

# 3 HEARING PROTECTION

4  
5 NIST S 7101.55

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7 Effective Date: 04/01/2015  
8  
9

## 10 1. PURPOSE

11 The purpose of the NIST Hearing Protection Program (HPP) is to reduce the risk of occupational  
12 hearing loss through recognition, evaluation, and control of workplace noise-related hazards.  
13

## 14 2. BACKGROUND

15 a. NIST must meet or exceed the requirements established by OSHA in [29 Code of Federal](#)  
16 [Regulations \(CFR\) 1910.95](#), Occupational Noise Exposure. Implementation of this suborder  
17 through the requirements in Section 6 and the roles and responsibilities in Section 9 exceeds  
18 those requirements.  
19

20  
21 b. This suborder supersedes NIST Health and Safety Instruction (HSI) 4, Hearing Conservation  
22 Program, March 1992.  
23  
24

## 25 3. APPLICABILITY

26 This suborder applies to NIST employees and associates who, in the conduct of their official  
27 duties, could receive noise doses that equal or exceed NIST noise dose limits, defined in Section  
28 6a. It also addresses nuisance noise, defined in Section 7.  
29  
30

## 31 4. REFERENCES

32 a. [29 CFR 1910.95](#), Occupational Noise Exposure  
33

34 b. [29 CFR 1904.10](#), Recording of Cases Involving Occupational Hearing Loss  
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<sup>1</sup> The revision history for this document can be found in Appendix A.

- 36 c. American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit  
37 Values: Documentation of the Threshold Limit Values for Physical Agents, 2001, 7<sup>th</sup> Ed.  
38
- 39 d. Criteria for a Recommended Standard, Occupational Noise Exposure; Department of Health  
40 and Human Services [National Institute for Occupational Safety and Health (NIOSH)]  
41 Publication Number 98-126  
42
- 43 e. American National Standard, Acoustical Terminology, American National Standards  
44 Institute (ANSI) S1.1-1994 (R2004)  
45
- 46 f. American National Standard, Specification for Sound-Level Meters, ANSI S1.4-1983  
47 (R2006)/ANSI S1.4A-1985 (R2006)  
48
- 49 g. [OSHA Publication 3074](#), “Hearing Conservation,” revised edition, 2002  
50  
51

## 52 **5. APPLICABLE NIST OCCUPATIONAL SAFETY AND HEALTH SUBORDERS**

- 53 a. NIST S 7101.20: Work and Worker Authorization Based on Hazard Reviews;  
54
- 55 b. NIST S 7101.21: Personal Protective Equipment;  
56
- 57 c. NIST S 7101.23: Safety Education and Training; and  
58
- 59 d. NIST S 7101.22: Hazard Signage.  
60  
61

## 62 **6. REQUIREMENTS<sup>2</sup>**

63 Requirements include the specification of NIST noise dose limits; hazard identification; hazard  
64 assessment; control methods, including hearing protection devices (HPDs) selected by competent  
65 persons; use of HPDs; audiometric testing; re-review of activity hazard reviews; training; noise-  
66 monitoring records; communication; and buy-quiet initiative, all implemented to ensure that  
67 employees and associates do not receive noise doses that equal or exceed NIST noise dose limits.  
68 In essence, if potential noise doses equal or exceed NIST noise dose limits, engineering or  
69 administrative controls must be implemented. If such controls fail to reduce potential noise doses  
70 to less than NIST noise dose limits, HPDs must be provided and used to reduce potential noise  
71 doses to less than NIST noise dose limits.<sup>3</sup>

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<sup>2</sup> The requirements in this section apply to employees and associates who, in the conduct of their official duties, could receive noise doses that equal or exceed NIST noise dose limits, and their management.

<sup>3</sup> The requirements delineated below for noise doses that equal or exceed NIST noise dose limits, augmented by the responsibilities in Section 9, constitute NIST’s Hearing Conservation Program. NIST’s Hearing Conservation Program is more protective than that specified by OSHA in 29 CFR 1910.95(c), Hearing Conservation Program.

