

**ENVIRONMENTAL QUALITY MONITORING REPORT  
FOR MANUFACTURING OF METALLIC COATED  
STEEL STRIP AND PAINTED STEEL STRIP OF  
JFE MERANTI MYANMAR CO., LTD.  
IN THILAWA SPECIAL ECONOMIC ZONE B  
(OPERATION STAGE)**

**February 2024**

**Myanmar Koei International Ltd.**



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## CHAPTER 1: OUTLINES AND SUMMARY OF MONITORING PLAN

### 1.1 General

JFE Meranti Myanmar Co., Ltd. (JMM) is the manufacturing of metallic coated steel strip and painted steel strip. The project is located at Lot No. BC1, Zone B, Thilawa Special Economic Zone, Yangon, Myanmar. The environmental monitoring report has been prepared for JFE Meranti Myanmar Co., Ltd. by Myanmar koei International Ltd (MKI).

JMM has a responsibility to carry out regular monitoring for manufacturing of metallic coated steel strip and painted steel strip factory in accordance with the approved Environmental Impact Assessment (EIA) report and Environmental Monitoring Plan (EMoP). JMM has implemented monitoring of various environmental items with the specified time frame to know the environmental conditions in and around the area. The detail description of the project is shown in Table 1.1-1.

**Table 1.1-1 Project Description**

Item	Description
Name of Project Proponent	JFE MERANTI MYANMAR CO., LTD.
Type of Project	Manufacturing of metallic coated steel strip and painted steel strip
Location	Lot No. BC1, Zone B, Thilawa Special Economic Zone, Yangon, Myanmar
Total Production Capacity	Phase 1: - Up to 100,000 tonnes per annum of painted steel strip from imported metallic coated feed Phase 2: - Up to 180,000 tonnes per annum of metallic coated strip, of which, up to 100,000 tonnes will be painted
Total Project Area	77,800 square meters (19.22 Acre)
Total Production Area	3,440 square meters (0.85 Acre)
Contact Person	Ms. Khaing Cho Khant Senior Environmental Engineer, Manufacturing
Email and Telephone	<a href="mailto:kkhant@jferanti.com">kkhant@jferanti.com</a> +95 9-950683557

Source: JFE Meranti Myanmar Co., Ltd.



## 1.2 Outlines of Monitoring Plan

To assess the impact on the manufacturing of metallic coated steel strip and painted steel strip factory to the surrounding environment, air quality, noise and vibration level, indoor air quality, workplace noise and vibration level and emission monitoring had been monitored from 26 December to 27 December, 2023 as follows:

**Table 1.2-1 Outline of the Field Survey**

Ambient Air Quality	Survey Parameter	1) CO, 2) NO <sub>2</sub> , 3) PM <sub>2.5</sub> , 4) PM <sub>10</sub> , 5) Ozone, 6) SO <sub>2</sub> , 7) Wind Speed and 8) Wind Direction
	Survey Period	26– 27 December 2023
	Number of Survey	at one point and 24 consecutive hours for one day
	Location	1 Point (Inside and south of the JMM factory compound, which is nearest place to the sensitive receptors).
Outdoor Noise Level	Survey Parameter	L <sub>Aeq</sub> (dB)
	Survey Period	26– 27 December 2023
	Number of Survey	at one point and 24 consecutive hours for one day
	Location	1 Point (Inside and south of the JMM factory compound, which is nearest place to the sensitive receptors).
Outdoor Vibration Level	Survey Parameter	L <sub>v10</sub> (dB)
	Survey Period	26– 27 December 2023
	Number of Survey	at one point and 24 consecutive hours for one day
	Location	1 Point (Inside and south of the JMM factory compound, which is nearest place to the sensitive receptors).
Indoor Air Quality	Survey Parameter	PM <sub>2.5</sub> , PM <sub>10</sub> and VOC
	Survey Period	27 December 2023
	Number of Survey	PM <sub>2.5</sub> , PM <sub>10</sub> and VOC: at two points and two hours/point
	Location	PM <sub>2.5</sub> , PM <sub>10</sub> and VOC: 2 Points 1) Coater-A and 2) Coater-B
Workplace Noise Level	Survey Parameter	L <sub>Aeq</sub> (dB)
	Survey Period	26 December 2023
	Number of Survey	at three points and one hour/point
	Location	3 Points: 1) Near Coater-A, 2) Entry Accumulator and 3) Near Quality Control Laboratory
Workplace Vibration Level	Survey Parameter	L <sub>v10</sub> (dB)
	Survey Period	26 December 2023
	Number of Survey	at three points and one hour/point
	Location	3 Points: 1) Near Coater-A, 2) Entry Accumulator and 3) Near Quality Control Laboratory
Emission Monitoring	Survey Parameter	NO <sub>x</sub>
	Survey Period	26 December 2023
	Number of Survey	at two points and one hour/point
	Location	2 Points: 1) Regenerative Thermal Oxidizer (RTO) Stack and 2) Chemical Drier Stack

Source: Myanmar Koei International Ltd.



## CHAPTER 2: FIELD SURVEY

### 2.1 Ambient Air Quality

The survey of ambient air quality, AQ-1, has been monitored south corner inside of the JMM factory compound, which is nearest place to the sensitive receptors. Ambient air quality and meteorology survey have been conducted for 24 hours continuously to know the current air quality of the project area. Table 2.1-1 shows the outline of the ambient air quality monitoring.

**Table 2.1-1 Outlines of Ambient Air Quality Monitoring**

Survey Period	Survey Item	Parameters	Number of Point	Duration	Survey Methodology
From 26 December – 27 December, 2023	Ambient Air Quality	CO, NO <sub>2</sub> , PM <sub>2.5</sub> , PM <sub>10</sub> , Ozone and SO <sub>2</sub>	1 point (AQ-1)	24 Hours	On site measurement by Haz-Scanner Environmental Perimeter Air Station (EPAS)

Source: Myanmar Koei International Ltd.

#### 2.1.1 Survey Items

The parameters for ambient air quality survey were CO, NO<sub>2</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, Ozone and SO<sub>2</sub> and the parameters for meteorology survey were wind speed and wind direction.

#### 2.1.2 Survey Location

The location of ambient air quality monitoring point is shown in Table 2.1-2 and Figure 2.1-1.

**Table 2.1-2 Location of Air Quality Monitoring**

Survey Point	Coordinates	Description of Survey Point
AQ-1	N: 16°39'57.38", E: 96°17'8.57"	South of the JMM factory compound, which is nearest place to the sensitive receptors

Source: Myanmar Koei International Ltd.





Source: Google Earth

**Figure 2.1-1 Location of Ambient Air Quality Monitoring Point**

## **AQ-1**

AQ-1 is located south corner inside of the JMM factory compound, which is nearest place to the sensitive receptors. The surrounding area are SIAM Gas Battery Myanmar Ltd. in the southwest, RK Yangon Steel factory in the southeast, vacant lands and Thilawa Development Road in the east and northeast, Phalan monastery and Phalan village in the south.

### **2.1.3 Survey Period**

Ambient air quality and meteorology survey were conducted 24 hours from 26 December 2023 – 27 December 2023.

### **2.1.4 Survey Method**

Survey of meteorology and ambient air quality (CO, NO<sub>2</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, Ozone and SO<sub>2</sub>) were conducted by referring to the recommendation of the United States Environmental Protection Agency (U.S. EPA). The Haz-Scanner EPAS was used to collect ambient air pollutants. The EPAS measures automatically every one minute and directly reads and records onsite for CO, NO<sub>2</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, Ozone and SO<sub>2</sub>. The equipment of meteorological and ambient air quality survey is shown in Figure 2.1-2.





Source: Myanmar Koei International Ltd.

**Figure 2.1-2 Status of Ambient Air Quality Monitoring Point at AQ-1**

### 2.1.5 Survey Results

The daily average value of ambient air quality monitoring results of CO, NO<sub>2</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, Ozone and SO<sub>2</sub> are described in Table 2.1-3. Comparing with the guideline values of CO, NO<sub>2</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, Ozone and SO<sub>2</sub> prescribed in final EIA report for JFE MERANTI Myanmar Co., Ltd. (referred to Section 2.2.1, Air Quality, Table 2.2-2), 24 hours average concentration of CO, NO<sub>2</sub>, PM<sub>10</sub> and Ozone were lower than the target value.

However, 24 hours average concentration of PM<sub>2.5</sub> was higher than the target value. Therefore, PM<sub>2.5</sub> 24-hr average result is compared with interim target 2 (0.050 mg/m<sup>3</sup>) of WHO Air Quality Guideline, 2021. The result was lower than the WHO 24 hours guideline value. The results of PM<sub>2.5</sub> 24-hour values compared with target value and WHO guideline value is shown in Figure 2.1-5.

**Table 2.1-3 Ambient Air Quality Survey Result (Daily Average)**

Date 26 ~27 December, 2023	CO	NO <sub>2</sub>	PM <sub>2.5</sub>	PM <sub>10</sub>	Ozone	SO <sub>2</sub>
	mg/m <sup>3</sup>	mg/m <sup>3</sup>	mg/m <sup>3</sup>	mg/m <sup>3</sup>	mg/m <sup>3</sup>	mg/m <sup>3</sup>
Result	0.384 (24-hr Avg)	0.082 (24-hr Avg)	0.043 (24-hr Avg)	0.050 (24-hr Avg)	0.074 (8-hr Max)	0.019 (24-hr Avg)
Target Value <sup>2)</sup>	10.26 (24-hr Avg)	0.1 (24-hr Avg)	0.025 (24-hr Avg)	0.05 (24-hr Avg)	0.1 (8-hr Max)	0.02 (24-hr Avg)
WHO <sup>3)</sup> (Interim Target Value)	-	-	0.050 (24-hr Avg)	0.100 (24-hr Avg)	-	0.050 (24-hr Avg)

Note:

1) Red color mentions the exceeded value for PM<sub>2.5</sub>.

