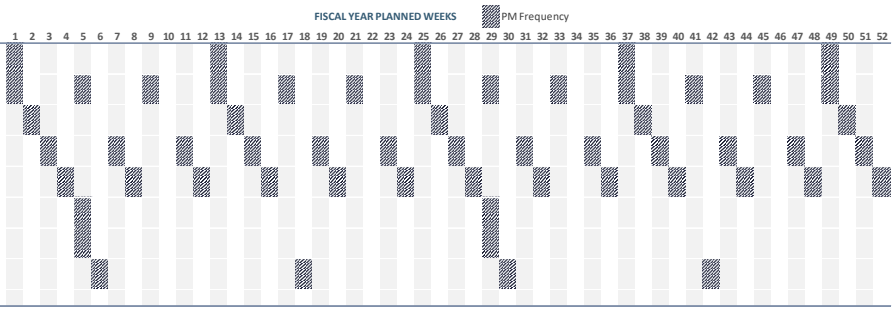
AIR HANDLING UNIT (AHU)

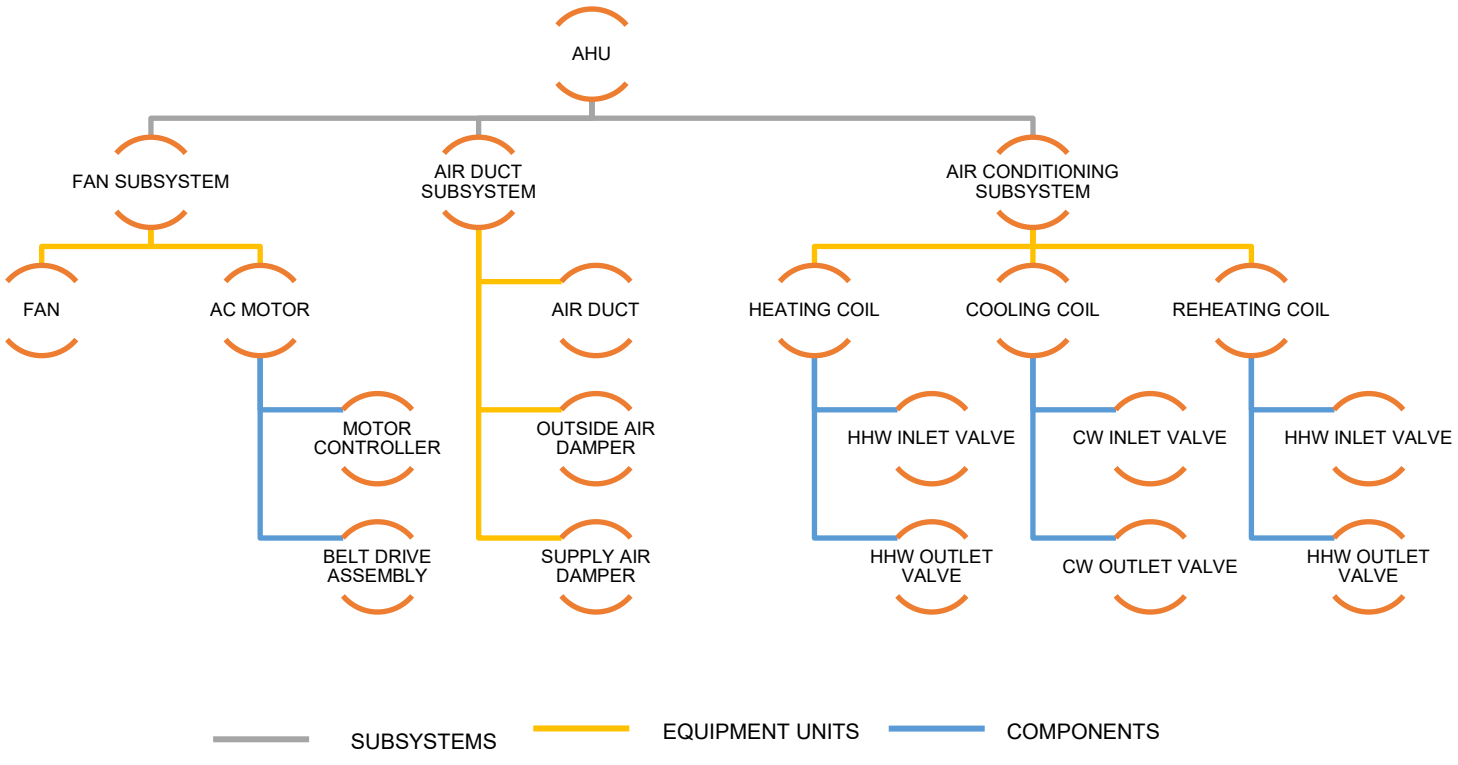
VERSION HISTORY				
VERSION	APPROVED BY	REVISION DATE	DESCRIPTION OF CHANGE	AUTHOR

