

**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)**

**3<sup>rd</sup> March 2023**

**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@jfeemeranti.com">kkhant@jfeemeranti.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, working place noise and vibration level and emission monitoring had been monitored from 27 December to 28 December, 2022 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	27– 28 December 2022
	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	27 – 28 December 2022
	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	27 – 28 December 2022
	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 2022
	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
Working Place Noise Level	Survey Parameter	L <sub>Aeq</sub> (dB)
	Survey Period	27 <sup>th</sup> December 2022
	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
Working Place Vibration Level	Survey Parameter	L <sub>v10</sub> (dB)
	Survey Period	27 December 2022
	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	27 December 2022
	Number of Survey	at two points and half-hour/point
	Location	2 Points: 1) Regenerative Thermal Oxidizer (RTO) Stack and 2) Chemical Drier Stack

Source: Myanmar Koci International Ltd.



## CHAPTER 2: FIELD SURVEY

### 2.1 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. 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 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 27 December – 28 December, 2022	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 27 December 2022 – 28 December 2022.

### **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 Koci 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.

24 hours average concentration of PM<sub>2.5</sub> was slightly higher than the target value. Therefore, PM<sub>2.5</sub> result is compared with interim target 3 (0.0375 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 values, WHO guideline value, and both are shown in Figure 2.1-4, Figure 2.1-5 and Figure 2.1-6.

24 hours average concentration of SO<sub>2</sub> was slightly higher than the target value. Therefore, SO<sub>2</sub> 24-hr average result is compared with interim target 2 (0.050 mg/m<sup>3</sup>) of WHO Air Quality Guideline, 2021, and SO<sub>2</sub> 10-min result is compared with EQEG Guideline, 2015. We found that all results are lower than the WHO 24 hours guideline value and EQEG guideline value. The results of SO<sub>2</sub> 10-minute values and SO<sub>2</sub> 24-hour values compared with target values, WHO guideline value, and both are shown in Figure 2.1-7, Figure 2.1-8, Figure 2.1-9 and Figure 2.1-10.

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

Date	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>	
27 ~28 December, 2022							
24-hour Average Value	0.094	0.033	0.027	0.045	0.038	0.021	-
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 Avg)	0.02 (24-hr Avg)	-
EQEG Value <sup>3)</sup>	-	-	-	-	-	-	0.5 (10-minute)
WHO <sup>3)</sup> (Interim Target Value)	-	-	0.0375 (24-hr Avg)	0.075 (24-hr Avg)	-	0.050 (24-hr Avg)	-

Note:

1) Red color mentions the exceeded value for PM<sub>2.5</sub> and SO<sub>2</sub>.

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

3) EQEG- National Environmental Quality Emission Guideline, Myanmar (Dec, 2015)

4) 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 Koci International Ltd.

Wind direction and wind speed were measured at AQ-1. Hourly average values of measured wind



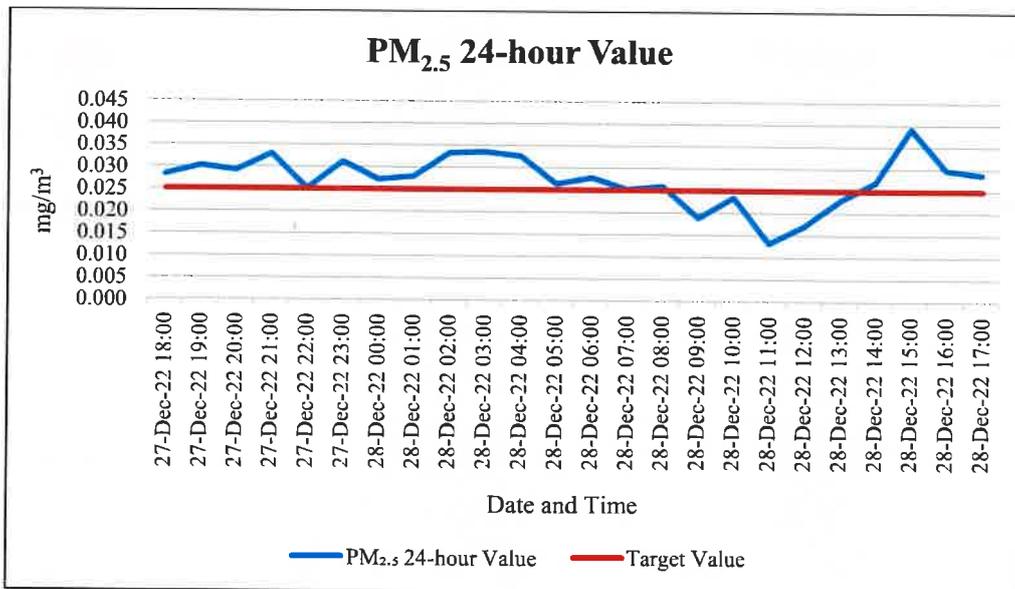
direction and wind speed data are described in Appendix-1. Status of ambient air quality monitoring point and wind direction are described in Figure 2.1-3. Depending on the wind direction, East (E), East-Northeast (ENE), Northeast (NE), North-Northeast (NNE), North (N), North-Northwest (NNW), Northwest (NW), West-Northwest (WNW), West (W) and West-Southwest (WSW) are assumed to come from the JFE factory compound. The wind came from other directions were from outside of the Project area, where, Thilawa Development Road, monastery, village, other factories at Thilawa industrial Zone and vacant lands.



Source: Google Earth

**Figure 2.1-3 Status of Ambient Air Quality Monitoring Point and Wind Direction**

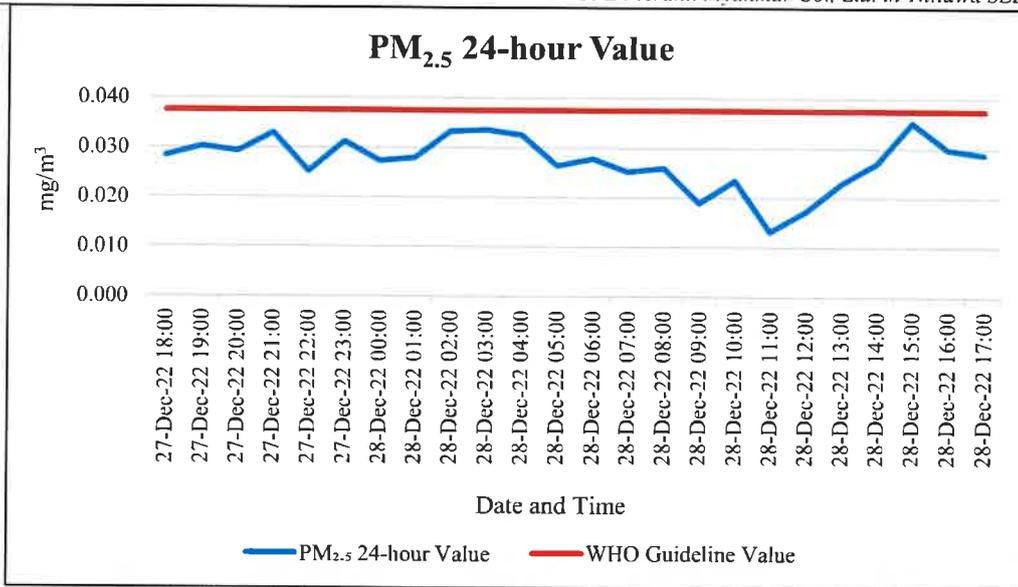
Remark: **N** North **NNE** North-Northeast **NE** Northeast **ENE** East-Northeast **E** East **ESE** East-Southeast **SE** Southeast **SSE** South-Southeast **S** South **SSW** South-Southwest **SW** Southwest **WSW** West-Southwest **W** West **WNW** West-Northwest **NW** Northwest **NNW** North-Northwest



Source: Myanmar Koci International Ltd.