2) Target value is referred to the final EIA report for JFE MERANTI Myanmar Co., Ltd (Oct, 2019)

a. (Ozone, mg/m<sup>3</sup>) = 8-hr maximum duration for Ozone concentration is from 17:00 to 1:00.

3) WHO (AQG) - World Health Organization Air Quality Guideline, 2021

The target value of CO, NO<sub>2</sub> and SO<sub>2</sub> were converted from ppm units to mg/m<sup>3</sup>. The conversion equation are as follows;

a. (CO, mg/m<sup>3</sup>) = (CO, ppm) \* (Molecular Weight of CO (28)) / 24.45 at 25°C and 1 atm condition.

b. (NO<sub>2</sub>, mg/m<sup>3</sup>) = (NO<sub>2</sub>, ppm) \* (Molecular Weight of NO<sub>2</sub> (46)) / 24.45 at 25°C and 1 atm condition.

c. (SO<sub>2</sub>, mg/m<sup>3</sup>) = (SO<sub>2</sub>, ppm) \* (Molecular Weight of SO<sub>2</sub> (64)) / 24.45 at 25°C and 1 atm condition.

Source: Myanmar Koei International Ltd.

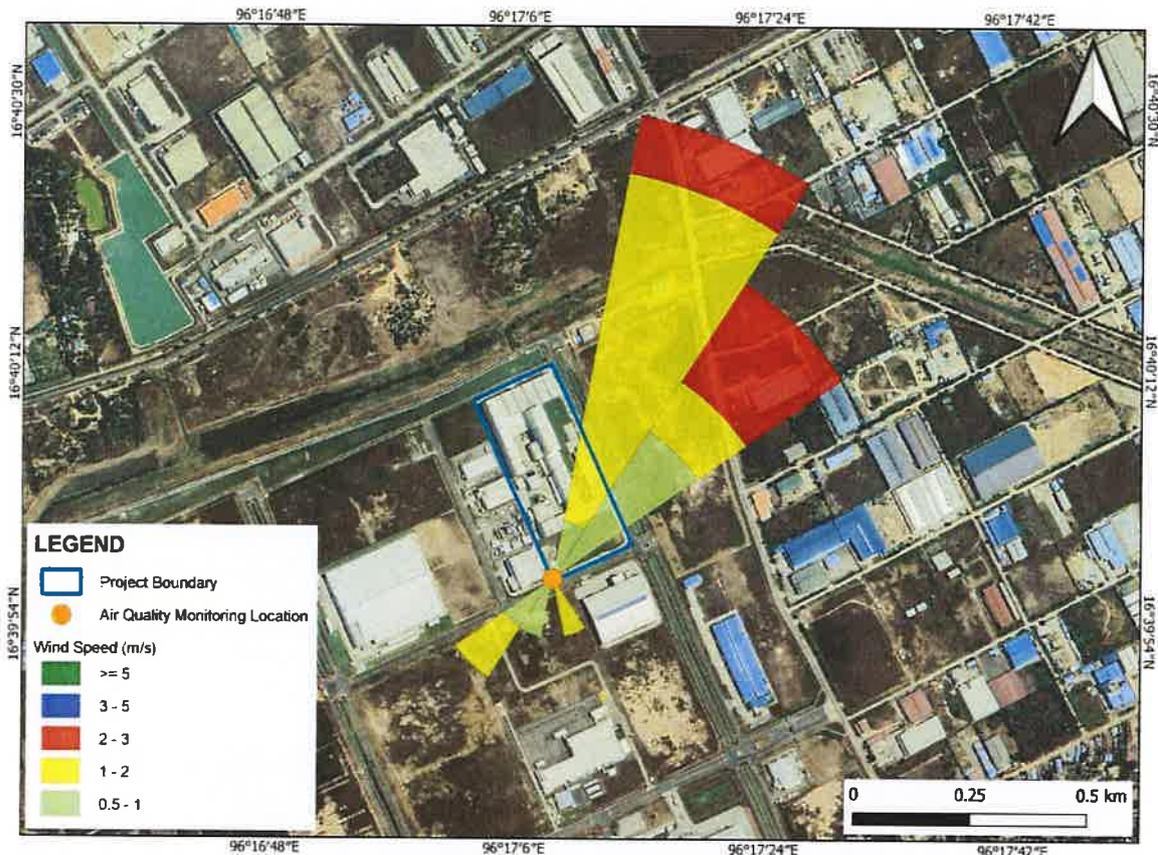
Wind direction and wind speed were measured at AQ-1. Hourly average values of measured wind direction and wind speed data are described in Appendix-1. Frequency of wind direction at AQ-1 and its wind rose diagram are described in Figure 2.1-3 and Figure 2.1-4. According to the wind rose analysis, the prevailing wind direction during monitoring was North-Northeast (NNE) and the least frequency wind direction was South-Southeast (SSE). During the monitoring period, while the maximum wind speed was 2.0 m/s, the average speed is 1.03 m/s. The calm wind is 25.00 %, whereas the calm wind is defined below 0.5 m/s. As the average wind speed is higher than the defined calm wind, it is assumed that the wind was light air during the monitoring period.



According to the summary of wind direction at AQ-1, most of the prominent wind were blowing from Northeast (NE) quadrants.

Possible sources for PM<sub>2.5</sub> is affected from natural origin such as dust from unpaved land area from outside of JMM factory and transportation in and around the monitoring area.

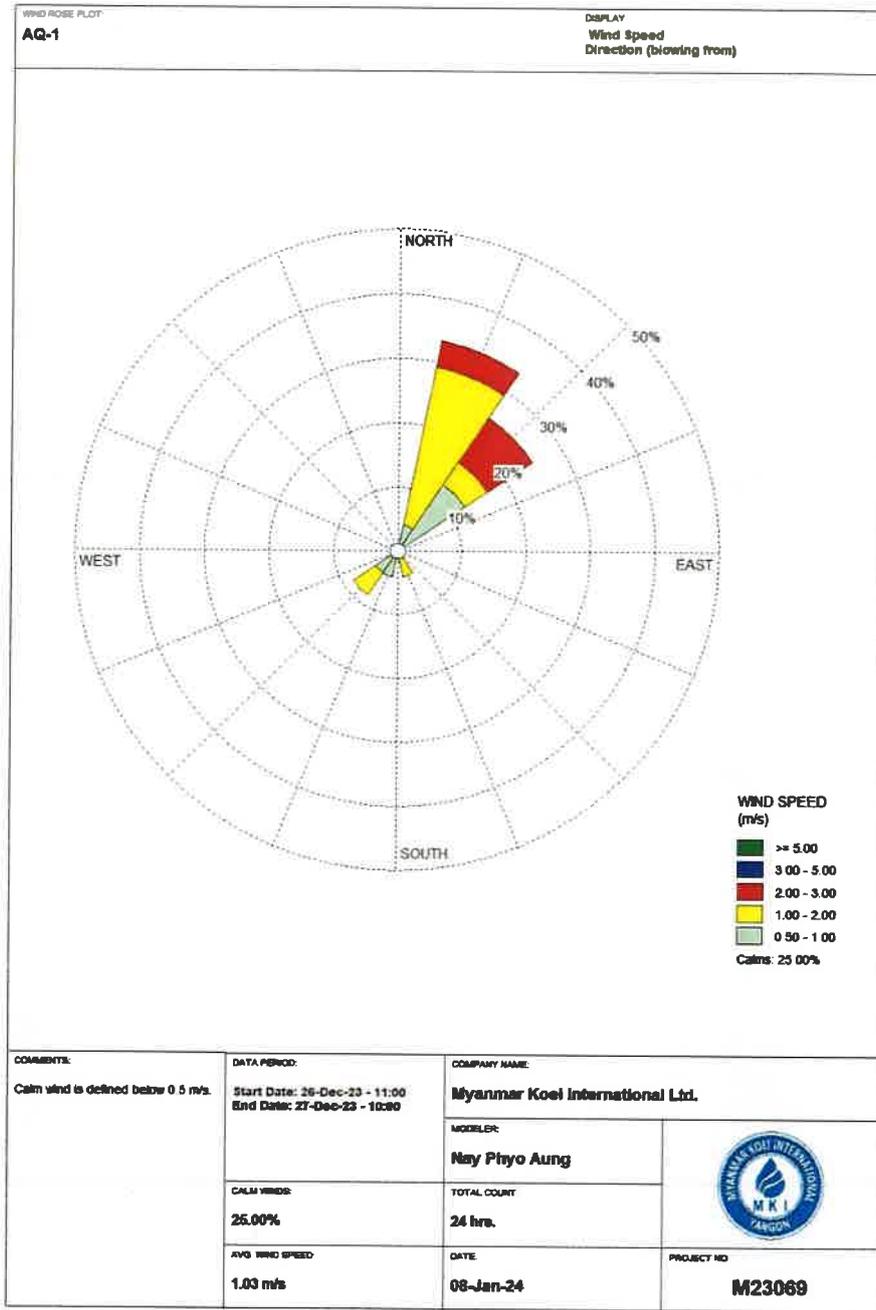
In the evening and night during winter, the air becomes cold, dense and moving slower than in day time. Consequently, cold air can trap the particulate matter or pollutants, and remaining in place for longer time, causing the high concentration of pollutants during night. Moreover, Planetary Boundary Layer, a section of atmosphere from 0 to about 1.5 km from above sea level, becomes shallow during night and there will be less space for pollution particle to move around, causing them to get more concentrated.