PM SCHEDULE

PREVENTIVE TASK	FREQUENCY (days)	START (week #)	DURATION (hours)	CONDITION	CRAFT
Clean and Inspect Fan or Blower	90	1	2.0	SHUTDOWN	MECH
Inspect Drive Belt and Sheaves_V or Cogged	30	1	1.0	SHUTDOWN	MECH
Collect Vibration Data_Rotating Assets	90	2	0.5	RUNNING	PDM TECH
Grease Bearings_Rolling Element	30	3	0.5	RUNNING	MECH
Replace Air Filter_Paper or Cloth	90	4	0.5	IDLE	MECH
Clean Inspect and Lubricate Damper	180	5	0.5	SHUTDOWN	MECH
Measure Insulation Resistance_AC Motor	180	5	1.3	SHUTDOWN	ELEC
Visually Inspect Heating or Cooling Coils	90	6	2.5	SHUTDOWN	MECH



ASSET HIERARCHY



FAILURE MODES

ASSET CLASS	FAILURE MODE	CAUSE	FAILURE MODE DESCRIPTION
Belt, Drive	Damaged	Improper Tension	Belt, Drive Damaged due to Improper Tension
Belt, Drive	Glazed	Improper Tension	Belt, Drive Glazed due to Improper Tension
Belt, Drive	Slipping	Improper Tension	Belt, Drive Slipping due to Improper Tension
Belt, Drive	Wear	Improper Tension	Belt, Drive Wear due to Improper Tension
Belt, Drive	Damaged	Misalignment	Belt, Drive Damaged due to Misalignment
Belt, Drive	Broke	Material Fatigue	Belt, Drive Broke due to Material Fatigue
Belt, Drive	Damaged	Worn Sheave	Belt, Drive Damaged due to Worn Sheave
Belt, Drive	Slipping	Worn Sheave	Belt, Drive Slipping due to Worn Sheave
Belt, Drive	Damaged	Chemical Reaction	Belt, Drive Damaged due to Chemical Reaction
Belt, Drive	Damaged	Damaged	Belt, Drive Damaged due to Damaged
Belt, Drive	Damaged	Improper Installation	Belt, Drive Damaged due to Improper Installation
Belt, Drive	Glazed (Slipping)	Improper Tension	Belt, Drive Glazed (Slipping) due to Improper Tension
Belt, Drive	Damaged	Sheave Defect	Belt, Drive Damaged due to Sheave Defect
Belt, Drive	Glazed (Slipping)	Sheave Defect	Belt, Drive Glazed (Slipping) due to Sheave Defect
Belt, Drive	Wear	Unmatched Set (If Multiples)	Belt, Drive Wear due to Unmatched Set (If Multiples)
Belt, Drive	Glazed (Slipping)	Wrong Material	Belt, Drive Glazed (Slipping) due to Wrong Material
Belt, Drive	Wear	Wrong Material	Belt, Drive Wear due to Wrong Material
Fan	Debris Buildup	Contamination	Fan Debris Buildup due to Contamination
Fan	Cracking/Fatigued	Aerodynamic Forces	Fan Cracking/Fatigued due to Aerodynamic Forces
Fan	Cracking/Fatigued	Imbalance	Fan Cracking/Fatigued due to Imbalance
Fan	Weld Defect	Manufacturing Defect	Fan Weld Defect due to Manufacturing Defect
Fan	Cracking/Fatigued	Misalignment	Fan Cracking/Fatigued due to Misalignment
Fan	Cracked	Aerodynamic Forces	Fan Cracked due to Aerodynamic Forces
Fan	Imbalance	Bearing Defect	Fan Imbalance due to Bearing Defect
Fan	Pitting	Chemical Reaction	Fan Pitting due to Chemical Reaction
Fan	Imbalance	Eccentric Rotation	Fan Imbalance due to Eccentric Rotation
Fan	Imbalance	Fan Blade Defect	Fan Imbalance due to Fan Blade Defect
Fan	Eccentric Wheel	Manufacturing Defect	Fan Eccentric Wheel due to Manufacturing Defect
Fan	Imbalance	Manufacturing Defect	Fan Imbalance due to Manufacturing Defect
Fan	Imbalance	Material Buildup	Fan Imbalance due to Material Buildup
Fan	Cracked	Metal Fatigue	Fan Cracked due to Metal Fatigue
Fan	Imbalance	Misalignment	Fan Imbalance due to Misalignment
Fan	Low Flow	Motor Defect	Fan Low Flow due to Motor Defect
Fan	Low Flow	Filter Defect	Fan Low Flow due to Filter Defect
Fan	Worn	Abrasive Wear	Fan Worn due to Abrasive Wear
Fan	Fatigue	Aerodynamic Forces	Fan Fatigue due to Aerodynamic Forces
Fan	Corrosion-Pitting	Chemical Reaction	Fan Corrosion-Pitting due to Chemical Reaction
Fan	Corrosion-Thinning	Chemical Reaction	Fan Corrosion-Thinning due to Chemical Reaction
Fan	Eroded	Contamination	Fan Eroded due to Contamination
Fan	Eccentric Wheel	Damaged	Fan Eccentric Wheel due to Damaged
Fan	Imbalance	Debris Buildup	Fan Imbalance due to Debris Buildup
Fan	Rivet/Bolt Failure	Metal Fatigue	Fan Rivet/Bolt Failure due to Metal Fatigue
Fan	Insufficient Clearance	Improper Installation	Fan Insufficient Clearance due to Improper Installation
Fan	Low Flow	Valve Misalignment	Fan Low Flow due to Valve Misalignment
Filter, Air	Particulate bypassing	Missing Filter	Filter, Air Particulate bypassing due to Missing Filter
Filter, Air	Excessive Vacuum	Plugged	Filter, Air Excessive Vacuum due to Plugged