72 a. NIST Noise Dose Limits

73  
 74 (1) Unprotected employees and associates shall not be exposed, during a work day, to noise  
 75 levels above 80 dBA for durations that would result in their receiving noise doses, D,  
 76 that equal or exceed 100%, where D is calculated from:

$$77 \quad D = [(C_1/T_1) + (C_2/T_2) + \dots + (C_n/T_n)] \times 100\%.$$

78  
 79 Here,  $C_i$  is the total exposure time, during a work day, at a specified noise level  $L_i$  ( $\geq 80$   
 80 dBA), and  $T_i$  is the time exposure limit at that noise level calculated from the following  
 81 equations:  
 82

$$83 \quad T = 8 / 2^{(L - 85)/5} \text{ for } 80 \leq L < 85$$

$$84 \quad T = 8 / 2^{(L - 85)/3} \text{ for } L \geq 85,$$

85  
 86  
 87 with L measured on the A-scale of a standard sound-level meter set at SLOW response  
 88 and T measured in hours.<sup>4</sup> Use of these equations yields the following time exposure  
 89 limits, T, at different sounds levels, L:  
 90

91

L (dBA)	T (h)
80	16
81	13.93
82	12.13
83	10.56
84	9.19
85	8
86	6.35
87	5.04
88	4
89	3.17
90	2.52
91	2
92	1.59
93	1.26
94	1

<sup>4</sup> The equation for  $L > 85$  dBA corresponds to that for the time exposure limits established by ACGIH. The equation for  $80 \text{ dBA} \leq L < 85 \text{ dBA}$  corresponds to that for the action levels established by OSHA in 29 CFR 1910.95(c). Its use in that range, rather than the equation for  $L \geq 85$  dBA, is necessary to ensure compliance by NIST with the requirements of 29 CFR 1910.95(c) for exposure times greater than 8 hours.

97	0.5
100	0.25
103	0.13
106	0.06
109	0.03
112	0.02
...	...

92  
93  
94  
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121

(2) Protected employees and associates shall not be exposed to noise levels that would result in their receiving noise doses that equal or exceed 100%, taking into account the attenuation provided by the use of HPDs.

b. Hazard Identification

(1) If a concern arises<sup>5</sup> regarding potential noise hazards in an already ongoing activity, a consultation shall be scheduled as soon as possible with a competent person to determine if noise doses could equal or exceed 100%.<sup>6</sup>

(2) If the hazard review of a new activity identifies potential noise hazards, a consultation shall be scheduled with a competent person to determine if noise doses could equal or exceed 100%.

(3) If the hazard review of a change in an existing activity identifies new noise hazards or potential increases in previously identified noise hazards, a consultation shall be scheduled with a competent person to reevaluate potential noise doses.

c. Hazard Assessment

(1) If consultation with a competent person indicates that noise doses could equal or exceed 100%, arrangements shall be made for a competent person to conduct noise monitoring to determine the noise dose.

<sup>5</sup> Such a concern could be raised by any individual, e.g., a worker, a coworker, a supervisor, a Division Safety Representative, or a competent person.

<sup>6</sup> For definitions of "Potential Noise Hazard," "Noise Hazard," and "Competent Person," see Section 7.

122 d. Control Methods

123

124 (1) Noise Doses that Equal or Exceed 100%

125

126 (a) Feasible<sup>7</sup> engineering or administrative controls (such as noise-attenuating devices,  
127 worker relocation, and reduced exposure times) shall be implemented in an effort to  
128 reduce noise doses to less than 100%.

129

130 (b) If feasible engineering and administrative controls fail to reduce noise doses to less  
131 than 100%, HPDs identified by a competent person as providing sufficient noise  
132 attenuation shall be provided and used to reduce noise doses to less than 100%.

133

134 (3) Nuisance Noise

135

136 (a) If practicable, engineering and administrative controls should be implemented to  
137 reduce nuisance noise or exposure to nuisance noise.

