Industrial Hygiene (Noise) Monitoring Reports Submission e-Services updated 24 March 2014

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Ministry of Manpower

A Great Workforce A Great Workplace
Reports Submission Requirements

• Submission of noise monitoring report once every 3 years in accordance with regulations 7 of the WSH (Noise) Regulations 2011

1. Noise monitoring report (template) – refer to Annex B of Hearing Conservation Programme Guideline, Page 40
ELECTRONIC SUBMISSIONS OF INDUSTRIAL HYGIENE (NOISE) MONITORING REPORT
Features of Hygiene (Noise) e-Services

• Majority of features remain unchanged
  – Report can be submitted either by the appointed e-service account user OR the competent person conducting the monitoring
  – Monitoring report must be tagged to a workplace number
  – The person submitting the report must log in using his/her SingPass

• New requirements during submission
  – Users are now required to key in date of calibration of the instrument
  – There is a shift in emphasis from Area Monitoring to a combination of Area and Personal Monitoring
  – Users are also required to provide information on the status of implementation of in-plant Hearing Conservation Programme
Personal Monitoring based on SEG

- Competent persons are required to group workers into Similar Exposure Groups (SEG) for personal monitoring.
- Personal monitoring should cover a major part of the worker’s work day, ~80% of work shift.
- All workers in the same SEG are assumed to have the same noise exposure throughout the day.
- Workers from each SEG are randomly selected for personal monitoring and the minimum required number of workers is based on the table below.

<table>
<thead>
<tr>
<th>No. of workers in SEG (N)</th>
<th>7-8</th>
<th>9-11</th>
<th>12-14</th>
<th>15-18</th>
<th>19-26</th>
<th>27-43</th>
<th>44-50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum no. of personal monitoring required (n)</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
</tbody>
</table>

Table 4: Sample Size for Top 20% and Confidence 0.95.

Note: Use n=N if N≤6
Step-by-Step Guide to Electronic Submissions of Industrial Hygiene (Noise) Monitoring Report

1. Full support on IE version 6, 7, 8 and 9, Firefox 16.0, Opera 12.0 (Windows version), Chrome 22.0, Safari 5.1

2. To update competent person (s) contact details, please download the form from the link below and email it back to us.

1. Information on Monitoring

• Information on noise monitoring must include
  – Date of monitoring
  – Name of representative present during monitoring
  – Details of instruments (calibrator, SLM, dosimeter) used for the monitoring
    • Brand
    • Model
    • Serial Number
    • Type (I/II)
    • Date of last calibration*

*System will prompt the user if the calibration date is 2 years before; or later than the date of monitoring
### Noise Monitoring Report

**Authorised Personnel/e-Service Account User Details**

<table>
<thead>
<tr>
<th>Authorised Personnel :</th>
<th>Ng Zihan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisation conducting the assessment :</td>
<td></td>
</tr>
<tr>
<td>e-Service Account User :</td>
<td>FLORENC</td>
</tr>
<tr>
<td>Contact No. :</td>
<td></td>
</tr>
</tbody>
</table>

**Workplace Monitoring**

**Workplace Details**

| Company Name : | | | |
| Workplace Name : | | | |
| Workplace Address : | | | |
| Workplace Representative : | | | |
| Date Of Monitoring : | | | |
| Workplace Representative Present During Monitoring : | | | |

**Instrumentation**

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Brand</th>
<th>Model</th>
<th>Serial No.</th>
<th>Type</th>
<th>Date of last calibration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Exposure Assessment**

| | | | | | | |

1. User to insert
2. To insert a new instrument, press add
3. All fields compulsory
2. Information on Monitoring Results

- Information on monitoring results must include
  - Area Noise Levels
    - Machine/Equipment
    - Process/Activity
    - No. of persons likely to be exposed
    - $L_{Aeq,T}$ (dBA)
    - Measurement Time, $T$ (mins)
Information on Monitoring Results

