Executive Summary

This report documents the engineering basis supporting the preventive maintenance tasks in the Maintenance Intelligence Group AHU (AHU) library. It identifies what each task protects, the equipment/work function involved, the functional failure addressed, the relevant failure mode, the failure effects, the maintenance strategy applied, what the technician or maintainer should observe, what acceptable condition looks like, when corrective work should begin, and important site-specific limitations. The evaluation framework applies recognized reliability, maintenance, failure-analysis, and condition-monitoring principles while preserving a clear boundary between a library-level engineering basis and site-specific RCM, risk, and asset-management decisions.

PURPOSE
Provide transparent, reviewable engineering justification behind a curated preventive maintenance library without claiming that a facility-specific Reliability-Centered Maintenance analysis has been completed.

Scope

- 49 preventive maintenance task rows evaluated.
- Task instructions, intervals, estimated labor, engineering rationale, acceptance criteria, escalation triggers, and site-specific limitations.
- Production layout based on the approved engineering-review format.

What this report is not

This document is not a facility-specific RCM study. It does not establish asset criticality, production consequences, financial risk, regulatory applicability, or optimized intervals for a particular installation. Those decisions require the asset owner's operating context, duty cycle, failure history, and risk tolerance.

Role of the Industry Best PM Library

The Industry Best PM library provides a standardized preventive maintenance baseline for comparable equipment. Organizations should validate and adapt the baseline to their operating environment, equipment configuration, duty cycle, failure history, and site objectives.

Highly critical assets may benefit from vibration analysis, infrared thermography, ultrasound, or oil analysis where justified by asset criticality, operating conditions, failure history, business objectives, and site-specific requirements. These technologies are examples, not requirements.

Site-specific Reliability-Centered Maintenance studies may further refine maintenance tasks, intervals, and strategies. This report does not perform RCM, determine criticality, optimize intervals, or require predictive maintenance. It provides a defensible engineering baseline upon which organizations can build a site-specific maintenance strategy.

	requirements.
Corrective-maintenance trigger	Shaft run-out exceeding established manufacturer-, model-, configuration-, or site-specific acceptance criteria.
Engineering justification	Measuring shaft run-out with a micrometer directly assesses a critical physical parameter that indicates the shaft's straightness and balance. Excessive run-out is a direct cause of vibration, which can lead to catastrophic component failure. Early detection allows for planned corrective action, preventing unscheduled downtime, secondary damage, and potential safety incidents. The task is specific to belt-drive units where shaft alignment and run-out are critical for belt and bearing life.
Site-specific limitations	The specific acceptance criteria for shaft run-out are highly dependent on the AHU manufacturer, model, fan shaft design, and operational context. These values are not provided and must be sourced locally. The task is explicitly limited to 'belt-drive units'.

ANNUAL TASK 3 OF 23

Perform FAN Balancing Analysis

ENGINEERING CONCLUSION

This annual PM task utilizes vibration analysis to proactively monitor the condition of the AHU fan assembly, specifically targeting vibration-related failure modes. By establishing an acceptance criterion of 0.1 in/sec, it aims to detect developing faults such as imbalance or bearing degradation before they lead to functional failure, thereby supporting equipment reliability and preventing secondary damage.

Existing PM task

Task	PERFORM FAN BALANCING ANALYSIS
Instruction	Perform vibration analysis to ensure fan levels remain below 0.1 in/sec.
Interval / Time	Annual | 20 min
Source fields	Component: FAN ASSEMBLY | Indicator: VIBRATION LEVEL | Failure prevented: VIBRATION
Standards Basis Classification	Condition Monitoring | Failure Analysis | Condition-Directed Maintenance

Engineering evaluation

Equipment function	The primary function of the Air Handling Unit's fan assembly is to move air at a specified flow rate and pressure to maintain environmental conditions.
Functional failure	Failure to move air at the specified flow rate or pressure, or moving air with excessive noise or vibration.
Failure mode	Excessive vibration due to imbalance, misalignment, bearing degradation, or structural issues within the fan assembly.
Failure effects	Premature bearing failure, structural damage to the fan or AHU casing, increased energy consumption, reduced airflow, increased noise, and potential for catastrophic fan failure leading to unscheduled downtime.
Maintenance strategy	This is a condition-based maintenance (CBM) or predictive maintenance (PdM) task. It involves monitoring a key performance indicator (vibration) to detect early signs of degradation, allowing for planned intervention before functional failure occurs.
Observable indicators	Vibration velocity (e.g., in/sec) measured on the fan bearings or housing, and analysis of the vibration frequency spectrum.
Acceptance criteria	Vibration levels must remain below 0.1 in/sec. This value is explicitly stated in the task instruction.
Corrective-maintenance trigger	Vibration levels exceeding 0.1 in/sec, or a significant change in the vibration signature indicating a developing fault, should trigger further investigation and planned corrective maintenance (e.g., balancing, bearing replacement).
Engineering justification	Regular vibration analysis is an effective predictive maintenance technique for rotating equipment. It allows for the early detection of developing faults such as imbalance, misalignment, or bearing wear, which are primary causes of fan failure. This proactive approach prevents unexpected failures, reduces secondary damage, optimizes maintenance scheduling, and extends the operational life of the fan assembly.
Site-specific limitations	The specific fan model, size, speed, operating environment, and mounting configuration can influence baseline vibration levels and appropriate limits. While 0.1 in/sec is provided, its universal applicability without