138

139 (b) HPDs may be used to reduce exposure to nuisance noise provided that their use does  
140 not impede the ability of employees and associates to engage in necessary  
141 communications or to hear alarms or other notifications. Decisions to wear HPDs to  
142 reduce nuisance noise should be made on a case-by-case basis.

143

144 e. Use of HPDs

145

146 (1) HPDs other than ear muffs shall not be traded or shared in work areas in which  
147 unprotected employees and associates would receive noise doses that equal or exceed  
148 100%.

149

150 (2) Ear muffs traded or shared in work areas in which unprotected employees and associates  
151 would receive noise doses that equal or exceed 100% shall be sanitized between uses.

152

153 (3) The use of audio headphones or ear buds in place of, or in conjunction with, HPDs is  
154 prohibited.<sup>8</sup>

155

156

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<sup>7</sup> OSHA currently considers feasible engineering and administrative controls to be those for which the costs of such controls are less than the cost of an effective Hearing Conservation Program.

<sup>8</sup> OSHE may waive this requirement on a case-by-case basis, e.g., in the case of headphones which have been rated by ANSI for noise reduction and which have been determined by a competent person to provide sufficient noise attenuation.

158 f. Audiometric Testing

159

160 (1) All employees and associates required to wear HPDs to reduce noise doses to less than  
161 100% shall be subject to the following audiometric testing requirements:

162

163 (a) Within 30 days of it being determined that an employee must wear HPDs, the  
164 employee must receive an audiogram administered by the Health Unit and to be used  
165 as the baseline against which subsequent audiograms are compared.

166

167 (b) Employees and associates required to wear HPDs must receive annual audiograms  
168 administered or arranged by the Health Unit.

169

170 (c) All baseline and repeat annual audiograms shall be preceded by at least 14 hours  
171 without exposure to workplace noise at levels above 80 dBA and should be preceded  
172 by at least 14 hours without exposure to non-workplace noise at levels above 80  
173 dBA.<sup>9</sup>

174

175 (d) If an employee's annual audiogram shows a NIOSH significant threshold shift  
176 (NSTS) or an OSHA standard threshold shift (OSTS), the employee must receive a  
177 repeat audiogram administered by the Health Unit within 30 days.

178

179 g. Re-Review of Activity Hazard Reviews

180

181 (1) Upon determination by the Health Unit that an OSTS has occurred, the applicable activity  
182 hazard review shall be re-reviewed in accordance with the requirements of the Hazard  
183 Review suborder.

184

185 (2) As part of the re-review of the hazard review, a consultation shall be scheduled with a  
186 competent person to re-evaluate the noise exposures of affected employees and  
187 associates.

188

189 h. Training

190

191 (1) Training provided by OSHE on the NIST HPP shall be completed annually by employees  
192 and associates required to wear HPDs to reduce noise doses to less than 100%.

193

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<sup>9</sup>When at least 14 hours without exposure to workplace noise cannot be achieved, HPDs identified previously by a competent person may be used as a substitute during that period for the requirement that baseline audiograms be preceded by at least 14 hours without exposure to workplace noise.

194 (2) Retraining provided by OSHE on the NIST HPP, including refitting of HPDs, should be  
195 completed by each employee who has been notified by the Health Unit that he or she has  
196 suffered a NSTS.

197  
198 (3) Retraining provided by OSHE on the NIST HPP, including refitting of HPDs, shall be  
199 completed by each employee who has been notified by the Health Unit that he or she has  
200 suffered an OSTs.

201  
202 (4) One-time-only training provided by OSHE on the NIST HPP shall be completed by  
203 Official First-Level Supervisors of employees and associates required to wear HPDs to  
204 reduce noise doses to less than 100%.

205  
206 (5) One-time training provided by OSHE on the NIST HPP should be completed by  
207 employees and associates exposed to nuisance noise who elect, or who are mandated by  
208 their management, to wear HPDs.

