



Pannier Corporation

Health and Safety Handbook

Marking System Group



Hearing Conservation

Original Date:	Section:	Revision date:	Page:
7/2/2009	19	5/20/2013	11 of 13

360	99.2
370	99.4
380	99.6
390	99.8
400	100.0
410	100.2
420	100.4
430	100.5
440	100.7
450	100.8
460	101.0
470	101.2
480	101.3
490	101.5
500	101.6
510	101.8
520	101.9
530	102.0
540	102.2
550	102.3
560	102.4
570	102.6
580	102.7
590	102.8
600	102.9
610	103.0
620	103.2
630	103.3
640	103.4
650	103.5
660	103.6
670	103.7
680	103.8
690	103.9
700	104.0
710	104.1
720	104.2
730	104.3
740	104.4
750	104.5
760	104.6
770	104.7
780	104.8



Pannier Corporation

Health and Safety Handbook

Marking System Group



Hearing Conservation

Original Date:	Section:	Revision date:	Page:
7/2/2009	19	5/20/2013	12 of 13

790	104.9
800	105.0
810	105.1
820	105.2
830	105.3
840	105.4
850	105.4
860	105.5
870	105.6
880	105.7
890	105.8
900	105.8
910	105.9
920	106.0
930	106.1
940	106.2
950	106.2
960	106.3
970	106.4
980	106.5
990	106.5
999	106.6

[If an employee has experienced a significant threshold shift (STS), retain the following guidance for estimating hearing protector attenuation with this Plan. Otherwise, you may cut it from this Plan and save it as a separate document for future use.]

Methods for Estimating the Adequacy Of Hearing Protector Attenuation

29 CFR 1910.95, Appendix B

For employees who have experienced a significant threshold shift, hearing protector attenuation must be sufficient to reduce employee exposure to a time-weighted average (TWA) of 85 decibels (dB). Select one of the methods described below to estimate the adequacy of hearing protector attenuation.

Noise Reduction Rating (NRR)

The most convenient method is the NRR developed by the Environmental Protection Agency (EPA). According to EPA regulation, the NRR must be shown on the hearing protector package. The NRR is then related to an individual worker's noise environment in order to assess the adequacy of the attenuation of a given hearing protector. This section describes six methods of using the NRR to determine whether a particular hearing protector provides adequate protection within a given exposure environment. Selection among the six procedures is dependent on the employer's noise measuring instruments.

Instead of using the NRR, employers may evaluate the adequacy of hearing protector attenuation by using one of the three procedures developed by the National Institute for Occupational Safety and Health (NIOSH), which are described in the "List of Personal Hearing Protectors and Attenuation Data," HEW Publication No. 76-120, 1975, pages 21 to 37. These procedures are known as:

- NIOSH method 1B1
- NIOSH method 1B2
- NIOSH method 1B3



Pannier Corporation

Health and Safety Handbook

Marking System Group



Hearing Conservation

Original Date:	Section:	Revision date:	Page:
7/2/2009	19	5/20/2013	13 of 13

The fourth procedure is an NRR that is a simplification of NIOSH method 1B2.

NOTE: The most complex method is NIOSH method 1B1, which is probably the most accurate method since it uses the largest amount of spectral information from the individual employee's noise environment. As in the case of the NRR method described below, if one of the NIOSH methods is used, the selected method must be applied to an individual's noise environment to assess the adequacy of the attenuation. Employers should be careful to take a sufficient number of measurements in order to achieve a representative sample for each time segment.

Remember that calculated attenuation values reflect realistic values only to the extent that the protectors are properly fitted and worn.

NRR Methods

When using the NRR to assess hearing protector adequacy, one of the following methods must be used.

Method 1—When using a dosimeter that is capable of C-weighted measurements:

- Obtain the employee's C-weighted dose for the entire work shift, and convert to TWA (see Appendix A, II).
- Subtract the NRR from the C-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.

Method 2—When using a dosimeter that is not capable of C-weighted measurements, the following method may be used:

- Convert the A-weighted dose to TWA (see Appendix A).
- Subtract 7 dB from the NRR.
- Subtract the remainder from the A-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.

Method 3—When using a sound level meter set to the A-weighting network:

- Obtain the employee's A-weighted TWA.
- Subtract 7 dB from the NRR, and subtract the remainder from the A-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.

Method 4—When using a sound-level meter set on the C-weighting network:

- Obtain a representative sample of the C-weighted sound levels in the employee's environment.
- Subtract the NRR from the C-weighted average sound level to obtain the estimated A-weighted TWA under the ear protector.

Method 5—When using area monitoring procedures and a sound-level meter set to the A-weighting network:

- Obtain a representative sound level for the area in question.
- Subtract 7 dB from the NRR and subtract the remainder from the A-weighted sound level for that area.

Method 6—When using area monitoring procedures and a sound-level meter set to the C-weighting network:

- Obtain a representative sound level for the area in question.
- Subtract the NRR from the C-weighted sound level for that area.