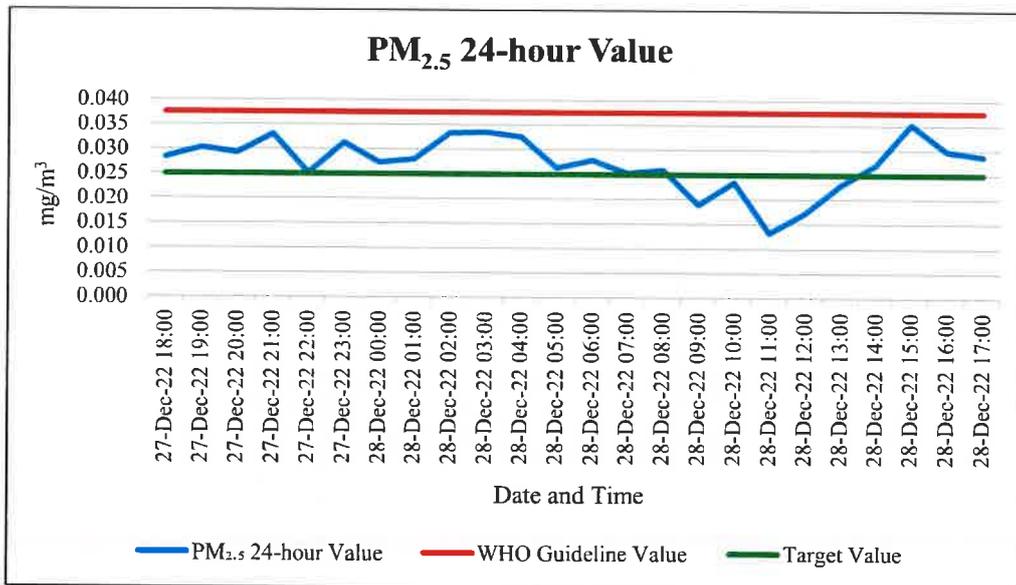
**Figure 2.1-4 PM<sub>2.5</sub> 24 hours Values and Target Value for Ambient Air Quality Monitoring**





Source: Myanmar Koei International Ltd.

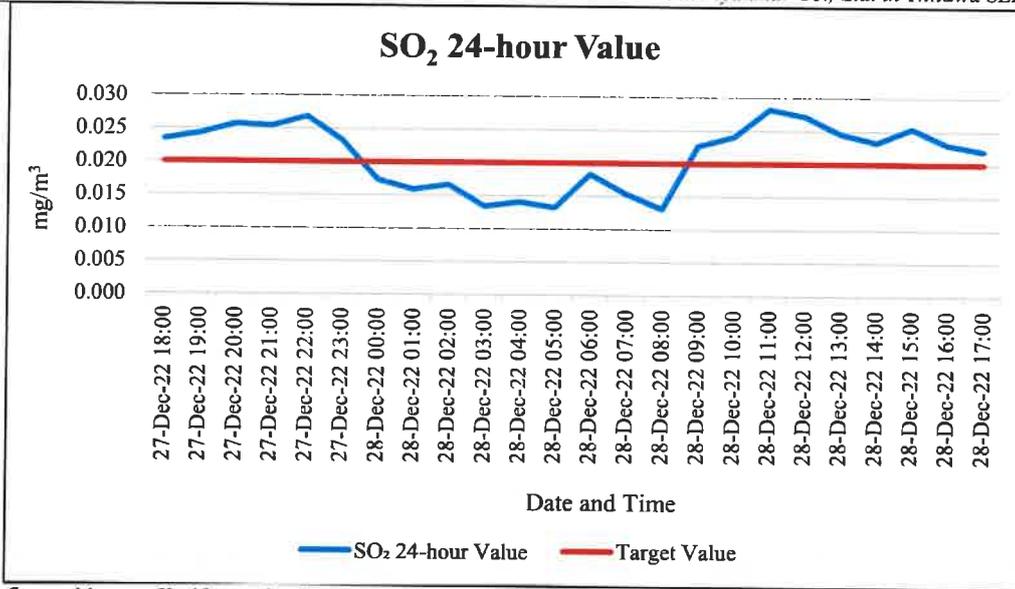
**Figure 2.1-5 PM<sub>2.5</sub> 24 hours Values and WHO Guideline Value for Ambient Air Quality Monitoring**



Source: Myanmar Koei International Ltd.

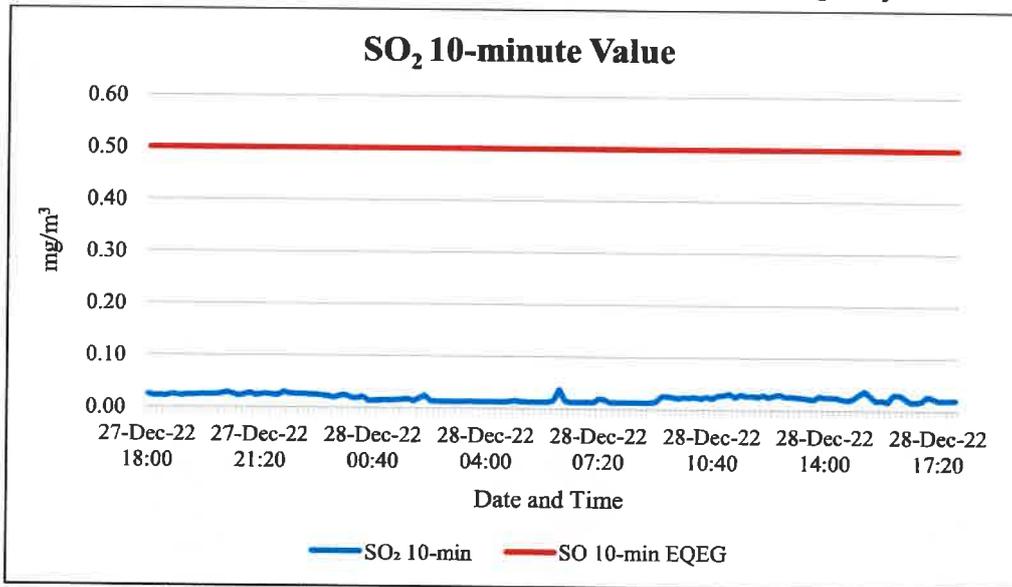
**Figure 2.1-6 PM<sub>2.5</sub> 24 hours Values, Target Value and WHO Guideline Value for Ambient Air Quality Monitoring**





Source: Myanmar Koei International Ltd.