209  
210 (6) Training shall be recorded in accordance with the requirements of the NIST Safety  
211 Education and Training Program, and training records made available to affected  
212 employees and associates upon request.

213  
214 i. Noise-Monitoring Records

215  
216 (1) The results of hazard assessments, i.e., the results of consultations, including the results  
217 of sound-level-meter screening surveys, noise monitoring, identified engineering and  
218 administrative controls, and required HPDs, shall be noted, referenced, or included as  
219 part of the activity-hazard-review documentation.

220  
221 (2) Noise-monitoring results requiring employees and associates to wear HPDs to reduce  
222 noise doses to less than 100% shall be provided to the Health Unit for inclusion in  
223 employee medical files.

224  
225 j. Communication

226  
227 (1) Hazard signage shall be posted at entrances to areas in which administrative controls or  
228 HPDs are required to reduce noise doses to less than 100%. Hazard signage shall clearly  
229 indicate the noise hazard and state the required administrative controls and HPDs.  
230 Appendix B provides an example of hazard signage meeting these requirements.

231  
232 (2) Electronic or hard copies of this suborder and of [29 CFR 1910.95](#) shall be made available  
233 to affected employees and associates or their representatives.

234 k. Buy-Quiet Initiative

235

236 (1) Manufacturers' noise specifications should be evaluated by a competent person prior to  
237 the purchase of equipment capable of producing noise hazards. If a quieter alternative is  
238 available, it should be considered; if not, the use of noise-attenuating devices should be  
239 considered.

240

241

## 242 7. DEFINITIONS

243 a. Audibility Threshold – The sound intensity at a given frequency which is the minimum  
244 perceptible by a normal human ear under specified standard conditions.

245

246 b. Audiogram – A chart, graph, or table resulting from an audiometric test showing an  
247 individual's hearing levels as a function of frequency.

248

249 c. Audiologist – A professional specializing in the study and rehabilitation of hearing, and  
250 certified by the American Speech-Language-Hearing Association or licensed by a state board  
251 of examiners.

252

253 d. Audiometric Test – A clinical evaluation of a person's hearing capacity using a calibrated,  
254 pure-tone audiometer and performed in accordance with OSHA 29 CFR 1910.95(g) and (h).

255

256 e. Baseline Audiogram – An audiogram that is preceded by a 14-hour period of quiet and  
257 obtained from an audiometric examination administered before employment or within the  
258 first 30 days of employment.

259

260 f. Certified Industrial Hygienist (CIH) – An individual who is board certified by the American  
261 Board of Industrial Hygiene and has met the minimum requirements for education,  
262 experience, and through examination has demonstrated a minimum level of knowledge in  
263 occupational health subject areas such as hearing protection.

264

265 g. Certified Safety Professional (CSP) – An individual who is board certified by the Board of  
266 Certified Safety Professionals and has met the professional challenge of demonstrating  
267 competency through education, experience, and examination.

268

269 h. Competent Person – A CIH or CSP in the NIST Office of Safety, Health and Environment  
270 (OSHE) or another NIST Organizational Unit (OU), a consultant CIH or CSP, or an  
271 individual directed by a CIH or CSP, who is capable of recognizing, controlling, and  
272 evaluating potential occupational hazards.