ASSET CLASS	FAILURE MODE	CAUSE	FAILURE MODE DESCRIPTION
Filter, Air	Particulate Bypassing	Restricted Flow	Filter, Air Particulate Bypassing due to Restricted Flow
Filter, Air	High Differential Pressure	Clogged	Filter, Air High Differential Pressure due to Clogged
Filter, Air	High Vacuum	Clogged	Filter, Air High Vacuum due to Clogged
Filter, Air	Plugged/Dirty	Contamination	Filter, Air Plugged/Dirty due to Contamination
Filter, Air	High Particulate	Damaged	Filter, Air High Particulate due to Damaged
Filter, Air	Plugged/Dirty	Material Fatigue	Filter, Air Plugged/Dirty due to Material Fatigue
Filter, Air	Excessive Pressure Drop	Filter Plugged	Filter, Air Excessive Pressure Drop due to Filter Plugged
Filter, Air	Excessive Pressure Drop	High Flow Rate	Filter, Air Excessive Pressure Drop due to High Flow Rate
Filter, Air	High Differential Pressure	High Moisture Saturation	Filter, Air High Differential Pressure due to High Moisture Saturation
Filter, Air	Excessive Pressure Drop	Wrong Material	Filter, Air Excessive Pressure Drop due to Wrong Material
Filter, Air	Particulate Bypassing	Wrong Material	Filter, Air Particulate Bypassing due to Wrong Material
Filter, Air	Excessive Vacuum	Damaged	Filter, Air Excessive Vacuum due to Damaged
Filter, Air	High Particulate	Improper Installation	Filter, Air High Particulate due to Improper Installation
Filter, Air	Particulate bypassing	Improper Installation	Filter, Air Particulate bypassing due to Improper Installation
Filter, Air	Restricted Air flow	Plugged	Filter, Air Restricted Air flow due to Plugged
Filter, Air	Particulate bypassing	Puncture/Rupture	Filter, Air Particulate bypassing due to Puncture/Rupture
Motor Starter	Fails Open	No Control Voltage	Motor Starter Fails Open due to No Control Voltage
Motor Starter	Fails Open	Damaged	Motor Starter Fails Open due to Damaged
Motor Starter	Fails Open	Loose Electrical Connection	Motor Starter Fails Open due to Loose Electrical Connection
Motor Starter	Open Circuit	Loose Electrical Connection	Motor Starter Open Circuit due to Loose Electrical Connection
Motor Starter	Open Circuit	Worn Contacts	Motor Starter Open Circuit due to Worn Contacts
Motor Starter	Open Circuit	No Control Voltage	Motor Starter Open Circuit due to No Control Voltage
Motor, AC, >25HP	Imbalance	Cracked	Motor, AC, >25HP Imbalance due to Cracked
Motor, AC, >25HP	Rotor Bar Defect	Cracked	Motor, AC, >25HP Rotor Bar Defect due to Cracked
Motor, AC, >25HP	Bent	Metal Fatigue	Motor, AC, >25HP Bent due to Metal Fatigue
Motor, AC, >25HP	Bent	Stress Fatigue	Motor, AC, >25HP Bent due to Stress Fatigue
Sensor, Thermocouple	Does Not Sense	Improper Installation	Sensor, Thermocouple Does Not Sense due to Improper Installation
Sensor, Thermocouple	Does Not Sense	Loose Electrical Connection	Sensor, Thermocouple Does Not Sense due to Loose Electrical Connection
Sensor, Thermocouple	Does Not Sense	Loose Mechanical Connection	Sensor, Thermocouple Does Not Sense due to Loose Mechanical Connection
Sensor, Thermocouple	Does Not Sense	Corrosion	Sensor, Thermocouple Does Not Sense due to Corrosion
Sensor, Thermocouple	Does Not Sense	Broken Tip	Sensor, Thermocouple Does Not Sense due to Broken Tip
Sensor, Thermocouple	Corroded Electrical Connections	Chemical Reaction	Sensor, Thermocouple Corroded Electrical Connections due to Chemical Reaction
Sensor, Thermocouple	Thermocouple Damaged	Manufacturing Defect	Sensor, Thermocouple Damaged due to Manufacturing Defect
Sensor, Thermocouple	Loose Electrical Connections	Improper Installation	Sensor, Thermocouple Loose Electrical Connections due to Improper Installation
Sensor, Thermocouple	Loose Mechanical Connections	Improper Installation	Sensor, Thermocouple Loose Mechanical Connections due to Improper Installation
Sensor, Thermocouple	Wrong Output	Improper Installation	Sensor, Thermocouple Wrong Output due to Improper Installation
Valve, Control	Fails to Operate	No Signal	Valve, Control Fails to Operate due to No Signal
Valve, Control	Fails to Regulate	Contamination	Valve, Control Fails to Regulate due to Contamination
Valve, Control	Fails to Regulate	Internal Defect	Valve, Control Fails to Regulate due to Internal Defect
Valve, Control	No Signal	Sensor Defect	Valve, Control No Signal due to Sensor Defect