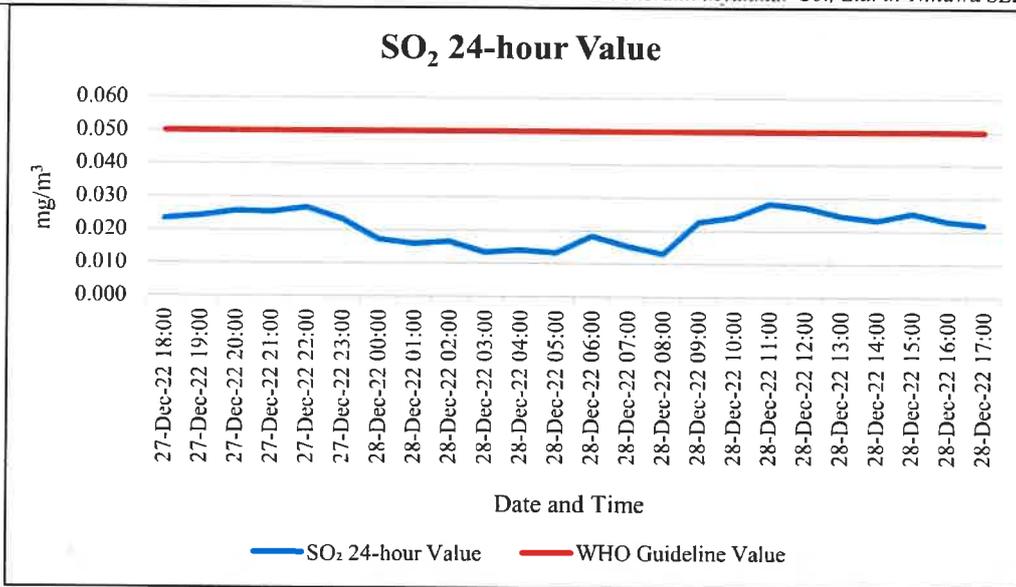
Figure 2.1-7 SO<sub>2</sub> 24 hours Values and Target Value for Ambient Air Quality Monitoring



Source: Myanmar Koei International Ltd.

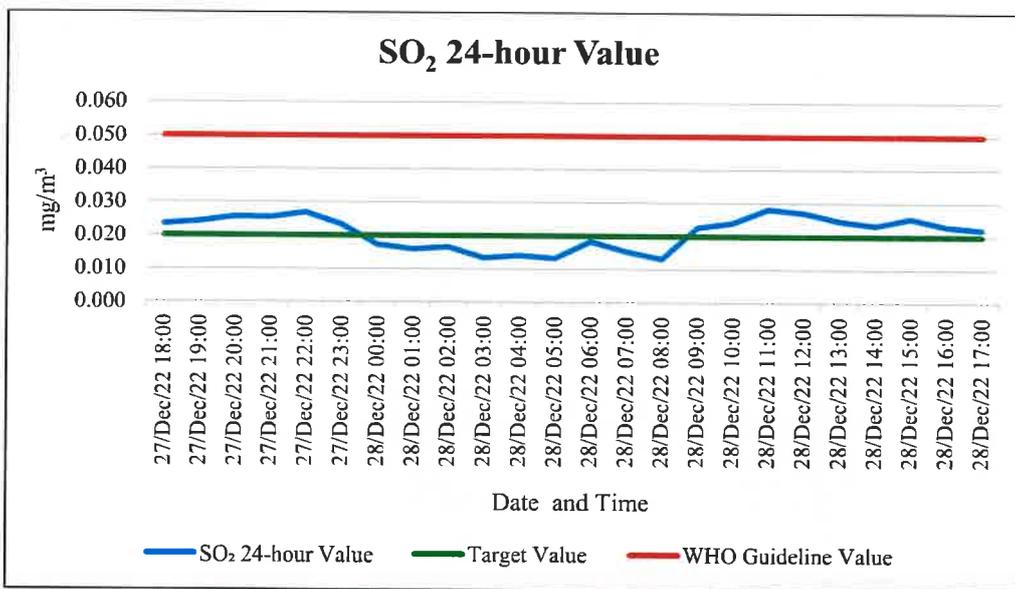
Figure 2.1-8 SO<sub>2</sub> 10-minute Values and EQEG Value for Ambient Air Quality Monitoring





Source: Myanmar Koei International Ltd.

**Figure 2.1-9 SO<sub>2</sub> 24 hours Values and WHO Guideline Value for Ambient Air Quality Monitoring**



Source: Myanmar Koei International Ltd.

**Figure 2.1-10 SO<sub>2</sub> 24 hours Values, Target Value and WHO Guideline Value for Ambient Air Quality Monitoring**

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

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

Date	Vehicle type	Quantity	Total
27 December, 2022	JMM Ferry	15	36
	JMM Rental Car	6	
	Contractor' Car	11	
	Employee' Car	4	
28 December, 2022	JMM Ferry	15	32
	JMM Rental Car	6	
	Contractor' Car	8	
	Employee' Car	3	

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 27 – 28 December, 2022	Outdoor Noise Level	L <sub>Aeq</sub> (dB)	1 (NV-1)	24 hours	On-site measurement by “Rion NL-42 sound level meter”
From 27 – 28 December, 2022	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 27 December 2022 – 28 December 2022.

### **2.2.4 Survey Method**

Outdoor noise level was measured by “Rion NL-42 sound level meter” and automatically recorded every 10 minutes in a memory card. The outdoor vibration level meter, VM-53A (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 ( $L_{Aeq}$ ) monitoring results at NV-1 is shown in Table 2.2-5 and Figure 2.2-3 showed the results of outdoor noise level ( $L_{Aeq}$ ) 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 the results were under the target values.

**Table 2.2-4 Results of Outdoor Noise Levels ( $L_{Aeq}$ ) Monitoring at NV-1**

Date	(Commercial and Industrial areas) Equivalent Noise Level ( $L_{Aeq}$ , 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)
27 December 2022 - 28 December 2022	55	53	53
Target Value	70	65	60

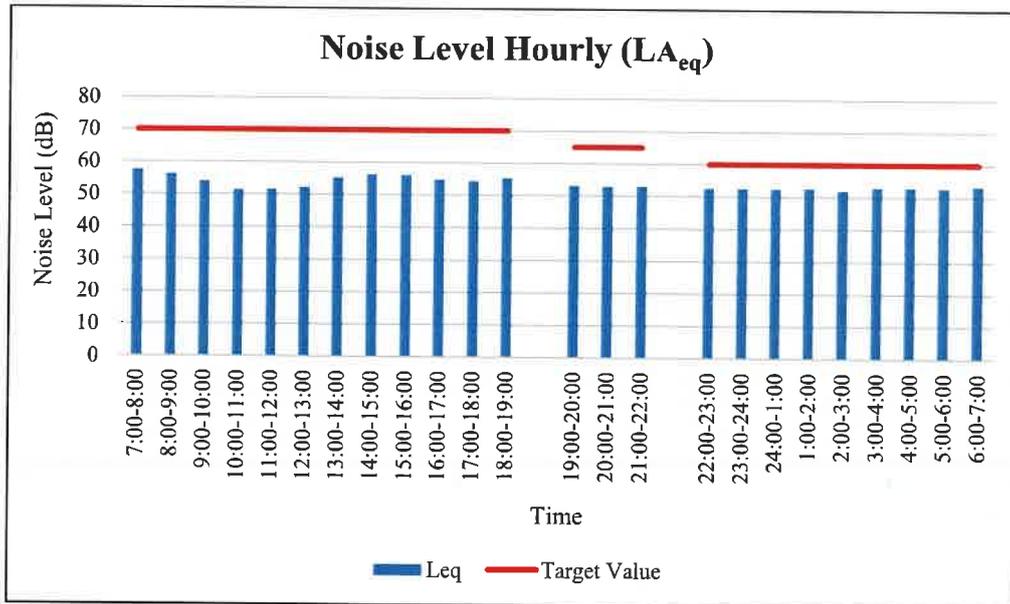
Note: Target value is referred to the final EIA report for JFE MERANTI Myanmar Co., Ltd.  
Source: Myanmar Koei International Ltd.