273

- 274 i. dB – Decibel. See Sound Pressure Level.  
275
- 276 j. dBA – Unit representing the sound level measured in dB on the A-weighted scale of a sound-  
277 level meter. The A-weighted scale closely resembles how the human ear perceives common  
278 sounds.  
279
- 280 k. dB(C) – Unit representing the sound level measured in dB on the C-weighted scale of a sound-  
281 level meter. The C-weighted scale represents how the human ear perceives sound at high  
282 sound levels.  
283
- 284 l. Frequency – The number of cycles of a periodic motion per unit time. The SI unit of  
285 frequency is Hertz (Hz).  
286
- 287 m. Hearing Protection Device (HPD) - A type of personal protective equipment specifically  
288 designed to prevent hearing damage. Earplugs and earmuffs are the most common hearing  
289 protection devices.  
290
- 291 n. Hertz (Hz) – Unit of measurement of frequency, numerically equal to cycles/second (c/s).  
292
- 293 o. Intermittent Noise – Noise levels that are interrupted by intervals of relatively low sound  
294 levels.  
295
- 296 p. NIOSH Significant Threshold Shift (NSTS) – An increase in an individual’s audibility  
297 threshold value of 15 dB or more at any of the frequencies 500, 1000, 2000, 3000, 4000, or  
298 6000 Hz, in either ear, from the baseline audiogram to the current audiogram.  
299
- 300 q. Noise Dosimeter – An instrument that integrates cumulative noise exposure over time and  
301 directly indicates noise dose. Noise dosimeters are used to conduct noise monitoring during a  
302 work day or monitoring period.  
303
- 304 r. Noise Hazard – Sound within the audible frequency range heard by the human ear (20 –  
305 20,000 Hertz) at levels that, without controls, would result in employees and associates  
306 receiving noise doses that equal or exceed NIST noise dose limits (see Section 6a).  
307
- 308 s. Noise Monitoring – Process or method of measuring a person’s individual exposure to noise  
309 levels over a given time period.  
310
- 311 t. Nuisance Noise – Noise which would not result in employees and associates receiving noise  
312 doses that equal or exceed NIST noise dose limits (see Section 6a) but which is capable of  
313 causing discomfort.

- 314 u. Octave Band Analyzer – A type of sound-level meter that can separate monitored noise  
315 levels into specific frequency bands.  
316
- 317 v. OSHA-Recordable Standard Threshold Shift – An OSTS in an individual with an overall  
318 hearing level of 25 dB or more above audiometric zero, averaged at the frequencies 2000,  
319 3000, and 4000 Hz in the same ear as the OSTS, that has been determined by an audiologist  
320 or physician to be workplace-noise induced.  
321
- 322 w. OSHA Standard Threshold Shift (OSTS) – An increase of 10 dB or more in the average of an  
323 individual’s audibility threshold values at the frequencies 2000, 3000, and 4000 Hz, in either  
324 ear, from the baseline audiogram to the current audiogram.  
325
- 326 x. Peak Noise Level – The highest instantaneous sound pressure level recorded during a  
327 measurement interval. Peak measurements are independent of noise dosimeter settings for  
328 response rate or weighting. According to [29 CFR 1910.95](#), unprotected employees and  
329 associates may not be exposed to peak noise levels greater than 140 dBC.  
330
- 331 y. Potential Noise Hazard – Sound within the audible frequency range heard by the human ear  
332 (20 – 20000 Hertz) that makes it difficult to have a conversation with someone three feet  
333 away, or has resulted in a complaint by one or more employees and associates, and to which  
334 there is a reasonable likelihood that employees and associates could be exposed.  
335
- 336 z. Sound-Level Meter – An instrument used to measure noise levels. A Type 1 sound-level  
337 meter is used for precision measurements in the field, and a Type 2 sound level-meter is used  
338 for general-purpose measurements.  
339
- 340 aa. Sound Pressure – The root-mean-square instantaneous sound pressure at a point during a  
341 given time interval.  
342
- 343 bb. Sound Pressure Level (dB) – Ten times the logarithm to the base ten of the ratio of the time-  
344 mean-square sound pressure, in a stated frequency band, to the square of the reference sound  
345 pressure in gases of 20  $\mu$ Pa.  
346
- 347 cc. Temporary Threshold Shift – A temporary shift in an ear’s audibility threshold possibly  
348 caused by exposure to high-intensity acoustic stimuli. It also may be caused by the use of  
349 aspirin or other drugs.  
350
- 351 dd. Unprotected Employee – An employee not wearing hearing protection devices.  
352  
353