— Personal Noise Levels

• Process/Activity
• No. of persons exposed
• Similar Exposure Group no.
• Name of persons exposed
• NRIC/FIN of person monitored
• $L_{A_{eq,T}}$ (dBA)
• Measurement Time, $T$ (mins)
• Duration of Exposure per day (mins)
• $L_{A_{eq,8hr}}$ (dBA)
Example

1. User to insert
2. To insert a new record, press add
3. All fields compulsory, example below
Detailed Assessment - Area

1. **Machine/Equipment**
   - Name of the machine/equipment

2. **Process/Activity**
   - The process/activity that is common to this machine/equipment
   - If user cannot find the process/activity, he/she can select ‘Others’ and this will activate the free text field for entry

3. **No. of persons likely to be exposed**
   - Number of persons that is required to work at or in the vicinity of this machine/equipment

4. **$L_{Aeq,T}$ (dBA)**
   - Noise levels measured by Sound Level Meter or Dosimeter
   - Meter must be calibrated and must conform to the relevant IEC standards, as described in Annex B of Hearing Conservation Programme Guideline, Page 34

5. **Measurement Time, T (mins)**
   - Time required to get a representative reading as described in Annex B of Hearing Conservation Programme Guideline, Page 37
Detailed Assessment – Personal (I)

1. Process/Activity
   – This field is defaulted to ‘Others’ so that the user can enter the process/activity common to this group of workers

2. No. of persons exposed
   – The number of workers who have similar exposure throughout the day

3. Similar Exposure Group no.
   – The group number that was assigned for this group of workers

4. Name of persons exposed
   – The name of the randomly selected worker whose result is to be keyed into as a record
   – Note that if the no. of persons exposed is 10 workers (from step 2), there should be at least 7 unique name records for this SEG
   – The minimum number of workers to include for personal monitoring is indicated in Annex B of Hearing Conservation Programme Guideline, Page 35

5. NRIC/FIN of person monitored
   – Refer to step 4
Detailed Assessment – Personal (Cont’)

1. \( L_{Aeq,T} \) (dBA)
   - Noise levels as measured by Dosimeter
   - Meter must be calibrated and conform to relevant IEC standards, as described in Annex B of Hearing Conservation Programme Guideline, Page 34

2. Measurement Time, \( T \) (mins)
   - The run time of the dosimeter, which should be at least 80% of the time the work shift.

3. Duration of exposure per day (mins)
   - The expected duration that the worker is expected to be working at this process/activity

4. \( L_{Aeq,8hr} \) (dBA)
   - The noise levels of this process/activity normalized to a 8 hour work-day
Example of Exposure Assessment

- After keying in all the monitoring results, your exposure assessment table will look something like the one below.
3. Findings and Recommendations

- The findings and recommendations given by the competent person in the report is to be entered into the system for record keeping.
- The user will also need to provide information regarding the status of the implementation of in-plant Hearing Conservation Programme at the workplace.
### Findings And Recommendations

<table>
<thead>
<tr>
<th>Finding(s)</th>
<th>Recommendation(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add</td>
<td></td>
</tr>
</tbody>
</table>

1. User to insert
2. To insert a new record, press add

### Questionnaire

<table>
<thead>
<tr>
<th>SNo.</th>
<th>Question</th>
<th>*Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Is a Noise Control Officer appointed when more than 50 workers exposed to excessive noise? *Note: Choose N/A if less than 50 workers are exposed to excessive noise.</td>
<td>N/A No Yes</td>
</tr>
<tr>
<td>2</td>
<td>Are workers who are exposed to excessive noise included in the list of workers to be examined for hearing loss (including audiometric examinations) annually?</td>
<td>N/A No Yes</td>
</tr>
<tr>
<td>3</td>
<td>Are workers who are exposed to excessive noise included in the list of workers to be trained annually on the required topics under the WSH (Noise) Regulations?</td>
<td>N/A No Yes</td>
</tr>
<tr>
<td>4</td>
<td>Are warning signs displaying the requirement to wear hearing protectors when working or entering the area displayed?</td>
<td>N/A No Yes</td>
</tr>
<tr>
<td>5</td>
<td>Are workers working in the identified noisy areas provided with the hearing protectors?</td>
<td>N/A No Yes</td>
</tr>
<tr>
<td>6</td>
<td>Are workers instructed on the proper use, care, maintenance and change of the hearing protectors?</td>
<td>N/A No Yes</td>
</tr>
</tbody>
</table>