**Table 2.2-5 Hourly Outdoor Noise Level ( $L_{Aeq}$ ) Monitoring Results at NV-1**

Date	Time	( $L_{Aeq}$ , dB)	( $L_{Aeq}$ , dB) Each Category	( $L_{Aeq}$ , dB) Target Value
27 December 2022 – 28 December 2022	7:00-8:00	58	55	70
	8:00-9:00	56		
	9:00-10:00	54		
	10:00-11:00	51		
	11:00-12:00	52		
	12:00-13:00	52		
	13:00-14:00	55		
	14:00-15:00	56		
	15:00-16:00	56		
	16:00-17:00	55		
	17:00-18:00	54		
	18:00-19:00	55		
	19:00-20:00	53	53	65
	20:00-21:00	53		
	21:00-22:00	53		
	22:00-23:00	53	53	60
	23:00-24:00	53		
	24:00-1:00	52		
	1:00-2:00	53		
	2:00-3:00	52		
	3:00-4:00	53		
	4:00-5:00	53		
	5:00-6:00	53		
	6:00-7:00	53		

Source: Myanmar Koei International Ltd.



Source: Myanmar Koei International Ltd.

**Figure 2.2-3 Results of Outdoor Noise Levels ( $L_{Aeq}$ ) 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 showed 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 Levels ( $L_{v10}$ ) 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)
27 December 2022 - 28 December 2022	25	22	22
Target Value	70	65	60

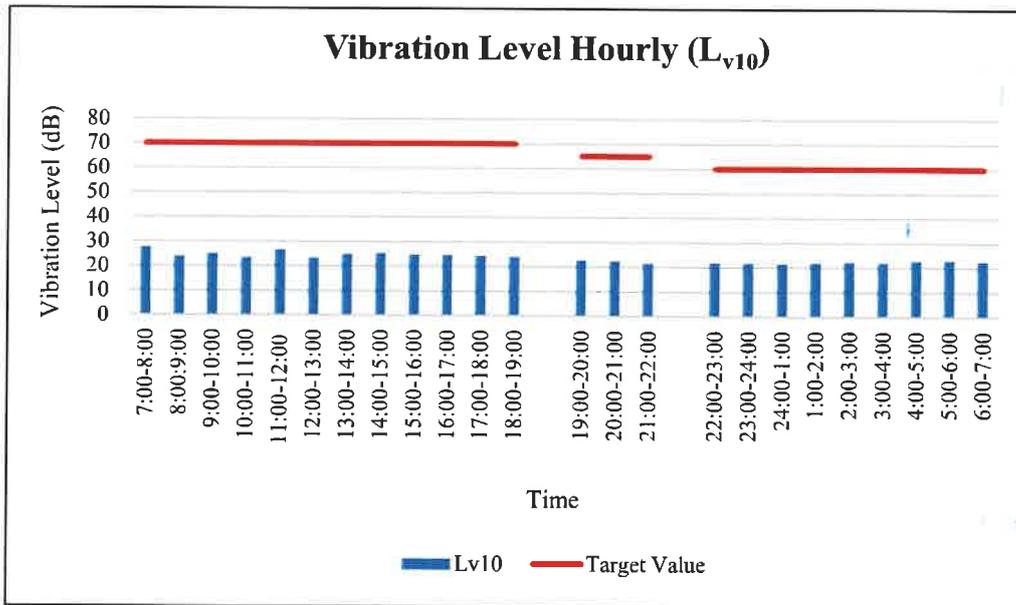
Note: Target value is referred to the final EIA report for JFE MERANTI Myanmar Co., Ltd.  
Source: Myanmar Koei International Ltd.

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

Date	Time	( $L_{v10}$ , dB)	( $L_{v10}$ , dB) Each Category	( $L_{v10}$ , dB) Target Value
27 December 2022 – 28 December 2022	7:00-8:00	28	25	70
	8:00-9:00	24		
	9:00-10:00	25		
	10:00-11:00	24		
	11:00-12:00	27		
	12:00-13:00	23		
	13:00-14:00	25		
	14:00-15:00	25		
	15:00-16:00	25		
	16:00-17:00	25		
	17:00-18:00	24		
	18:00-19:00	24		
	19:00-20:00	23	22	65
	20:00-21:00	23		
	21:00-22:00	22		
	22:00-23:00	22	22	60
	23:00-24:00	22		
	24:00-1:00	22		
	1:00-2:00	22		
	2:00-3:00	22		
	3:00-4:00	22		
	4:00-5:00	23		
	5:00-6:00	23		
	6:00-7:00	23		

Source: Myanmar Koei International Ltd.





Source: Myanmar Koei International Ltd.

**Figure 2.2-4 Results of Outdoor Vibration Levels ( $L_{v10}$ ) 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
27 December, 2022	JMM Ferry	15	36
	JMM Rental Car	6	
	Contractor' Car	11	
	Employee' Car	4	
28 December, 2022	JMM Ferry	15	32
	JMM Rental Car	6	
	Contractor' Car	8	
	Employee' Car	3	

Source: JFE Meranti Myanmar Co., Ltd.



## 2.3 Indoor Air Quality

The survey of Indoor air quality has been monitored at two locations which 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, 2022	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 which 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 2022.

**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 EPAS 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>.

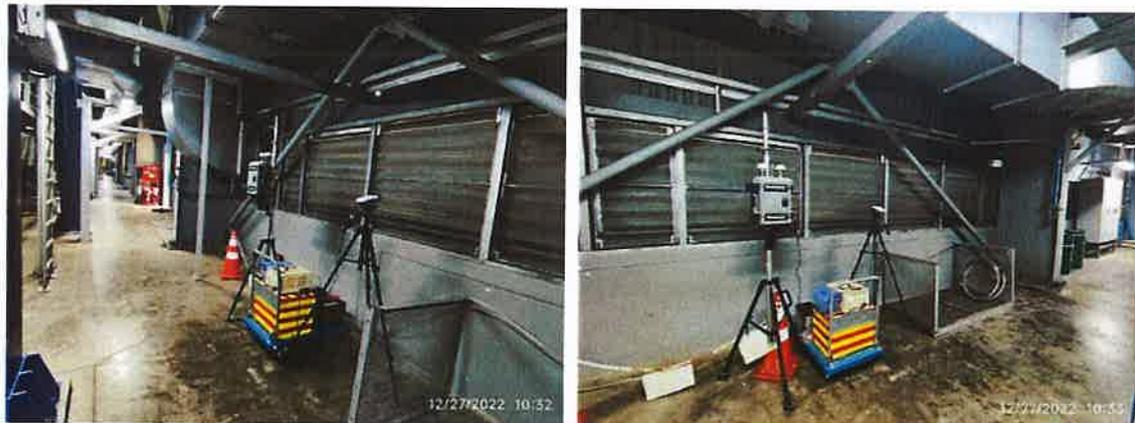
Survey of volatile organic compound (VOC) was conducted by using Aeroqual-500 series with VOC sensor (0-2000 ppm range). VOC sensor (0-2000 ppm range) was chosen because the measurement was conducted in indoor production area. The detailed information of VOC sensors with different ranges are described 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<sub>2.5</sub> and PM<sub>10</sub> 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<sub>2.5</sub> and PM<sub>10</sub> in Myanmar's EQEG guideline. Therefore, the values of PM<sub>2.5</sub> and PM<sub>10</sub> 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<sub>2.5</sub> and PM<sub>10</sub> 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 and Figure 2.3-5 showed the results of VOC for indoor air quality monitoring.

Table 2.3-4 Indoor Air Quality Result 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, 2022	11:00 ~ 12:59	IAQ-1	Coater-A	0.0339	0.0456
27 December, 2022	11:00 ~ 12:59	IAQ-2	Coater-B	0.0118	0.0199
<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.