354 **8. ACRONYMS**

355 a. ACGIH – American Conference of Governmental Industrial Hygienists

356

357 b. ANSI – American National Standards Institute

358

359 c. CFR – Code of Federal Regulations

360

361 d. CIH – Certified Industrial Hygienist

362

363 e. CSP – Certified Safety Professional

364

365 f. HPD – Hearing Protection Device

366

367 g. HPP – Hearing Protection Program

368

369 h. NIOSH – National Institute of Occupational Safety and Health

370

371 i. NIST – National Institute of Standards and Technology

372

373 j. NSTS – NIOSH Significant Threshold Shift

374

375 k. OSHE – Office of Safety, Health, and Environment

376

377 l. OU – Organizational Unit

378

379 m. STS – Standard Threshold Shift

380

381

382 **9. ROLES AND RESPONSIBILITIES**

383 a. Employees and Associates Engaged in Activities that Could Result in Their Receiving Noise  
384 Doses that Equal or Exceed 100%:

385

386 (1) If a concern arises regarding potential noise hazards in an already ongoing activity,  
387 schedule a consultation with a competent person as soon as possible to determine if noise  
388 doses could equal or exceed 100%;

389

390 (2) If the hazard review of a new activity identifies potential noise hazards, schedule a  
391 consultation with a competent person to determine if noise doses could equal or exceed  
392 100%;

393

- 394 (3) If the hazard review of a change in an existing activity identifies new noise hazards or  
395 potential increases in previously identified noise hazards, schedule a consultation with a  
396 competent person to reevaluate potential noise doses;  
397
- 398 (4) Inform Official First-Level Supervisors of any consultations scheduled with competent  
399 persons and of the results of those consultations;  
400
- 401 (5) If consultation with a competent person indicates that noise dose could equal or exceed  
402 100%, arrange for a competent person to conduct noise monitoring to determine the noise  
403 dose;  
404
- 405 (6) If the noise dose equals or exceeds 100%, implement feasible engineering or  
406 administrative controls (such as noise-attenuating devices, worker relocation and reduced  
407 exposure times) in an effort to reduce noise doses to less than 100%;  
408
- 409 (7) If feasible engineering and administrative controls fail to reduce noise doses to less than  
410 100%, use HPDs identified by a competent person to reduce noise doses to less than  
411 100%; and  
412
- 413 (8) Ensure that the results of hazard assessments, i.e., the results of consultations, including  
414 the results of sound-level-meter screening surveys, noise monitoring, identified  
415 engineering and administrative controls, and required HPDs, are noted, referenced, or  
416 included as part of the activity-hazard-documentation.  
417
- 418 b. Employees and Associates Required to Wear HPDs to Reduce Noise Doses to Less than  
419 100% (in addition to the responsibilities of above):  
420
- 421 (1) Use their HPDs in accordance with the requirements of the activity hazard review and  
422 their training on HPD fit, use, and care;  
423
- 424 (2) Participate in audiometric testing as specified in Section 9f;  
425
- 426 (3) Complete the annual training provided by OSHE on the NIST HPP;  
427
- 428 (4) Upon being notified by the Health Unit that they have suffered a NSTS, strongly consider  
429 completing the retraining provided by OSHE on the NIST HPP, including refitting of  
430 their HPDs, or complete this training if it is assigned to them by their official first-level  
431 supervisors; and  
432