Source: Myanmar Koei International Ltd.

Figure 2.1-3 Wind Status at AQ-1

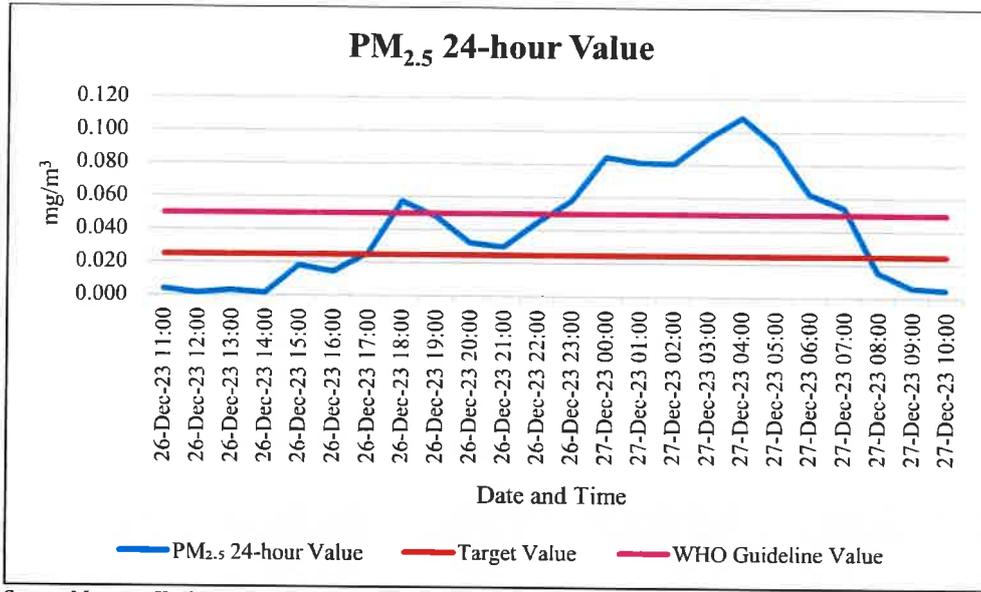




Source: Myanmar Koei International Ltd.

Figure 2.1-4 Wind Rose Diagram of AQ-1





Source: Myanmar Koei International Ltd.

**Figure 2.1-5 PM<sub>2.5</sub> 24 hours Values, Target Value and WHO Guideline Value for Ambient Air Quality Monitoring**

The vehicle usage record of JMM factory during ambient air quality monitoring period is shown in Table 2.1-4.

**Table 2.1-4 Vehicle Usage Record During Ambient Air Quality Monitoring Period**

Date	Vehicle type	Quantity	Total
26 December, 2023	JMM Ferry	13	36
	JMM Rental Car	11	
	Contractor' Car	9	
	Employee' Car	3	
27 December, 2023	JMM Ferry	13	41
	JMM Rental Car	10	
	Contractor' Car	16	
	Employee' Car	2	

Source: JFE Meranti Myanmar Co., Ltd.



## 2.2 Outdoor Noise and Vibration Level

The survey of outdoor noise and vibration level at NV-1 was conducted within the JMM factory compound. Outdoor noise and vibration level monitoring was conducted 24 hours for survey point to know the outdoor noise and vibration level near the JMM factory. Table 2.2-1 shows the outline of the outdoor noise and vibration level monitoring.

**Table 2.2-1 Outlines of Outdoor Noise and Vibration Level Monitoring**

Survey Date	Survey Item	Parameters	Number of Points	Duration	Survey Methodology
From 26 – 27 December, 2023	Outdoor Noise Level	L <sub>Aeq</sub> (dB)	1 (NV-1)	24 hours	On-site measurement by “Rion NL-42 sound level meter”
From 26 – 27 December, 2023	Outdoor Vibration Level	L <sub>v10</sub> (dB)	1 (NV-1)	24 hours	On-site measurement by “Vibration Level Meter- VM-53A”

Source: Myanmar Koei International Ltd

### 2.2.1 Survey Items

The outdoor noise and vibration level monitoring items are shown in Table 2.2-2.

**Table 2.2-2 Survey Parameters for Outdoor Noise and Vibration Level**

No.	Item	Parameter
1	Outdoor Noise	A-weighted loudness equivalent (L <sub>Aeq</sub> )
2	Outdoor Vibration	Vibration level, vertical, percentile (L <sub>v10</sub> )

Source: Myanmar Koei International Ltd.

### 2.2.2 Survey Location

The location of outdoor noise and vibration level points is shown in Table 2.2-3. The detail of survey point is described below. The location of the outdoor noise and vibration monitoring points is shown in Figure 2.2-1.

**Table 2.2-3 Location of Outdoor Noise and Vibration Monitoring Station**

Survey Point	Coordinates	Description of Monitoring Point
NV-1	N: 16°39'57.39", E: 96°17'8.56"	South of the factory compound

Source: Myanmar Koei International Ltd.





Source: Google Earth

**Figure 2.2-1 Location of Outdoor Noise and Vibration Level Monitoring Point**

### **NV-1**

NV-1 is located at the south corner inside the factory compound which is the nearest place to the sensitive receptors. The surrounding area are SIAM Gas Battery Myanmar Ltd. in the southwest, RK Yangon Steel factory in the southeast, vacant lands and Thilawa Development Road in the east and northeast, Phalan monastery and Phalan village in the south.

### **2.2.3 Survey Period**

Outdoor noise and vibration level monitoring were conducted 24 hours from 26 December 2023 – 27 December 2023.

### **2.2.4 Survey Method**

Outdoor noise level was measured by “Rion NL-43 sound level meter” and automatically recorded every 10 minutes in a memory card. The outdoor vibration level meter, VM-55 (Rion Co. Ltd., Japan), accompanied by a 3-axis accelerometer PV-83C (Rion Co. Ltd.), was placed on solid soil ground. Vertical vibration (Z axis),  $L_{v10}$ , was measured every 10 minutes within the adaptable range of (10-70) dB at NV-1 recorded to a memory card.

The measurement period of outdoor noise and vibration was 24 hours for survey point. The status of the noise and vibration level monitoring on NV-1 is shown in Figure 2.2-2.





Source: Myanmar Koei International Ltd.

**Figure 2.2-2 Status of Noise and Vibration Level Monitoring at NV-1**

## 2.2.5 Survey Result

### Outdoor Noise Measurement Results

Outdoor noise monitoring results are separated daytime (7:00 AM to 7:00 PM), evening time (7:00 PM to 10:00 PM), and night time (10:00 PM to 7:00 AM), time frames respectively for NV-1. Outdoor noise measurements was carried out for one location on a 24-hour basis. The monitoring results are summarized in Table 2.2-4. Hourly outdoor noise level ( $L_{A_{eq}}$ ) monitoring results at NV-1 is shown in Table 2.2-5 and Figure 2.2-3 shows the results of outdoor noise level ( $L_{A_{eq}}$ ) at NV-1. Comparing with the target value of outdoor noise level in operation stage prescribed in final EIA report for JFE MERANTI Myanmar Co., Ltd. (referred to Section 2.2.3 Noise, Table 2.2-13), all results were under the target values.

**Table 2.2-4 Results of Outdoor Noise Level ( $L_{A_{eq}}$ ) Monitoring at NV-1**

Date	(Commercial and Industrial areas) Equivalent Noise Level ( $L_{A_{eq}}$ , dB)		
	Day Time (7:00 AM – 7:00 PM)	Evening Time (7:00 PM – 10:00 PM)	Night Time (10:00 PM – 7:00 AM)
26 December 2023 - 27 December 2023	60	59	60
Target Value	70	65	60

Note: Target value is referred to the final EIA report for JFE MERANTI Myanmar Co., Ltd.

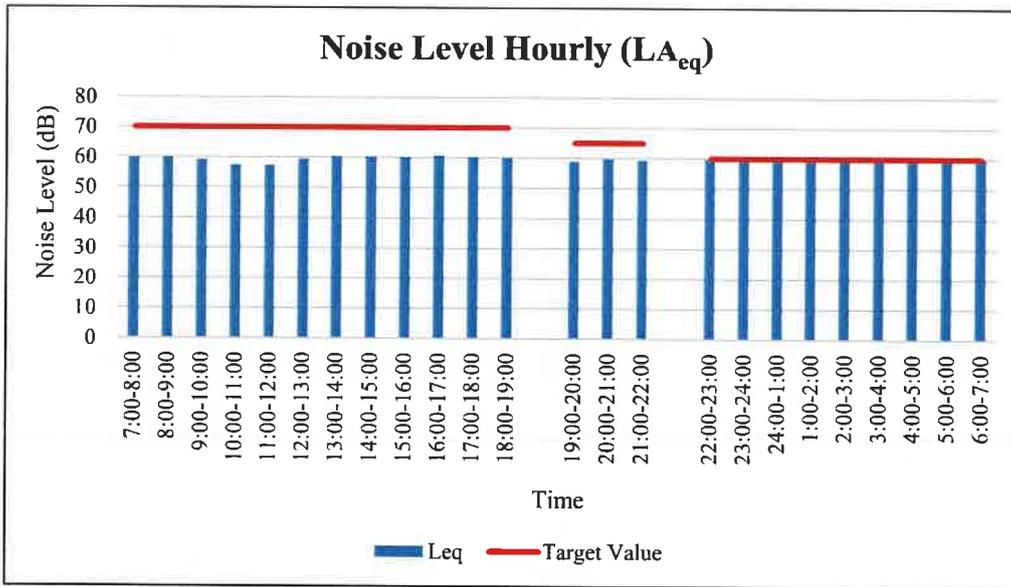
Source: Myanmar Koei International Ltd.