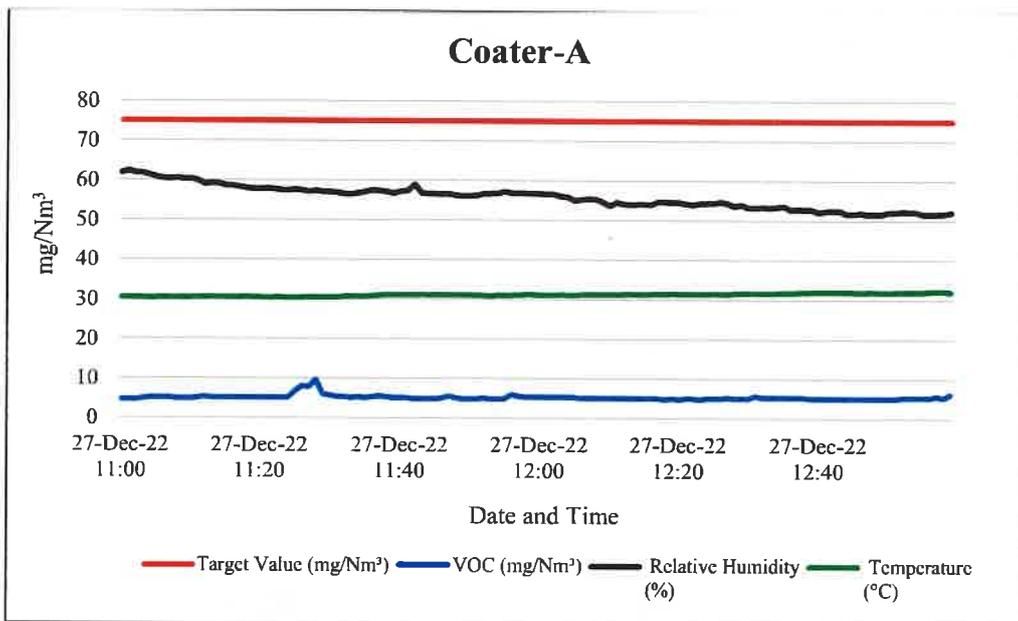


**Table 2.3-5 Indoor Air Quality Result of VOC (Two Hour Average)**

Date	Time	Survey Point	Survey Location	Relative Humidity	Temperature	VOC
				(%)	(°C)	(mg/Nm <sup>3</sup> )
27 December, 2022	11:00 ~ 12:59	IAQ-1	Coater-A	55.9	31.2	5.2
27 December, 2022	15:30 ~ 17:29	IAQ-2	Coater-B	48.8	34.4	5.5
<b>Target Value</b>				-	-	<b>75</b>

Note:

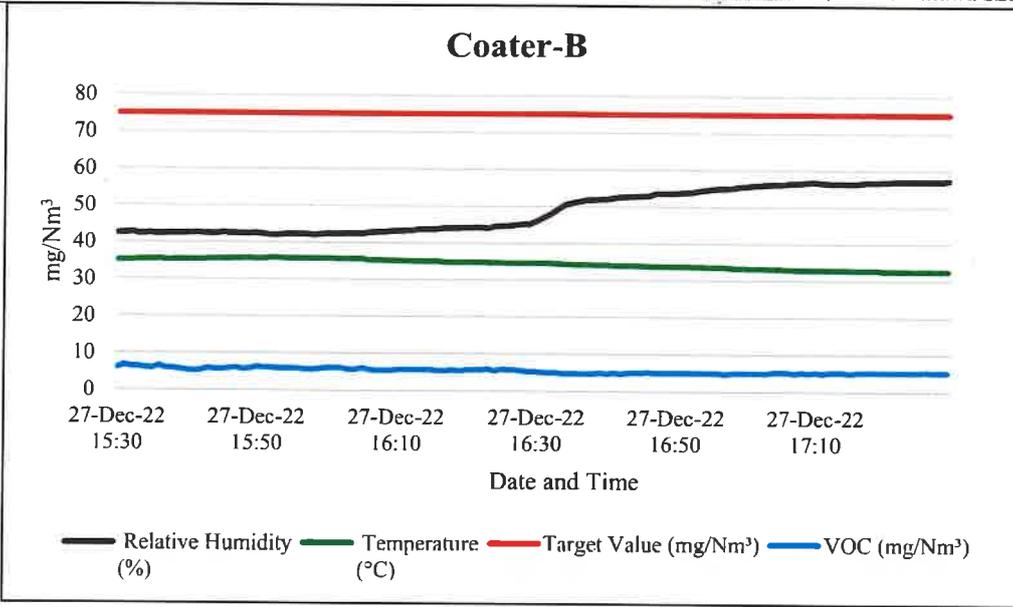
- 1) The value of VOC is two hours average. All results are lower than the target value.
  - 2) The value of VOC was converted to mg/Nm<sup>3</sup> from ppm.
  - 3) Target value is referred to the final EIA report for JFE MERANTI Myanmar Co., Ltd.
- Source: Myanmar Koei International Ltd.



Source: Myanmar Koei International Ltd.

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





Source: Myanmar Koei International Ltd.

**Figure 2.3-5 Results of Indoor Air Quality Monitoring (VOC) at Coater-B**

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

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

Monitoring Location	Operation 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.</p>	3 shifts per day	Two 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	Four persons per shift.

Source: JFE Meranti Myanmar Co., Ltd.



## 2.4 Working Place Noise and Vibration Level Monitoring

The survey of working place 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. Working place 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 working place 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
27 December, 2022	Working Place Noise Level	L <sub>Aeq</sub> (dB)	1 (INV-1)	1 hour/point	On-site measurement by “Rion NL-42 sound level meter”
27 December, 2022	Working Place Noise Level	L <sub>Aeq</sub> (dB)	1 (INV-2)	1 hour/point	On-site measurement by “Rion NL-42 sound level meter”
27 December, 2022	Working Place Noise Level	L <sub>Aeq</sub> (dB)	1 (INV-3)	1 hour/point	On-site measurement by “Rion NL-42 sound level meter”
27 December, 2022	Working Place Vibration Level	L <sub>v10</sub> (dB)	1 (INV-1)	1 hour/point	On-site measurement by “Vibration Level Meter- VM-53A”
27 December, 2022	Working Place Vibration Level	L <sub>v10</sub> (dB)	1 (INV-2)	1 hour/point	On-site measurement by “Vibration Level Meter- VM-53A”
27 December, 2022	Working Place Vibration Level	L <sub>v10</sub> (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 <sub>Aeq</sub> )
2	Vibration	Vibration level, vertical, percentile (L <sub>v10</sub> )

Source: Myanmar Koei International Ltd.

### 2.4.2 Survey Location

The location of the working place 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 working place 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**

Working place noise and vibration level monitoring were conducted one hour for each point on 27 December 2022.