- 433 (5) Upon being notified by the Health Unit that they have suffered an OSTs, complete the  
434 retraining provided by OSHE on the NIST HPP, including refitting of their HPDs.  
435
- 436 c. Official First-Level Supervisors of Any of the Above Employees and Associates:  
437
- 438 (1) Ensure that competent persons from outside of OSHE engaged by the OU to conduct  
439 hazard assessments and specify HPDs understand the responsibilities delineated below  
440 for competent persons;  
441
- 442 (2) Provide the results of hazard assessments resulting in employees and associates being  
443 required to use HPDs to all such affected employees and associates, the OSHE Hearing  
444 Program Protection Manager, and the Health Unit for inclusion in employee medical  
445 files;  
446
- 447 (3) Ensure that the results of hazard assessments are noted, referenced, or included as part of  
448 the activity-hazard-review documentation;  
449
- 450 (4) Make electronic or hard copies of this suborder and of [29 CFR 1910.95](#) available to  
451 those employees and associates who are required to wear HPDs, or their representatives;  
452
- 453 (5) Provide affected employees and associates with HPDs identified by competent persons  
454 as providing sufficient noise attenuation, at no cost to affected employees and  
455 associates;  
456
- 457 (6) Provide affected employees and associates the opportunity to select HPDs from a variety  
458 of suitable HPDs;  
459
- 460 (7) Assign training to affected employees and associates in accordance with the  
461 requirements in Section 6h;  
462
- 463 (8) When employees and associates they supervise are required to wear HPDs, complete the  
464 one-time only training provided by OSHE on the NIST HPP;  
465
- 466 (9) Make training records available to affected employees and associates upon request;  
467
- 468 (10) Ensure that hazard signage meeting the requirements of Section 9j is posted at entrances  
469 to areas in which administrative controls or HPDs are required; And  
470
- 471 (11) Upon being notified by the Health Unit that employees and associates they supervise  
472 have suffered workplace-noise-induced OSTs, ensure that all applicable activity hazard

473 reviews are re-reviewed in accordance with the requirements of the Hazard Review  
474 suborder, and, as part of the re-reviews, that consultations with competent persons are  
475 scheduled to re-evaluate the noise exposures of affected employees and associates.  
476

477 d. Employees and Associates Exposed to Nuisance Noise:

478  
479 (1) Strongly consider completing the one-time-only training prescribed by OSHE on the  
480 NIST HPP.

481

482 e. OSHE Hearing Protection Program Manager:

483

484 (1) Ensure that training provided by OSHE on the HPP is available and includes, at a  
485 minimum:

486

487 (a) An overview of the NIST HPP;

488

489 (b) Physical and psychological effects of noise and hearing loss;

490

491 (c) Recognition of noise hazards;

492

493 (d) Noise control principles:

494

495 i. Engineering controls;

496

497 ii. Administrative controls, including hazard signage; and

498

499 iii. HPDs, including selection, fit, use, and care; and

500

501 (e) Overview of audiometric-testing requirements;

502

503 (2) Ensure that training provided by OSHE on the HPP is documented in NIST's electronic  
504 safety training application;

505

506 (3) Ensure that non-web-based training provided by OSHE on the HPP and completed by  
507 affected employees and associates is recorded in NIST's electronic safety training  
508 application;

509

510 (4) Ensure that all OSHA-recordable OSTs are recorded on the OSHA 300 log maintained  
511 by OSHE in accordance with the requirements of [29 CFR 1904.10](#), Recording of Cases  
512 Involving Occupational Hearing Loss; and

513 (5) Assist NIST staff in the development of signage that complies with the requirements of  
514 this suborder and the NIST Hazard Signage Program.

515

516 f. Competent Persons:

517

518 (1) Consult with potentially affected employees and associates to determine if noise doses  
519 could equal or exceed 100%;

520

521 (2) When it has been determined that noise doses could equal or exceed 100%, conduct noise  
522 monitoring, document the results in writing, and provide those results to the employee  
523 who scheduled the assessment and his or her Official First-Level Supervisor;

524

525 (3) When conducting noise monitoring, inform affected employees and associates in areas  
526 being monitored, along with any designated employee representatives, of the purpose of  
527 the noise monitoring and provide them with the opportunity to observe noise-monitoring  
528 activities;

529

530 (4) When employees and associates are required to wear HPDs to reduce noise doses to less  
531 than 100%, specify the necessary protection in accordance with [29 CFR 1910.95](#),  
532 [Appendix B](#): "Methods for Estimating the Adequacy of Hearing Protection Attenuation";

533

534 (5) Recommend a variety of suitable HPDs for selection and proper fit; and

535

536 (6) If noise monitoring identifies a potential noise hazard or a potential increase in a  
537 previously identified noise hazard, work with affected employees and associates to ensure  
538 that noise doses do not equal or exceed 100%;