**HCP Implementation Status:**

1. User to provide information
2. Select N/A if the element is not applicable
3. After providing all information, the system will assigned a status for the HCP implementation
4. Supporting Documents

• The last step is to upload the Noise Monitoring Report that has been compiled and to declare that all information given is true and correct
• The size of the document that can be uploaded is 3MB
• Users can upload multiple files to ensure the report is of reasonable legibility and complete
1. User to insert
2. To insert a new attachment, browse to the location the file is in your computer and click ‘Add’

1. Please remember to tick this box before submitting.
5. Submitting the e-service Form

• After ensuring that all information is true and correct, the user will proceed to submit the report. A successful submission looks something like the one below.

1. A successful submission is tagged with a file reference number.
Useful Equations

• To calculate equivalent sound pressure level

\[ L_{eq,T} = 10 \log \left( \frac{1}{T} \sum t_i \times 10^{\frac{SPL_i}{10}} \right) \]

Where:
- \( L_{eq,T} \) is the equivalent Sound Pressure Level (dBA)
- \( SPL_i \) is the sound pressure level measured
- \( t_i \) is the measurement time for \( SPL_i \)
- \( T \) is the total measurement time (hrs)

• To calculate % Dose

\[ SPL = 85 + 10 \log \left( \frac{D\%}{12.5 \times T} \right) \]

Where:
- \( SPL \) is Sound Pressure Level (dBA)
- \( D\% \) is the percent dose
- \( T \) is the measurement time (hrs)
Example 1 – Calculating %Dose

- A dosimeter measures a worker’s noise exposure for 8 hours at 91 dB(A). The worker works for 8 hours a day.
- Refer to next slide for sample calculations

<table>
<thead>
<tr>
<th>Information</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>$L_{Aeq,T}$ (dBA)</td>
<td>91 dBA</td>
</tr>
<tr>
<td>Measurement time (mins)</td>
<td>480 mins</td>
</tr>
<tr>
<td>Duration of exposure per day (mins)</td>
<td>480 mins</td>
</tr>
<tr>
<td>$L_{Aeq,8hr}$ (dBA)</td>
<td>91 dBA</td>
</tr>
<tr>
<td>% Dose</td>
<td>398%</td>
</tr>
</tbody>
</table>
Sample calculations for Example 1

• For dose calculations

\[ SPL = 85 + 10 \log \left( \frac{D\%}{12.5 \times T} \right) \]

\[ 91 = 85 + 10 \log \left( \frac{D\%}{12.5 \times 8} \right) \]

\[ 6 = 10 \log \left( \frac{D\%}{100} \right) \]

\[ 10^{10} = \left( \frac{D\%}{100} \right)^{6} \]

\[ D\% = 100 \times 10^{10^{6}} \]

\[ D\% = 398\% \]
Example 2 – Calculating $L_{Aeq,8hrs}$ (normal working hours)

- A dosimeter measures a worker’s noise exposure for 7 hours at 86 dBA. The worker usually works for 8 hours a day. Assuming the worker works at the same location for the whole 8 hours

<table>
<thead>
<tr>
<th>Information</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>$L_{Aeq,T}$ (dBA)</td>
<td>86 dBA</td>
</tr>
<tr>
<td>Measurement time (mins)</td>
<td>420 mins</td>
</tr>
<tr>
<td>Duration of exposure per day (mins)</td>
<td>480 mins</td>
</tr>
<tr>
<td>$L_{Aeq,8hr}$ (dBA)</td>
<td>86 dBA</td>
</tr>
<tr>
<td>% Dose</td>
<td>126%</td>
</tr>
</tbody>
</table>
Example 3 – Calculating $L_{Aeq,8\,hrs}$ (normal working hours)