### **2.4.4 Survey Method**

Working Place noise level was measured by “Rion NL-42 sound level meter” and automatically recorded every 10 minutes in a memory card. Working Place vibration level meter, VM-53A (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 working place of noise and vibration was one hour for each survey point. The status of the working place 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 Working Place Noise and Vibration Monitoring at Near Coater-A**



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



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



## 2.4.5 Survey Result

### Working Place Noise Measurement Results

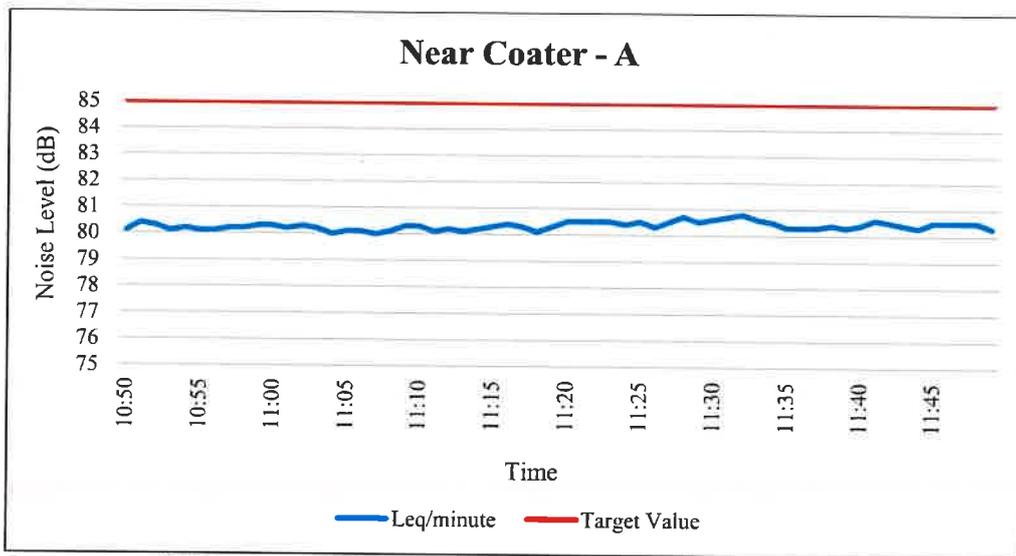
The one hour average value of working place noise monitoring results of INV-1, INV-2 and INV-3 are described in Table 2.4-4. The values of INV-1, INV-2 and INV-3 were compared with The National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention (CDC), U.S. 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, Figure 2.4-6 and Figure 2.4-7 showed the results of INV-1, INV-2 and INV-3 for working place noise monitoring.

**Table 2.4-4 Results of Working Place Noise Levels ( $L_{Aeq}$ ) Monitoring**

Date	Time	Survey Point	Location	$L_{Aeq}$ , dB
27 December, 2022	10:50 ~ 11:49	INV-1	Near Coater-A	80.3
27 December, 2022	12:10 ~ 13:09	INV-2	Entry Accumulator	81.1
27 December, 2022	15:40 ~ 16:39	INV-3	Near Quality Control Laboratory	77.0
<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).

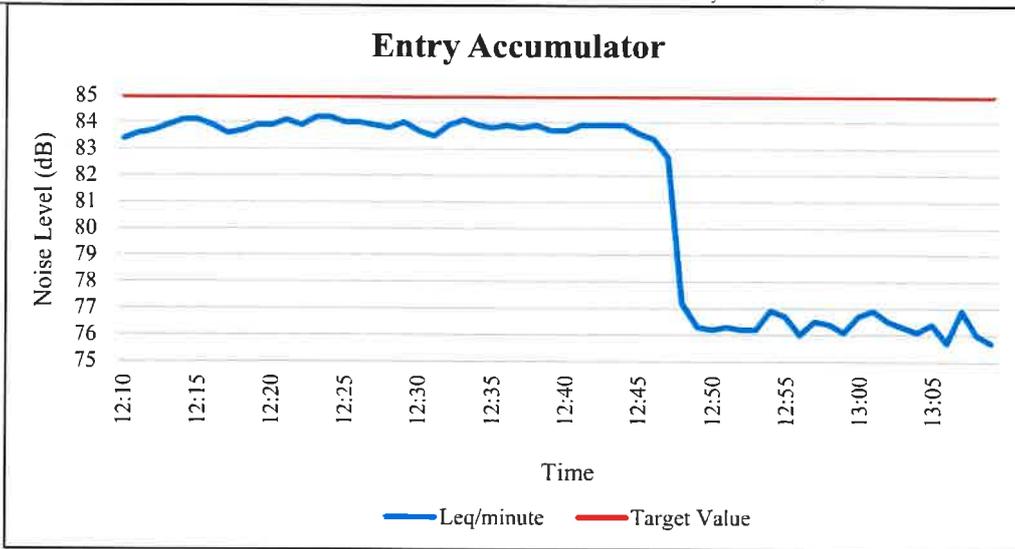
Source: Myanmar Koei International Ltd.



Source: Myanmar Koei International Ltd.

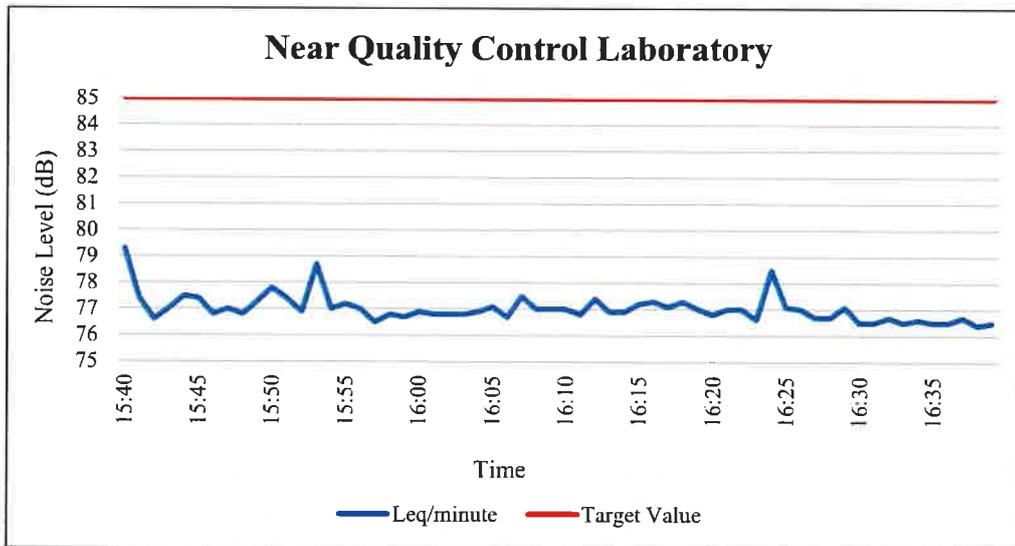
**Figure 2.4-5 Results of Working Place Noise Levels ( $L_{Aeq}$ ) Monitoring Near Coater-A**





Source: Myanmar Koei International Ltd.

Figure 2.4-6 Results of Working Place Noise Levels ( $L_{A_{eq}}$ ) Monitoring at Entry Accumulator



Source: Myanmar Koei International Ltd.

Figure 2.4-7 Results of Working Place Noise Levels ( $L_{A_{eq}}$ ) Monitoring 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.

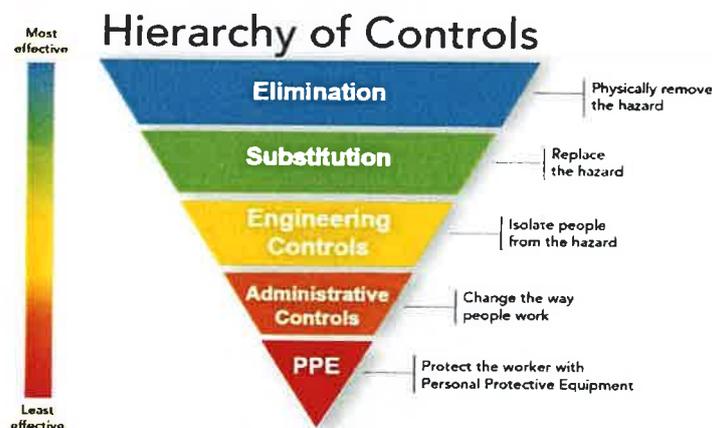
**Personal Protective Equipment (PPE):** The last option in the hierarchy of control PPE is generally less effective than elimination, substitution, and engineering controls because they rely on human actions to reduce noise. Personal protective equipment (PPE) for hearing protection is shown in Table 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 2.4-8.