**Table 2.2-5 Hourly Outdoor Noise Level (LAeq) Monitoring Results at NV-1**

Date	Time	(LAeq, dB)	(LAeq, dB) Each Category	(LAeq, dB) Target Value
26 December 2023 – 27 December 2023	7:00-8:00	60	60	70
	8:00-9:00	60		
	9:00-10:00	59		
	10:00-11:00	57		
	11:00-12:00	57		
	12:00-13:00	59		
	13:00-14:00	60		
	14:00-15:00	60		
	15:00-16:00	60		
	16:00-17:00	61		
	17:00-18:00	60		
	18:00-19:00	60		
	19:00-20:00	59	59	65
	20:00-21:00	60		
	21:00-22:00	59		
	22:00-23:00	60	60	60
	23:00-24:00	60		
	24:00-1:00	59		
	1:00-2:00	60		
	2:00-3:00	59		
	3:00-4:00	59		
	4:00-5:00	60		
	5:00-6:00	60		
	6:00-7:00	60		

Source: Myanmar Koei International Ltd.



Source: Myanmar Koei International Ltd.

**Figure 2.2-3 Results of Outdoor Noise Levels (LAeq) Monitoring at NV-1**



### Outdoor Vibration Measurement Results

Outdoor vibration monitoring results are separated daytime (7:00 AM to 7:00 PM), evening time (7:00 PM to 10:00 PM) and night time (10:00 PM to 7:00 AM) time frames respectively for NV-1. Outdoor vibration measurement was carried out for one location on a 24-hour basis. The results of outdoor vibration level ( $L_{v10}$ ) monitoring at NV-1 are shown in Table 2.2-6. Results of hourly outdoor vibration level monitoring for NV-1 are summarized in Table 2.2-7 and Figure 2.2-4 shows the results of vibration level ( $L_{v10}$ ) at NV-1. By comparing with the target vibration level in operation stage in final EIA report for JFE MERANTI Myanmar Co., Ltd. (referred to Section 2.2.4 Vibration, Table 2.2-14), all results were under the target values.

**Table 2.2-6 Results of Outdoor Vibration Level ( $L_{v10}$ ) Monitoring at NV-1**

Date	(Office, Commercial facilities, and Factories) Equivalent Vibration Level ( $L_{v10}$ , dB)		
	Day Time (7:00 AM – 7:00 PM)	Evening Time (7:00 PM – 10:00 PM)	Night Time (10:00 PM – 7:00 AM)
26 December 2023 - 27 December 2023	29	28	28
Target Value	70	65	60

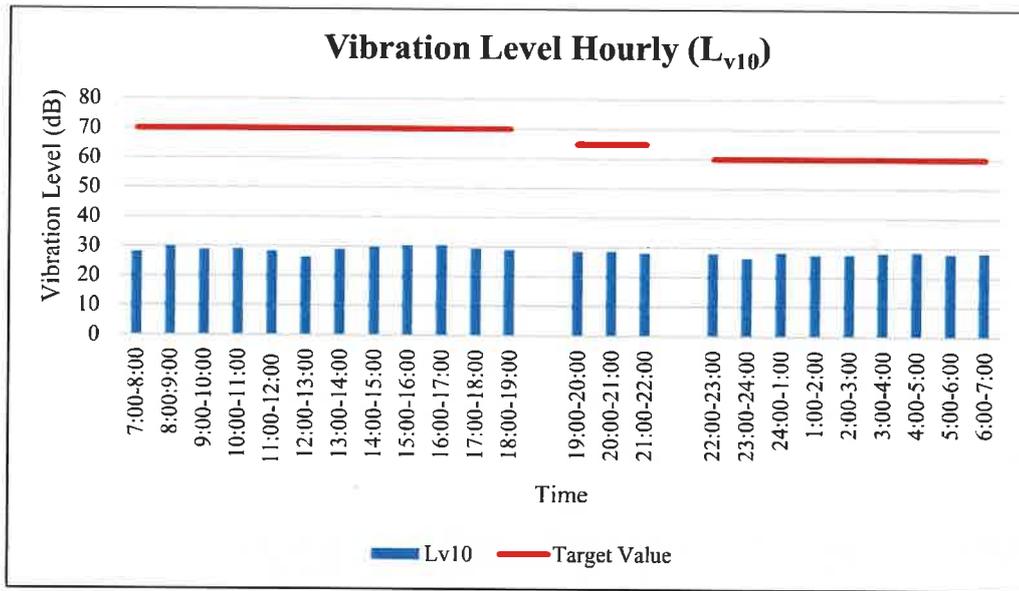
Note: Target value is referred to the final EIA report for JFE MERANTI Myanmar Co., Ltd.  
Source: Myanmar Koei International Ltd.

**Table 2.2-7 Results of Hourly Outdoor Vibration Level ( $L_{v10}$ ) Monitoring at NV-1**

Date	Time	( $L_{v10}$ , dB)	( $L_{v10}$ , dB) Each Category	( $L_{v10}$ , dB) Target Value
26 December 2023 – 27 December 2023	7:00-8:00	28	29	70
	8:00-9:00	30		
	9:00-10:00	29		
	10:00-11:00	29		
	11:00-12:00	28		
	12:00-13:00	26		
	13:00-14:00	29		
	14:00-15:00	30		
	15:00-16:00	30		
	16:00-17:00	31		
	17:00-18:00	30		
	18:00-19:00	29	28	65
	19:00-20:00	29		
	20:00-21:00	29		
	21:00-22:00	28		
	22:00-23:00	28	28	60
	23:00-24:00	27		
	24:00-1:00	28		
	1:00-2:00	28		
	2:00-3:00	28		
	3:00-4:00	28		
	4:00-5:00	29		
	5:00-6:00	28		
	6:00-7:00	28		

Source: Myanmar Koei International Ltd.





Source: Myanmar Koei International Ltd.

**Figure 2.2-4 Results of Outdoor Vibration Level (Lv10) Monitoring at NV-1**

The vehicle usage record of JMM during the outdoor noise and vibration monitoring period is shown in Table 2.2-8.

**Table 2.2-8 Vehicle Usage Record During Outdoor Noise and Vibration Monitoring Period**

Date	Vehicle type	Quantity	Total
26 December, 2023	JMM Ferry	13	36
	JMM Rental Car	11	
	Contractor' Car	9	
	Employee' Car	3	
27 December, 2023	JMM Ferry	13	41
	JMM Rental Car	10	
	Contractor' Car	16	
	Employee' Car	2	

Source: JFE Meranti Myanmar Co., Ltd.



## 2.3 Indoor Air Quality

The survey of indoor air quality has been monitored at two locations, Coater-A and Coater-B inside the JMM factory. Indoor air quality has been conducted for two hours to know the current indoor air quality of the JMM factory. Table 2.3-1 shows the outline of the indoor air quality monitoring.

**Table 2.3-1 Outlines of Indoor Air Quality Monitoring**

Survey Period	Survey Item	Parameter	Survey Location	Number of Point	Duration	Survey Methodology
27 December, 2023	Indoor Air Quality	PM <sub>2.5</sub> , PM <sub>10</sub> and VOC	Coater-A and Coater-B	2 points	2 hours/point	On site measurement by Haz-Scanner Environmental Perimeter Air Station (EPAS)

Source: Myanmar Koei International Ltd.

### 2.3.1 Survey Item

The parameters for indoor air quality monitoring were PM<sub>2.5</sub>, PM<sub>10</sub> and VOC.

### 2.3.2 Survey Location

The location of indoor air quality monitoring point is shown in Table 2.3-2. The detail of the monitoring point is described below. The location of the indoor air quality monitoring point is shown in Figure 2.3-1.

**Table 2.3-2 Location of Indoor Air Quality Monitoring**

Survey Point	Coordinates	Description of Monitoring Point
Indoor Air Quality	16°40'4.49"N, 96°17'6.22"E	Two locations, Coater-A and Coater-B inside the compound of JFE factory.

Source: Myanmar Koei International Ltd.



Source: Google Earth

**Figure 2.3-1 Location of Indoor Air Quality Monitoring Point**



**IAQ-1**

IAQ-1 is located outside the Coater A room in the Coil Painting Line (CPL) building of JMM factory, and it is located near to the walkway platform.

**IAQ-2**

IAQ-2 is located outside the Coater B room in the Coil Painting Line (CPL) building of JMM factory, and it is located near to the walkway platform.

**2.3.3 Survey Period**

Indoor air quality monitoring was conducted two hours per point (total 2 points) on 27 December 2023.

**2.3.4 Survey Method**

Survey of indoor air quality (PM<sub>2.5</sub> and PM<sub>10</sub>) was conducted by referring to the recommendation of the United States Environmental Protection Agency (U.S. EPA). The Haz-Scanner FPAS was used to collect indoor air pollutants. The EPAS measures automatically every one minute and directly reads and records onsite for PM<sub>2.5</sub> and PM<sub>10</sub>.

Survey of volatile organic compound (VOC) was conducted by using Aeroqual-500 series with VOC sensor (0-2000 ppm range). VOC sensor (0-2000 ppm range) was chosen because the measurement was conducted in indoor production area. The detailed information of VOC sensors with different ranges are described in the Table 2.3-3. Aeroqual-500 series equipment was set up and placed at height of 1.5m which is the breathing level relative to the average human height. The equipment measures automatically every five minutes and the data was recorded and logged into PC on real time basis.

The status of indoor air quality monitoring for PM<sub>2.5</sub>, PM<sub>10</sub> and VOC are shown in Figure 2.3-2 and Figure 2.3-3.