- A dosimeter measures a worker’s noise exposure for 7 hours at 89 dB(A). The worker usually works for 8 hours a day. Assuming the last hour the worker is not exposed to loud noise i.e. below 80 dBA

- Refer to next 2 slides for sample calculations

<table>
<thead>
<tr>
<th>Information</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>$L_{Aeq,T}$ (dBA)</td>
<td>89 dBA</td>
</tr>
<tr>
<td>Measurement time (mins)</td>
<td>420 mins</td>
</tr>
<tr>
<td>Duration of exposure per day (mins)</td>
<td>420 mins</td>
</tr>
<tr>
<td>$L_{Aeq,8hr}$ (dBA)</td>
<td>88 dBA</td>
</tr>
<tr>
<td>% Dose</td>
<td>199%</td>
</tr>
</tbody>
</table>
Sample calculations for Example 3

• For $L_{eq,8hr}$ calculations

$$L_{eq,8hr} = 10 \log \left[ \frac{1}{T} \sum t_i \times 10^{\frac{SPL_i}{10}} \right]$$

$$L_{eq,8hr} = 10 \log \left[ \frac{1}{8} \left( 7 \times 10^{10} + 1 \times 10^{10} \right) \right]$$

$L_{eq,8hr} = 88$ dBA
Example 4 – Calculating $L_{A_{eq}, 8\, \text{hrs}}$ (overtime work)

- A dosimeter measures a worker’s noise exposure for 9 hours at 89 dBA. The worker usually works for 10 hours a day. Assuming the worker works at the same location for the whole 10 hours.

- Refer to next 2 slides for sample calculations

<table>
<thead>
<tr>
<th>Information</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>$L_{A_{eq}, T}$ (dBA)</td>
<td>89 dBA</td>
</tr>
<tr>
<td>Measurement time (mins)</td>
<td>540 mins</td>
</tr>
<tr>
<td>Duration of exposure per day (mins)</td>
<td>600 mins</td>
</tr>
<tr>
<td>$L_{A_{eq}, 8, \text{hr}}$ (dBA)</td>
<td>90dBA</td>
</tr>
<tr>
<td>% Dose</td>
<td>316%</td>
</tr>
</tbody>
</table>
Sample calculations for Example 4

• For $L_{eq,8hr}$ calculations

$$L_{eq,8hr} = 10\log \left[ \frac{1}{T} \sum t_i \times 10^{\frac{SPL_i}{10}} \right]$$

$$L_{eq,8hr} = 10\log \left[ \frac{1}{8} \left( 10 \times 10^{\frac{89}{10}} \right) \right]$$

$L_{eq,8hr} = 90\text{dBA}$
Sample calculations for Example 4

• For dose calculations

\[
SPL = 85 + 10 \log \left( \frac{D\%}{12.5 \times T} \right)
\]

\[
90 = 85 + 10 \log \left( \frac{D\%}{12.5 \times 8} \right)
\]

\[
5 = 10 \log \left( \frac{D\%}{100} \right)
\]

\[
10^{\frac{5}{10}} = \left( \frac{D\%}{100} \right)
\]

\[
D\% = 100 \times 10^{\frac{5}{10}}
\]

\[
D\% = 316\%
\]
End
Useful Resources

• Ministry of Manpower Website at [www.mom.gov.sg](http://www.mom.gov.sg)
  – Search for “Noise Regulations”
  – Search for “Hygiene Monitoring”
  – Search for “Tax Incentives Scheme for Noise Control”

• WSH Council’s NID webpage
  – [https://www.wshc.sg/nidResources](https://www.wshc.sg/nidResources)

• Singapore Standards e-shop
  – [http://www.singaporestandardseshop.sg/Product/Home.a spx](http://www.singaporestandardseshop.sg/Product/Home.a spx)
  – Search for “SS549”
  – Search for “CP99”