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

**Figure 2.4-8 Hierarchy of Controls**



### Working Place Vibration Measurement Results

The one hour average value of working place 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 2.4-9, Figure 2.4-10 and Figure 2.4-11 showed the results of INV-1, INV-2 and INV-3 for working place vibration monitoring.

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

Date	Time	Survey Point	Location	( $m/s^2$ )
27 December, 2022	10:50 ~ 11:40	INV-1	Near Coater-A	0.00011
27 December, 2022	12:10 ~ 13:00	INV-2	Entry Accumulator	0.00007
27 December, 2022	15:40 ~ 16:30	INV-3	Near Quality Control Laboratory	0.00004
<b>Target Value</b>				<b>0.040</b>

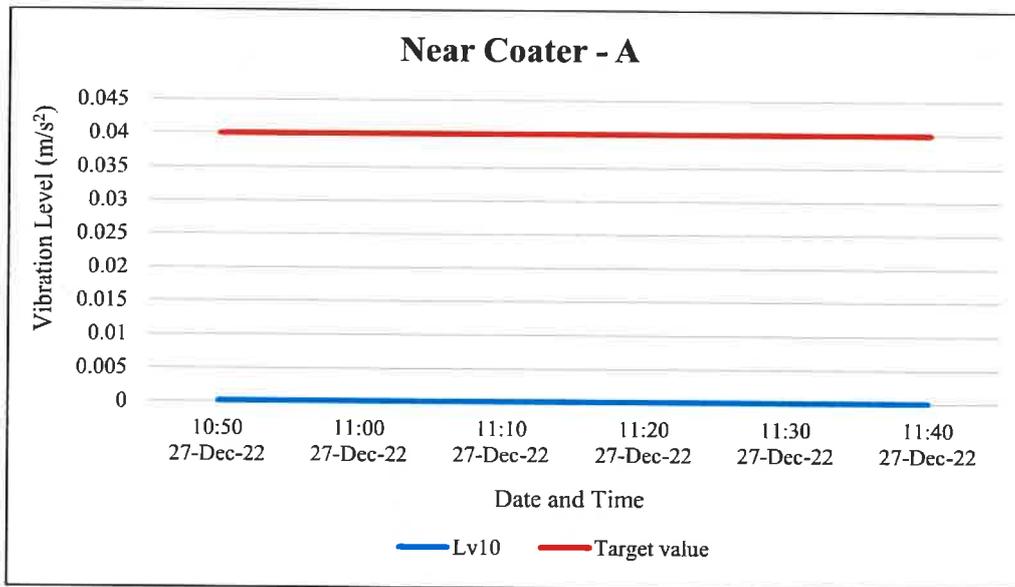
Note:

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 \(nsw.gov.au\)](http://www.nsw.gov.au/assessing-vibration-a-technical-guideline))

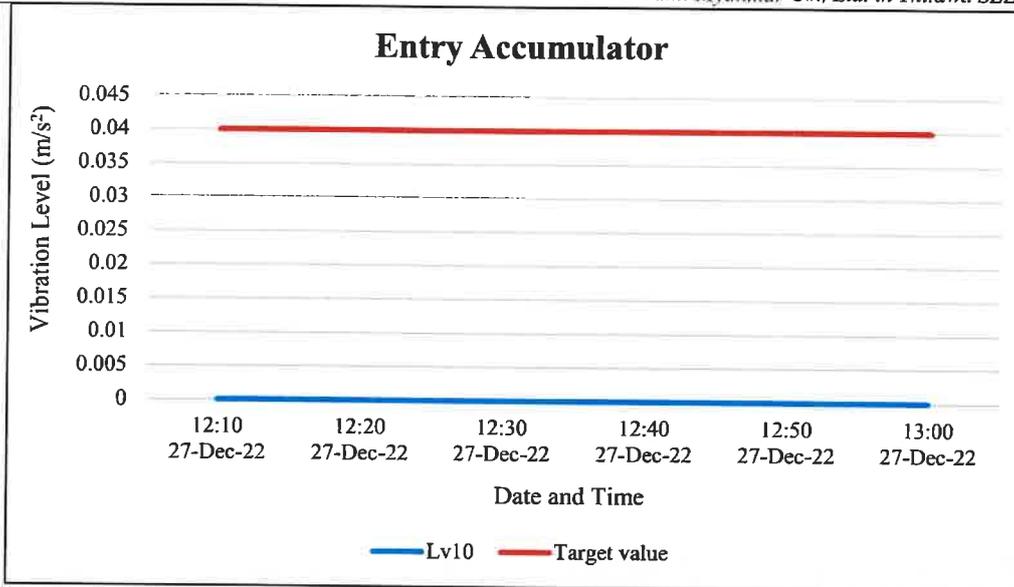
Source: Myanmar Koei International Ltd.



Source: Myanmar Koei International Ltd.

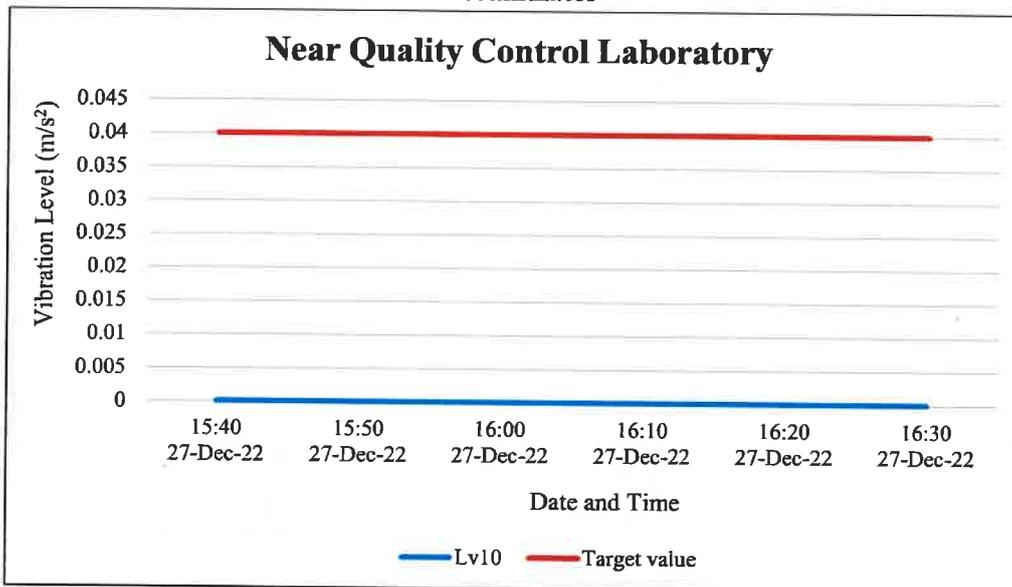
**Figure 2.4-9 Results of Working Place Vibration Levels ( $L_{v10}$ ) Monitoring Near Coater-A**





Source: Myanmar Koei International Ltd.

**Figure 2.4-10 Results of Working Place Vibration Levels (L<sub>v10</sub>) Monitoring at Entry Accumulator**



Source: Myanmar Koei International Ltd.

**Figure 2.4-11 Results of Working Place Vibration Levels (L<sub>v10</sub>) Monitoring Near Quality Control Laboratory**



The operation activities of JMM during the working place noise and vibration monitoring period is shown in Table 2.4-7.

**Table 2.4-7 Operation activities for Working Place Noise and Vibration Monitoring**

Monitoring Location	Operation 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.</p>	3 shifts per day	Two 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	Four persons per shift.
Entry Accumulator	Coil feeding and stitching operations are controlled by control room operators. No working activities in near entry accumulator.	3 shifts per day	one or two persons for petrolling
Near Quality Control Laboratory	Quality Control members conduct the quality checks on the painted product	3 shifts per day	Average 3 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
27 December, 2022	Emission Monitoring	NO <sub>x</sub>	2 points	Half an hour per 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 one day on 27 December 2022.