**Table 2.3-3 Detailed Information of VOC Sensors**

Gas	Range (ppm)	Minimum Detection Limit	Resolution	Response Times	Operating Conditions		Application Type
					Temp	RH	
VOC	0-25	0.1	0.1	60	0-40C	10-90%	ENV, IAQ
VOC	0-2000	0.1	<1000 ppm: 0.1 >1000 ppm:1	30	0-40C	10-95%	IND

ENV = Outdoor Environmental Monitoring, IAQ = Indoor Air Quality, IND = Industrial health and safety  
Source: Myanmar Koei International Ltd.





Figure 2.3-2 Status of Indoor Air Quality Monitoring at Coater-A



Figure 2.3-3 Status of Indoor Air Quality Monitoring at Coater-B

### 2.3.5 Survey Results

The two hours average value of indoor air quality monitoring results of  $PM_{2.5}$  and  $PM_{10}$  are described in Table 2.3-4 and VOC is described in Table 2.3-5. There is no guideline value for indoor air quality for  $PM_{2.5}$  and  $PM_{10}$  in Myanmar's EQEG guideline. Therefore, the values of  $PM_{2.5}$  and  $PM_{10}$  were compared with The National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention (CDC), U.S. However, the value of VOC was compared with the final EIA report for JFE MERANTI Myanmar Co., Ltd. (referred to Section 2.2.1, (2) Air Emission Level, Table 2.2-4). The two hours average concentration of  $PM_{2.5}$  and  $PM_{10}$  were lower than the guideline value and the two hours average concentration of VOC was lower than the target value at Coater-A and Coater-B. Figure 2.3-4 showed the results of VOC for indoor air quality monitoring.



**Table 2.3-4 Indoor Air Quality Results of PM<sub>2.5</sub> and PM<sub>10</sub> (Two Hour Average)**

Date	Time	Survey Point	Survey Location	PM <sub>2.5</sub>	PM <sub>10</sub>
				(mg/m <sup>3</sup> )	(mg/m <sup>3</sup> )
27 December, 2023	14:30 ~ 16:29	IAQ-1	Coater-A	0.0141	0.0207
27 December, 2023	12:00 ~ 13:59	IAQ-2	Coater-B	0.0076	0.0183
<b>Target Value</b>				<b>15</b>	<b>15</b>

Note:

- 1) The value of PM<sub>2.5</sub> and PM<sub>10</sub> are two hours average. All results are lower than the target value.
- 2) The value of PM<sub>2.5</sub> and PM<sub>10</sub> were converted to mg/m<sup>3</sup> from µg/m<sup>3</sup> at 25°C, 1 atm condition
- 3) Target value is referred to the National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention (CDC), U.S.

(Link: <https://www.cdc.gov/niosh/pel88/dusts.html>)

Source: Myanmar Koei International Ltd.

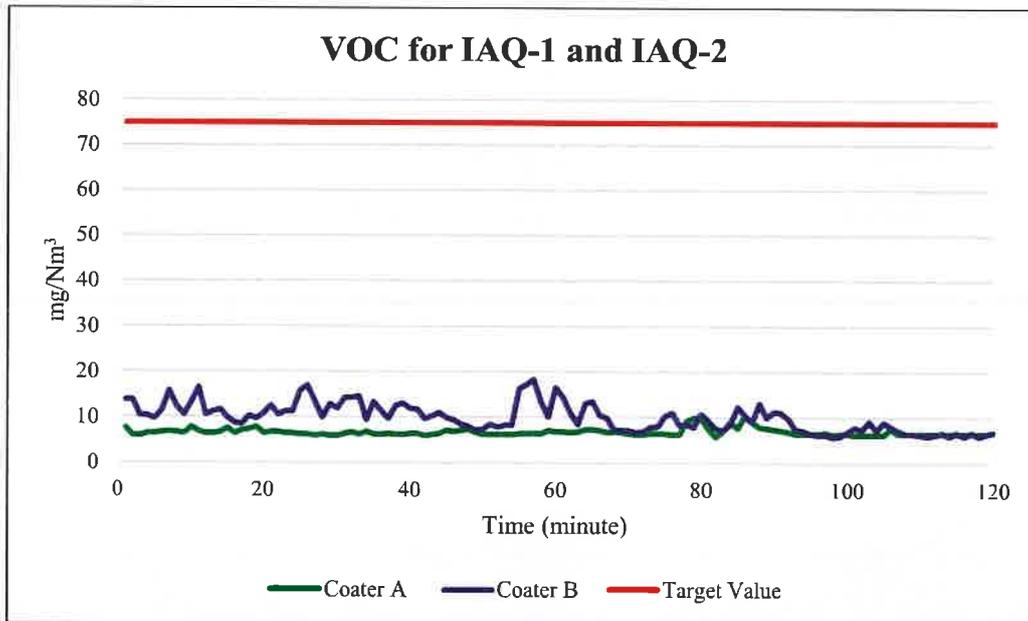
**Table 2.3-5 Indoor Air Quality Results of VOC (Two Hour Average)**

Date	Time	Survey Point	Survey Location	Relative Humidity	Temperature	VOC
				(%)	(°C)	(mg/Nm <sup>3</sup> )
27 December, 2023	14:30 ~ 16:29	IAQ-1	Coater-A	46.7	34.3	7
27 December, 2023	12:00 ~ 13:59	IAQ-2	Coater-B	42.9	35.8	10
<b>Target Value</b>				-	-	<b>75</b>

Note:

- 1) The value of VOC is two hours average. All results are lower than the target value.
- 2) The value of VOC was converted to mg/Nm<sup>3</sup> from ppm.
- 3) Target value is referred to the final EIA report for JFE MERANTI Myanmar Co., Ltd.

Source: Myanmar Koei International Ltd.



Source: Myanmar Koei International Ltd.

**Figure 2.3-4 Results of Indoor Air Quality Monitoring (VOC) at Coater-A and Coater-B**



The operating activities of JMM during the indoor air quality monitoring period is shown in Table 2.3-6.

**Table 2.3-6 Operating activities for Indoor Air Quality Monitoring**

Monitoring Location	Operating activities	Working Hours	Man-power
Coater-A	<p><b>Inside Pulpit</b> – Operators monitor and control HMI for production.</p> <p><b>Inside Coater Room</b> – Operators use respirators, goggles, and earmuffs to set coater equipment setting, to check viscosity and prepare paint.</p> <p><b>Outside Coater Room</b> – This is a walkway platform. Operators use half-masks, goggles, and earmuffs to walk from coater room to pulpit during production. Operators walk through this area less than a minute.</p>	3 shifts per day	Four persons per shift
Coater-B	<p><b>Inside Pulpit</b> – Operators monitor and control HMI for production.</p> <p><b>Inside Coater Room</b> – Operators use respirators, goggles, and earmuffs to set coater equipment setting, to check viscosity and prepare paint.</p> <p><b>Outside Coater Room</b> – This is a walkway platform. Operators use half-masks, goggles, and earmuffs to walk from coater room to pulpit during production. Operators walk through this area less than a minute.</p>	3 shifts per day	Three persons per shift.

Source: JFE Meranti Myanmar Co., Ltd.



## 2.4 Workplace Noise and Vibration Level Monitoring

The survey of workplace noise and vibration level, INV-1, INV-2 and INV-3, have been monitored inside the JMM factory which is the nearest place to near coater-A, entry accumulator and near quality control laboratory. Workplace noise and vibration level monitoring have been conducted one hour for each survey point to know the occupational noise and vibration level inside the JMM factory. Table 2.4-1 shows the outline of the workplace noise and vibration level monitoring.

**Table 2.4-1 Outlines of Noise and Vibration Level Monitoring**

Survey Date	Survey Item	Parameters	Number of Points	Duration	Survey Methodology
26 December, 2023	Workplace Noise Level	$L_{Aeq}(dB)$	1 (INV-1)	1 hour/point	On-site measurement by "Rion NL-42 sound level meter"
26 December, 2023	Workplace Noise Level	$L_{Aeq}(dB)$	1 (INV-2)	1 hour/point	On-site measurement by "Rion NL-42 sound level meter"
26 December, 2023	Workplace Noise Level	$L_{Aeq}(dB)$	1 (INV-3)	1 hour/point	On-site measurement by "Rion NL-42 sound level meter"
26 December, 2023	Workplace Vibration Level	$L_{v10}(dB)$	1 (INV-1)	1 hour/point	On-site measurement by "Vibration Level Meter- VM-53A"
26 December, 2023	Workplace Vibration Level	$L_{v10}(dB)$	1 (INV-2)	1 hour/point	On-site measurement by "Vibration Level Meter- VM-53A"
26 December, 2023	Workplace Vibration Level	$L_{v10}(dB)$	1 (INV-3)	1 hour/point	On-site measurement by "Vibration Level Meter- VM-53A"

Source: Myanmar Koei International Ltd.

### 2.4.1 Survey Items

The noise and vibration level survey items are shown in Table 2.4-2.

**Table 2.4-2 Survey Parameters for Noise and Vibration Level**

No.	Item	Parameter
1	Noise	A-weighted loudness equivalent ( $L_{Aeq}$ )
2	Vibration	Vibration level, vertical, percentile ( $L_{v10}$ )

Source: Myanmar Koei International Ltd.

### 2.4.2 Survey Location

The location of the workplace noise and vibration level points are shown in Table 2.4-3. The detail of each survey point is described below. The location of the workplace noise and vibration monitoring points are shown in Figure 2.4-1.