539

540 (7) Ensure that:

541

542 (a) Noise screening and octave-band analysis is conducted using ANSI Type 1 or Type 2  
543 sound-level meters;

544

545 (b) Noise monitoring is conducted using ANSI Type 2 noise dosimeters;

546

547 (c) Noise dosimeters used for noise monitoring integrate all sound levels between 80  
548 dBA and 130 dBA and measure peak sound levels up to and including 140 dB; and

549

549 (d) Sound-level meters and noise dosimeters are calibrated at least annually and  
550 according to manufacturers' specifications; and

551

552 (8) Re-evaluate the noise exposures of employees and associates who have suffered  
553 workplace-noise-induced OSTs.

554

555 g. Each Health Unit:

556

557 (1) Maintain an audiometric testing program in accordance with 29 CFR 1910.95(g),  
558 Audiometric Testing Program;<sup>10</sup>

559

560 (a) Notify employees and associates that during the 14-hour period immediately  
561 preceding a baseline or repeat annual audiometric examination, they must avoid  
562 exposure to workplace noise at levels above 80 dBA and should avoid exposure to  
563 non-workplace noise at levels above 80 dBA;

564

565 (2) Conduct audiometric tests in accordance with 29 CFR 1910.95(h), Audiometric Test  
566 Requirements;

567

568 (3) Determine whether NSTs and OSTs have occurred, and upon determining that they  
569 have, notify affected employees and associates, affected employees' and associates'  
570 Official First-Level Supervisors, OU Safety Coordinators, and the OSHE Hearing  
571 Protection Program Manager in writing within 21 days;

572

573 (4) Upon determining that OSTs have occurred, arrange for audiological evaluations as  
574 necessary to assist in determining whether the OSTs are workplace-noise induced;

575

576 (5) Upon determining that OSTs are workplace-noise induced, notify affected employees  
577 and associates, affected employees and associates' Official First-Level Supervisors, OU  
578 Safety Coordinators, and the OSHE Hearing Protection Program Manager; and

579

580 (6) Maintain audiometric test records in accordance with 29 CFR 1910.95(m),  
581 Recordkeeping.

582

583

## 584 **10. AUTHORITIES**

585 There are no authorities specific to this suborder alone.

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<sup>10</sup> NIST does not use age correction to attempt to differentiate between hearing losses caused by age-related factors and those caused by noise exposures.

589 **11. DIRECTIVE OWNER**

590 Chief Safety Officer

591

592

593 **12. APPENDICES**

594 a. Appendix A. Revision History

595 b. Appendix B. Hazard Signage



596

597  
598

### Appendix A. Revision History

Revision	Date	Responsible Person	Description of Change
0	03/20/2014	Amber Carlberg	None – Initial suborder approval
1	02/06/2015	Richard Kayser	<ol style="list-style-type: none"><li>1. Addition of Revision History in Appendices.</li><li>2. Revisions throughout to include NIST associates.</li><li>3. Addition of NIOSH Significant Threshold Shift.</li><li>4. Inclusion of statement that it is NIST policy not to use age-correction factors.</li><li>5. Addition of audiological evaluations to assist in making determinations of work-relatedness.</li></ol>
2	01/07/2021	April Camenisch	Updated suborder links.

599

 <b>WARNING</b>	
<b>NOISE HAZARD</b>	
EXCEEDS REGULATORY NOISE LIMITS DURING EQUIPMENT OPERATION	
CAN CAUSE NOISE-INDUCED HEARING LOSS	
DO NOT EXCEED 2 HOURS IN ROOM DURING EQUIPMENT OPERATION	
WEAR EAR PROTECTION	
MINIMUM NOISE REDUCTION RATING (NRR) REQUIRED FOR DUAL EAR PROTECTION: EAR PLUGS (NRR 33), EAR MUFFS (NRR 28)	