### 2.5.4 Survey Method

Survey of emission monitoring (NO<sub>x</sub>) were 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 measures automatically every one minute and directly reads and records 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 half-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 half-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> )
27 December, 2022	13:00 ~ 13:29	EM-1	Regenerative Thermal Oxidizer (RTO) Stack	7.35
27 December, 2022	10:46 ~ 11:15	EM-2	Chemical Drier Stack	8.58
<b>Target Value</b>				<b>320</b>

Note:

- 1) The value of NO<sub>x</sub> is half an 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 operation activities of JMM during the emission monitoring period is shown in Table 2.5-5.

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

Monitoring Location	Operation 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.	8 hours per shift, 3 shifts per day	A team of three employee do the startup and shut-down of Exhaust fans and equipment upstream of Exhaust fan as per operation startup and shut-down procedures. No operation activities on the stack itself.
Chemical Drier Stack	Gases in Chemical drying oven has been vented into atmosphere through Chemical Dyer Stack by Chemical dryer Exhaust Fan	8 hours per shift, 3 shifts per day	A team of three employee do the startup and shut-down of Chemical dryer Exhaust fan and equipment upstream of Exhaust fan as per operation startup and shut-down procedures. No operation activities on the stack itself.

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> and Ozone are under the target value at AQ-1, thus there are no impacts on the surrounding environment. On the other hand, concentration of PM<sub>2.5</sub> and SO<sub>2</sub> level exceeded the target value at AQ-1. However, the PM<sub>2.5</sub> result was lower than WHO's interim target 3 (0.0375 mg/m<sup>3</sup>) and SO<sub>2</sub> result was lower than both interim target 2 (0.050 mg/m<sup>3</sup>) and EQEG 10-mins guideline value. Thus, there are no impacts from the operation 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 operation 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 operation activities of JMM Factory to the surrounding environment.

### **Working Place Noise and Vibration Level**

The results of working place 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 working place noise level at near Coater-A (INV-1) and entry accumulator (INV-2) were close to the NIOSH guideline value and the results of working place noise level at near quality control laboratory was slightly high. Therefore, ear muffs must be used when working in (INV-1) and (INV-2) and wearing the standard earplug is acceptable to work in (INV-3).

The results of working place 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 operation 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 operation 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>	SO <sub>2</sub>	O <sub>3</sub>	Wind Speed	Wind Direction	
		mg/m <sup>3</sup>	m/s	Deg.	Direction					
		Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly
27 Dec, 2022	18:00 ~ 18:59	0.121	0.036	0.028	0.053	0.023	0.053	0.243	168	SSE
27 Dec, 2022	19:00 ~ 19:59	0.159	0.045	0.030	0.048	0.024	0.063	0.002	183	S
27 Dec, 2022	20:00 ~ 20:59	0.157	0.047	0.029	0.045	0.026	0.060	0.039	219	SW
27 Dec, 2022	21:00 ~ 21:59	0.127	0.051	0.033	0.047	0.025	0.063	0.131	235	SW
27 Dec, 2022	22:00 ~ 22:59	0.087	0.049	0.025	0.046	0.027	0.060	0.023	236	SW
27 Dec, 2022	23:00 ~ 23:59	0.060	0.048	0.031	0.045	0.023	0.058	0.048	230	SW
28 Dec, 2022	0:00 ~ 0:59	0.039	0.044	0.027	0.049	0.017	0.054	0.030	238	WSW
28 Dec, 2022	1:00 ~ 1:59	0.067	0.044	0.028	0.047	0.016	0.051	0.097	229	SW
28 Dec, 2022	2:00 ~ 2:59	0.068	0.043	0.033	0.045	0.017	0.049	0.015	223	SW
28 Dec, 2022	3:00 ~ 3:59	0.057	0.044	0.034	0.060	0.013	0.050	0.000	231	SW
28 Dec, 2022	4:00 ~ 4:59	0.061	0.045	0.033	0.068	0.014	0.046	0.000	228	SW
28 Dec, 2022	5:00 ~ 5:59	0.078	0.044	0.026	0.053	0.013	0.046	0.000	227	SW
28 Dec, 2022	6:00 ~ 6:59	0.133	0.048	0.028	0.050	0.018	0.049	0.000	227	SW
28 Dec, 2022	7:00 ~ 7:59	0.088	0.043	0.025	0.056	0.015	0.045	0.000	227	SW
28 Dec, 2022	8:00 ~ 8:59	0.023	0.011	0.026	0.039	0.013	0.008	0.060	215	SW
28 Dec, 2022	9:00 ~ 9:59	0.023	0.009	0.019	0.021	0.023	0.002	0.669	205	SSW
28 Dec, 2022	10:00 ~ 10:59	0.028	0.009	0.023	0.019	0.024	0.002	0.474	166	SSE
28 Dec, 2022	11:00 ~ 11:59	0.027	0.009	0.013	0.020	0.028	0.002	0.500	163	SSE
28 Dec, 2022	12:00 ~ 12:59	0.024	0.009	0.017	0.022	0.027	0.002	0.680	139	SE
28 Dec, 2022	13:00 ~ 13:59	0.026	0.009	0.023	0.019	0.025	0.002	0.669	183	S
28 Dec, 2022	14:00 ~ 14:59	0.090	0.009	0.027	0.051	0.023	0.005	2.081	209	SSW
28 Dec, 2022	15:00 ~ 15:59	0.217	0.013	0.039	0.066	0.025	0.031	2.001	203	SSW
28 Dec, 2022	16:00 ~ 16:59	0.245	0.030	0.030	0.055	0.023	0.053	1.004	186	S
28 Dec, 2022	17:00 ~ 17:59	0.262	0.043	0.029	0.051	0.022	0.060	0.747	174	S

Max	0.262	0.051	0.039	0.068	0.028	0.063	
Avg	0.094	0.033	0.027	0.045	0.021	0.038	
Min	0.023	0.009	0.013	0.019	0.013	0.002	



**APPENDIX-2 CERTIFICATE OF CALIBRATION**



**Certificate of Calibration**  
 Certificate Number: EDCQP200-4.11.5

**Environmental Devices Corporation** certifies the Haz-Scanner model EPAS is calibrated to published specifications and NIST traceable.

Calibration Dust Specifications are NIST traceable using Coulter Mutisizer II e. ISO12103 -1 A2 Fine Test Dust and is designed to agree with EPA Class I and Class III FRM and FEM particulate samplers and monitors and EN 12341 and EN 14907 standards.

Gas sensors are Calibrated against NIST/EPA traceable Calibration Gas using NIST primary Flow Standard: LFE774300 to ISO 17025 and EPA Instrumental Test Methods as defined by 40 CFR Part 60.

Quality system standard to meet the requirements of ANSI/ASQC standard Q9000-1994 (ISO 9001), MIL-STD 45662A, and customer's specification if required.

**Temperature = 22°C**  
**Relative Humidity = 30%**  
**Atmospheric Pressure = 760 mmHg**  
**Measurement Uncertainty Estimated @ 95% Confidence Level (k=2) using ISO 17025 guidelines.**

Model	Serial Number	Calibration Date	Next Calibration Due
EPAS-6000	S/N 918189	December 21, 2021	December 2022

Calibration Span Accessory if purchased	Sensor A K=	Sensor B K=	Model
	9.91	9.25	S-105

Technician	Supervisor
Dan Okuniewicz <i>[Signature]</i>	Mark Sullivan <i>[Signature]</i>

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