**Table 2.4-3 Location of Noise and Vibration Monitoring Station**

Survey Point	Coordinates	Description of Monitoring Point
INV-1	N: 16°40'4.50", E: 96° 17'6.14"	Near Coater-A which is inside the JMM factory
INV-2	N: 16°40'7.17", E: 96° 17'4.90"	Entry Accumulator which is inside the JMM factory
INV-3	N: 16°40'8.22", E: 96° 17'4.87"	Near Quality Control Laboratory which is inside the JMM factory

Source: Myanmar Koei International Ltd.





Source: Google Earth

**Figure 2.4-1 Location of Noise and Vibration Level Monitoring Points**

#### **INV-1**

INV-1 is located inside the Coil Painting Line (CPL) building of JMM factory which is the nearest place to the Coater-A.

#### **INV-2**

INV-2 is located inside the Coil Painting Line (CPL) building of JMM factory which is the nearest place to the entry accumulator.

#### **INV-3**

INV-3 is located inside the Coil Painting Line (CPL) building of JMM factory which is the nearest place to the quality control laboratory.

### **2.4.3 Survey Period**

Workplace noise and vibration level monitoring were conducted one hour for each point on 26 December 2023.

### **2.4.4 Survey Method**

Workplace noise level was measured by “Rion NL-43 sound level meter” and automatically recorded every 10 minutes in a memory card. Workplace vibration level meter, VM-55 (Rion Co. Ltd., Japan), accompanied by a 3-axis accelerometer PV-83C (Rion Co. Ltd.), was placed on solid soil ground. Vertical vibration (Z axis),  $L_{v10}$ , was measured every 10 minutes within the adaptable range of (10-70) dB at INV-1, (10-70) dB at INV-2 and (10-70) dB at INV-3 recorded to a memory card.



The measurement period of workplace noise and vibration were one hour for each survey point. The status of the workplace noise and vibration level monitoring on INV-1, INV-2 and NV-3 is shown in Figure 2.4-2, Figure 2.4-3 and Figure 2.4-4.



**Figure 2.4-2 Status of Workplace Noise and Vibration Monitoring at Near Coater-A**



**Figure 2.4-3 Status of Workplace Noise and Vibration Monitoring at Entry Accumulator**



**Figure 2.4-4 Status of Workplace Noise and Vibration Monitoring Near Quality Control Laboratory**

## 2.4.5 Survey Result

### Workplace Noise Measurement Results

The one hour average value of workplace noise monitoring results of INV-1, INV-2 and INV-3 are described in Table 2.4-4. The values of INV-1, INV-2 and INV-3 were compared with The National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention (CDC), U.S. The one hour average concentration of INV-1, INV-2 and INV-3 were lower than the guideline value near coater-A, entry accumulator and near quality control laboratory. Figure 2.4-5 showed the results of INV-1, INV-2 and INV-3 for workplace noise monitoring.

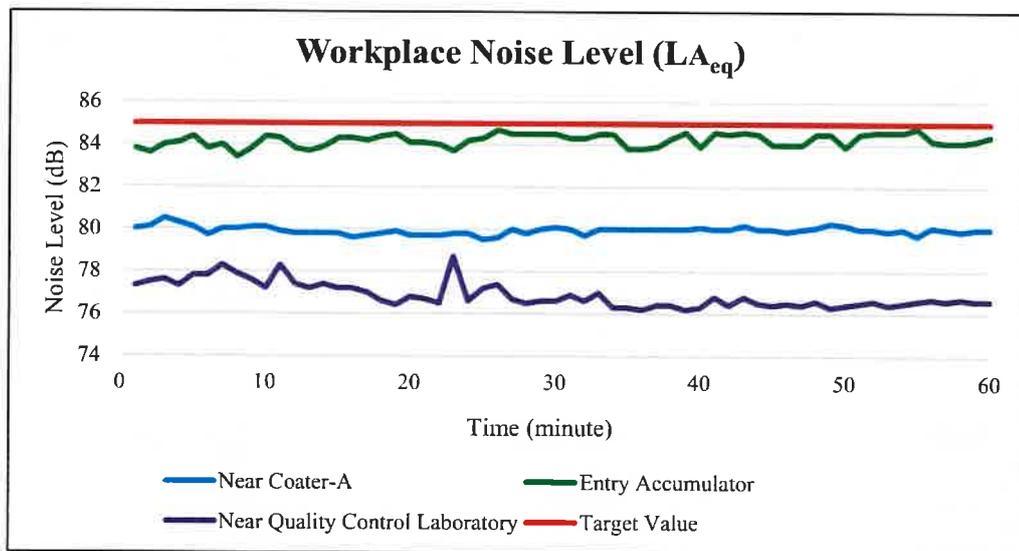
**Table 2.4-4 Results of Workplace Noise Level ( $L_{Aeq}$ ) Monitoring**

Date	Time	Survey Point	Location	$L_{Aeq}$ , dB
26 December, 2023	17:00 ~ 17:59	INV-1	Near Coater-A	80
26 December, 2023	18:10 ~ 19:09	INV-2	Entry Accumulator	84
26 December, 2023	19:30 ~ 20:29	INV-3	Near Quality Control Laboratory	77
<b>Target Value</b>				<b>85</b>

Note: 1) The value of  $L_{Aeq}$  is one hour average. All results are lower than the guideline value.

2) Target value is referred to the National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention (CDC), U.S (June, 1998).

Source: Myanmar Koei International Ltd.



Source: Myanmar Koei International Ltd.

**Figure 2.4-5 Results of Workplace Noise Level ( $L_{Aeq}$ ) Monitoring at Near Coater-A, Entry Accumulator and Near Quality Control Laboratory**

## 2.4.6 Control for Noise Exposure

### The Hierarchy of Control

The hierarchy of control can be used to determine how to implement feasible and effective controls. This approach groups actions by their likely effectiveness in reducing or removing the noise hazard.

**Elimination:** In most cases, the preferred approach is to eliminate the source of hazardous noise.

**Substitution:** When elimination is not possible, the substitution of loud equipment for quieter equipment may be the next best alternative to protect workers from hazardous noise.



**Engineering Controls:** Engineering controls require physical changes to the workplace such as redesigning equipment to eliminate noise sources and constructing barriers that prevent noise from reaching a worker.

**Administrative Controls:** Engineering control is not possible to remove the hazard through the use of administrative controls. Employers may change an employee’s work schedule to avoid too much noise.

**Personal Protective Equipment (PPE):** The last option in the hierarchy of control PPE is generally less effective than elimination, substitution, and engineering controls because they rely on human actions to reduce noise. Personal protective equipment (PPE) for hearing protection is shown in Table 2.4-5.

**Table 2.4-5 Personal Protective Equipment (PPE) for Hearing Protection**

	HPD with ear shells (ear muffs) Also called earmuffs, headphones, or ear shells, it can either be assembled on an industrial safety helmet or worn independently. It is positioned around the ear, and is connected by a hoop or headband passing overhead. It is reusable. It is advisable to change the ear pads every year to ensure effective blocking of noise.
	Earplugs with hoop/headband It is worn either at the ear canal or is placed within. The earplugs are connected by a plastic band (hoop) which holds them together.
	The standard earplug The pre-formed/pre-molded earplug is made of silicone, rubber, etc. It can be inserted into the ear without prior shaping.
	The earplug that must be shaped by the user is generally malleable and made of compressible foam. It will thus be shaped by the employee prior to being placed in the ear canal. This type of earplug is generally disposable.
	The personalized molded earplug (customized) Made from an impression of the employee’s ear, this hearing protector is made of silicone or acrylic resin. New technologies now allow for full digital manufacturing of these hearing protectors, offering an accuracy of about 100µ. A passive acoustic filter helps select the attenuation level to meet the needs of the wearer.

Source: HearingProTech.com

The hierarchy of controls are show in Figure 2.4-6.



Source: The National Institute for Occupational Safety and Health (NIOSH)

**Figure 2.4-6 Hierarchy of Controls**



**Workplace Vibration Measurement Results**

The one hour average value of workplace vibration monitoring results of INV-1, INV-2 and INV-3 are described in Table 2.4-6. The values of INV-1, INV-2 and INV-3 were compared with the Australia Technical Guideline value. The one hour average concentration of INV-1, INV-2 and INV-3 were lower than the guideline value near coater-A, entry accumulator and near quality control laboratory. Figure 2.4-7 showed the results of INV-1, INV-2 and INV-3 for workplace vibration monitoring.

**Table 2.4-6 Results of Workplace Vibration Levels ( $L_{v10}$ ) Monitoring**

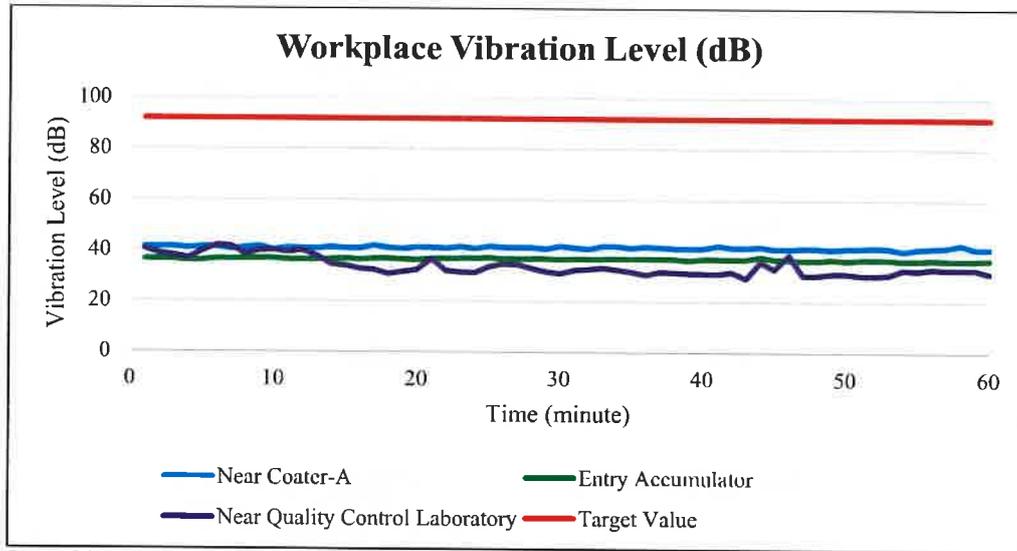
Date	Time	Survey Point	Location	$L_{v10}$ (dB)
26 December, 2023	17:00 ~ 17:59	INV-1	Near Coater-A	41
26 December, 2023	18:10 ~ 19:09	INV-2	Entry Accumulator	37
26 December, 2023	19:30 ~ 20:29	INV-3	Near Quality Control Laboratory	34
<b>Target Value</b>				<b>92</b>

Note:

- 1) The value of  $L_{v10}$  is one hour average. All results are lower than the guideline value.
- 2) Target value is referred to the Australia Technical Guideline Value.

(Link: [Assessing vibration: a technical guideline \(nsw.gov.au\)](https://www.nsw.gov.au/assessing-vibration-a-technical-guideline))

Source: Myanmar Koei International Ltd.



Source: Myanmar Koei International Ltd.

**Figure 2.4-7 Results of Workplace Vibration Level ( $L_{v10}$ ) Monitoring at Near Coater-A, Entry Accumulator and Near Quality Control Laboratory**



The operating activities of JMM during the workplace noise and vibration monitoring period is shown in Table 2.4-7.

**Table 2.4-7 Operating activities for Workplace Noise and Vibration Monitoring**

Monitoring Location	Operating activities	Working Hours	Man-power
Coater-A	<p><b>Inside Pulpit</b> – Operators monitor and control HMI for production.</p> <p><b>Inside Coater Room</b> – Operators use respirators, goggles, and earmuffs to set coater equipment setting, to check viscosity and prepare paint.</p> <p><b>Outside Coater Room</b> – This is a walkway platform. Operators use half-masks, goggles, and earmuffs to walk from coater room to pulpit during production. Operators walk through this area less than a minute.</p>	3 shifts per day	Four persons per shift
Coater-B	<p><b>Inside Pulpit</b> – Operators monitor and control HMI for production.</p> <p><b>Inside Coater Room</b> – Operators use respirators, goggles, and earmuffs to set coater equipment setting, to check viscosity and prepare paint.</p> <p><b>Outside Coater Room</b> – This is a walkway platform. Operators use half-masks, goggles, and earmuffs to walk from coater room to pulpit during production. Operators walk through this area less than a minute.</p>	3 shifts per day	Three persons per shift
Entry Accumulator	<p>Coil feeding and stitching operations are controlled by control room operators.</p> <p>No working activities in near entry accumulator.</p>	3 shifts per day	Two persons per shift
Near Quality Control Laboratory	<p>Quality Control members conduct the quality checks on the painted product from the line.</p> <p><b>Inside Quality Control Lab</b> - Two persons conduct Quality Control lab test.</p> <p><b>Outside Quality Control Lab</b> - It is not a working area, used for walkway during production.</p>	3 shifts per day	Three persons per shift

Source: JFE Meranti Myanmar Co., Ltd.



## 2.5 Emission Monitoring

The survey of emission monitoring has been monitored inside the compound of JMM factory. Emission monitoring has been conducted to know the current emission level of the project area. Table 2.5-1 shows the outline of the emission monitoring.

**Table 2.5-1 Outlines of Emission Monitoring**

Survey Period	Survey Item	Parameters	Number of Point	Duration	Survey Methodology
26 December, 2023	Emission Monitoring	NO <sub>x</sub>	2 points	1 hour/ point	On site measurement by "PG 350 Horiba Portable Gas Analyzer"

Source: Myanmar Koei International Ltd.

### 2.5.1 Survey Items

The parameter for emission monitoring was NO<sub>x</sub>.

### 2.5.2 Survey Location

The emission monitoring measurement equipment, "PG-350 Horiba Portable Gas Analyzer" was set up at Regenerative Thermal Oxidizer (RTO) Stack and Chemical Drier Stack. The detail location of emission monitoring points is described in Table 2.5-2 and the location of emission monitoring points are shown in the Figure 2.5-1.

**Table 2.5-2 Location of Emission Air Quality Monitoring Point**

Survey Point	Coordinates	Description of Survey Point
EM-1	16°40'5.04"N, 96°17'6.35"E	Regenerative Thermal Oxidizer (RTO) Stack
EM-2	16°40'5.39"N, 96°17'6.17"E	Chemical Drier Stack

Source: Myanmar Koei International Ltd.



Source: Myanmar Koei International Ltd.

**Figure 2.5-1 Location of Emission Monitoring Point**

**2.5.3 Survey Period**

Emission monitoring was conducted on 26 December 2023.

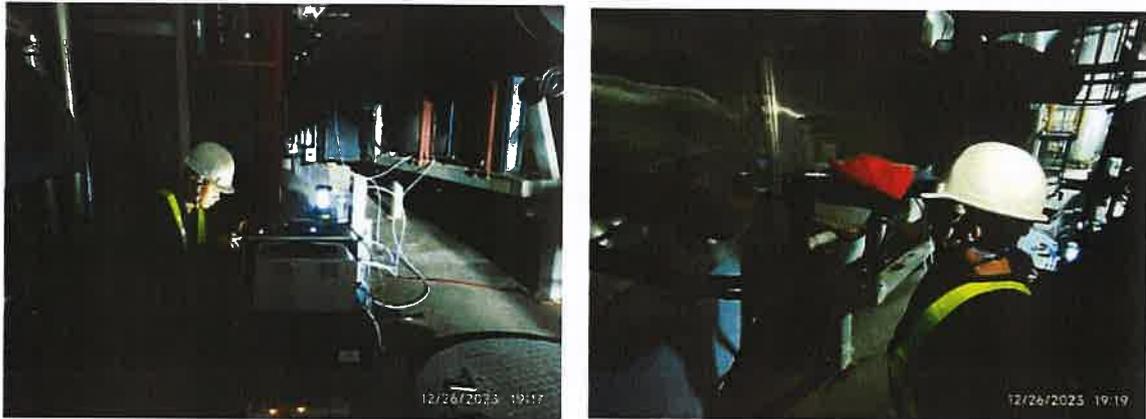
**2.5.4 Survey Method**

Survey of emission monitoring (NO<sub>x</sub>) was conducted by following the analysis principle of the PG-350 Horiba Portable Gas Analyzer as shown in Table 2.5-3. The equipment was used to collect emission air pollutants, and it measured automatically every one minute and directly read and recorded onsite for NO<sub>x</sub>. The status of emission monitoring is shown in Figure 2.5-2 and Figure 2.5-3.

**Table 2.5-3 Analytic Method for Emission Monitoring**

No.	Parameter	Method
1	NO <sub>x</sub>	Cross-Flow Modulation Chemiluminescence Detection Method

Source: Myanmar Koei International Ltd.



**Figure 2.5-2 Status of Emission Monitoring at Regenerative Thermal Oxidizer (RTO) Stack**



**Figure 2.5-3 Status of Emission Monitoring at Chemical Drier Stack**



## 2.5.6 Survey Results

The one hour average value of emission monitoring results of NO<sub>x</sub> are described in Table 2.5-4. The value of NO<sub>x</sub> was compared with the final EIA report for JFE MERANTI Myanmar Co., Ltd (referred to Section 2.2.1, (2) Air Emissions Level, Table 2.2-7). The one hour average concentration of NO<sub>x</sub> was lower than the target value at Regenerative Thermal Oxidizer (RTO) Stack and Chemical Drier Stack.

**Table 2.5-4 Emission Monitoring NO<sub>x</sub> Result**

Date	Time	Survey Point	Location	NO <sub>x</sub>
				(mg/Nm <sup>3</sup> )
26 December, 2023	19:30 ~ 20:29	EM-1	Regenerative Thermal Oxidizer (RTO) Stack	12
26 December, 2023	17:30 ~ 18:29	EM-2	Chemical Drier Stack	7
<b>Target Value</b>				<b>320</b>

Note:

- 1) The value of NO<sub>x</sub> is one hour average. All results are lower than the guideline value.
- 2) The value of NO<sub>x</sub> was converted to mg/Nm<sup>3</sup> from ppm.
- 3) The target value is referenced to the Final EIA report for JFE MERANTI Myanmar Co., Ltd.

Source: Myanmar Koei International Ltd.

The operating activities of JMM during the emission monitoring period is shown in Table 2.5-5.

**Table 2.5-5 Operating activities for Emission Monitoring**

Monitoring Location	Operating activities	Working Hours	Man-power
Regenerative Thermal Oxidizer (RTO) Stack	Oven Exhaust Fumes has been treated in RTO to convert flue gases upstream of RTO stack. After passing through two heat exchangers, these flue gases has been vented into atmosphere through RTO stack by RTO Exhaust Fan. Only one or two persons perform start up and shutdown of RTO. RTO operation is controlled by control room. No person is needed to attend at RTO stack during production.	3 shifts per day	No working activities at the stack itself during production.
Chemical Drier Stack	Gases in Chemical drying oven has been vented into atmosphere through Chemical Dyer Stack by Chemical dryer Exhaust Fan. Only one or two persons perform start up and shutdown of chemical dryer. Chemical Dryer operation is controlled by control room. No person is needed to attend at Chemical Dryer stack during production.	3 shifts per day	No working activities at the stack itself during production.

Source: JFE Meranti Myanmar Co., Ltd.



## **CHAPTER 3: CONCLUSION AND RECOMMENDATIONS**

### **Air Quality**

The result of 24 hours average air quality of CO, NO<sub>2</sub>, PM<sub>10</sub>, Ozone and SO<sub>2</sub> are under the target value at AQ-1, thus there are no impacts on the surrounding environment. On the other hand, concentration of and PM<sub>2.5</sub> level exceeded the target value at AQ-1. Possible sources for PM<sub>2.5</sub> is affected from natural origin such as dust from unpaved land area from outside of JMM factory and transportation in and around the monitoring area. However, the PM<sub>2.5</sub> result was lower than WHO's interim target 2 (0.050 mg/m<sup>3</sup>). Thus, there are no impacts from the operating activities of JMM Factory to the surrounding environment.

### **Noise and Vibration Level**

The results of noise and vibration level for NV-1 is lower than the target levels. Thus, there are no impacts from the operating activities of JMM Factory to the surrounding environment.

### **Indoor Air Quality**

The results of indoor air quality of PM<sub>2.5</sub>, PM<sub>10</sub> and VOC at Coater-A and Coater-B were lower than the target value. Thus, there are no impacts from the operating activities of JMM Factory to the surrounding environment.

### **Workplace Noise and Vibration Level**

The results of workplace noise and vibration level at near Coater-A, entry accumulator and near quality control laboratory were lower than the NIOSH guideline value. However, the results of workplace noise level at near Coater-A (INV-1) and entry accumulator (INV-2) were close to the NIOSH guideline value and the result of workplace noise level at near quality control laboratory was lower than the target value. Therefore, the standard earplug must be used when working in INV-1, INV-2 and INV-3.

The results of workplace vibration level at near Coater-A, entry accumulator and near quality control laboratory were lower than the target value. Thus, there are no impacts from the operating activities of JMM Factory to the workplace environment.

### **Emission Monitoring**

The results of emission monitoring of NO<sub>x</sub> at Regenerative Thermal Oxidizer (RTO) Stack and Chemical Drier Stack were lower than the target value. Thus, there are no impacts from the operating activities of JMM Factory to the surrounding environment.

In conclusion of this environmental survey, periodical monitoring will be necessary to grasp the surrounding environmental conditions and to show the compliance status in the operation phase of the JMM Factory. Once enough environmental data is collected, the mitigation measures for environmental management will be considered in the future, as necessary.



## APPENDIX-1 HOURLY AIR QUALITY RESULTS



Environmental Monitoring Report for Manufacturing of Metallic Coated Steel Strip and Painted Steel Strip of  
JFE Meranti Myanmar Co., Ltd. in Thilawa SEZ Zone B

Date	Time	CO	NO <sub>2</sub>	PM <sub>2.5</sub>	PM <sub>10</sub>	O <sub>3</sub>	SO <sub>2</sub>	Wind Speed	Wind Direction	
		mg/m <sup>3</sup>	m/s	Deg.	Direction					
		Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly
26 Dec, 2023	11:00 ~ 11:59	0.231	0.005	0.004	0.010	0.005	0.010	2.76	45	NE
26 Dec, 2023	12:00 ~ 12:59	0.274	0.004	0.002	0.004	0.008	0.001	2.02	47	NE
26 Dec, 2023	13:00 ~ 13:59	0.701	0.004	0.003	0.005	0.003	0.012	1.47	49	NE
26 Dec, 2023	14:00 ~ 14:59	0.401	0.004	0.002	0.004	0.002	0.034	1.33	33	NNE
26 Dec, 2023	15:00 ~ 15:59	0.316	0.004	0.018	0.030	0.002	0.038	1.60	12	NNE
26 Dec, 2023	16:00 ~ 16:59	0.458	0.004	0.015	0.028	0.016	0.040	1.48	157	SSE
26 Dec, 2023	17:00 ~ 17:59	0.329	0.039	0.026	0.043	0.070	0.052	1.47	229	SW
26 Dec, 2023	18:00 ~ 18:59	0.284	0.106	0.057	0.063	0.100	0.034	0.65	218	SW
26 Dec, 2023	19:00 ~ 19:59	0.292	0.093	0.048	0.054	0.084	0.020	0.63	209	SSW
26 Dec, 2023	20:00 ~ 20:59	0.305	0.066	0.032	0.039	0.061	0.005	0.43	203	SSW
26 Dec, 2023	21:00 ~ 21:59	0.302	0.117	0.030	0.036	0.063	0.015	0.33	186	S
26 Dec, 2023	22:00 ~ 22:59	0.408	0.260	0.045	0.050	0.091	0.017	0.28	189	S
26 Dec, 2023	23:00 ~ 23:59	0.259	0.106	0.058	0.063	0.065	0.018	0.35	12	NNE
27 Dec, 2023	0:00 ~ 0:59	0.263	0.078	0.085	0.092	0.057	0.015	0.37	18	NNE
27 Dec, 2023	1:00 ~ 1:59	0.382	0.066	0.081	0.087	0.056	0.016	0.38	18	NNE
27 Dec, 2023	2:00 ~ 2:59	0.485	0.077	0.081	0.088	0.051	0.015	0.48	19	NNE
27 Dec, 2023	3:00 ~ 3:59	0.525	0.155	0.096	0.105	0.056	0.015	0.70	53	NE
27 Dec, 2023	4:00 ~ 4:59	0.436	0.242	0.109	0.116	0.058	0.014	0.85	43	NE
27 Dec, 2023	5:00 ~ 5:59	0.369	0.157	0.092	0.098	0.047	0.016	0.80	38	NE
27 Dec, 2023	6:00 ~ 6:59	0.348	0.141	0.063	0.067	0.043	0.017	1.28	26	NNE
27 Dec, 2023	7:00 ~ 7:59	0.507	0.203	0.054	0.059	0.048	0.014	1.53	18	NNE
27 Dec, 2023	8:00 ~ 8:59	0.389	0.020	0.016	0.031	0.011	0.005	1.50	18	NNE
27 Dec, 2023	9:00 ~ 9:59	0.475	0.004	0.006	0.019	0.002	0.014	1.87	18	NNE
27 Dec, 2023	10:00 ~ 10:59	0.488	0.004	0.005	0.008	0.002	0.011	2.28	18	NNE

Max	0.701	0.260	0.109	0.116	0.100	0.052
Avg	0.384	0.082	0.043	0.050	0.074	0.019
Min	0.231	0.004	0.002	0.004	0.057	0.001

Note: Analysis result for Ozone is 8-hr maximum.



**APPENDIX-2 CERTIFICATE OF CALIBRATION**





## SYSTEM HEALTH CHECK REPORT

### Information

Instrument----- Haz-scanner  
Model----- EPAS  
Serial number----- 918189  
Unit Sensor----- CO,NO2,O3,NO,SO2,PM10  
PM2.5,T & RH,WS/WD,SLRR  
Customer----- Myanmar Koei International LTD.  
Date----- Sep-23

### Check List

Physical Check----- OK  
Supply Voltage Check----- OK  
PM 10,PM2.5 Air Flow Check----- OK  
SLRR,T & RH,WS/WD sensor Check----- OK  
NO Sensor Health Check----- Moderate  
CO,NO2,O3,SO2 Sensor Health Check----- Still Good  
Lithium Battery Voltage Check----- OK  
Data Logging Check----- OK  
Data Downloading Check----- OK

### Recommend

Need to replace new acid gas scrubber (schedule is 6 months)  
Need to replace internal filters (schedule is 6 months)  
Need to perform factory calibration or in-field calibration.(schedule is 12 months)

Performed by  
Phoe Saw Htoo  
Technical Service Engineer  
NANOVA CO.,LTD

Approved by  
Myo Oo  
Technical Service Manager  
NANOVA CO.,LTD

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**Calibration Record**

Project Name: *Regular check*

Calibration Date: *8.1.2024*

No.	Instrument (Brand, Model)	Sensor/Probe	Calibration Equipment	Unit	Calibration Index	Before Calibration	After Calibration	Remark
1.	Sound Level Meter (RION NL-43) Sr.No.00230104	Sound Level	NC-74 Sound Callibrator	dB	94	<i>93.7</i>	<i>94.0</i>	<i>Completed</i>
2.	Vibration Level Meter (RION VM-55) Sr.No.00627370	Vibration Level						No need calibration, as the manufactured date is within one year. (MFD - June 2023)

Calibrated by  
*Kyau Soe Thu*  
 Environmental Expert

Checked by  
*Thura Aung*  
 Environmental & Social Expert





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Date. 2.1.2024

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www.aeroqual.com

**Calibration Certificate No. 28133**

**Calibration Date: 17 Aug 2018 09:37**

**Model:** VOC PID 0-2000 ppm

**Serial No:** PDH-2707182-006

**Environmental Conditions**

Temperature  °C

Relative Humidity  %

**Measurements**

Calibration Standard /ppm	0.0	500.0	1000.0	0.0
AQL Sensor (Mean) /ppm	0.0	506.5	1012.4	0.0
AQL Sensor (Std. Dev) /ppm	0.000	2.124	0.866	0.000

\*The Mean and Standard Deviation are calculated from three consecutive readings.

**Calibration Standard**

This sensor was calibrated against a certified mixture of isobutene in synthetic air diluted with zero air using mass flow controllers with calibrations traceable to the National Institute of Standards and Technology (NIST).

**QC Approval:** Farid Yanes  
**Date:** 17 Aug 2018

**DECLARATION**

- Verification on measurement (by VOC sensor) has been done.
- Accuracy of measured data is acceptable (<+0.5 ppm).

Thura Aung  
Environmental and Social Expert