Clean and Inspect Fan/Blower

VERSION HISTORY				
VERSION	APPROVED BY	REVISION DATE	DESCRIPTION OF CHANGE	AUTHOR

SCOPE

Describe for what or to whom the task plan applies.

This procedure applies to axial flow fans or shrouded blowers with permitted access to blade or fin surfaces.

PURPOSE

Describe the reason for the task plan.

To remove debris and material buildup, and to inspect blade or fin surfaces for defects that may cause an imbalance condition.

TERMS AND DEFINITIONS

Define any acronyms, jargon, or terms that might have multiple meanings.

TERM	DEFINITION
Unbalance	[Verb] An act causing the loss of balance.
Imbalance	[Noun] The state of not being balanced.

WARNINGS

Asset MUST BE SHUTDOWN and de-energized prior to commencing this procedure to avoid serious injury or death. Follow the Lockout/Tagout/Tryout procedure approved for the assigned asset.

CAUTIONS

Use caution not to damage blade or fin surfaces while cleaning to prevent the introduction of defects that may cause an imbalance condition.

ACCEPTANCE CRITERIA

If shrouded, blade or fin clearances from the outer edge to the shroud must be between the Minimum and Maximum allowable limits of the table below:

Fan Diameter	Minimum Clearance	Maximum Clearance
3 to 9 feet	1/4 inch	1/2 inch
>9 feet to 11 feet	1/4 inch	5/8 inch
>11 feet to 16 feet	1/4 inch	3/4 inch
>16 feet up to 40 feet	1/2 inch	1 inch
>40 feet	See OEM recommendations	See OEM recommendations

PERSONAL PROTECTIVE EQUIPMENT

Select the PPE required by your site safety regulations.

SPECIAL TOOLS AND MATERIALS

- Mechanic's tool kit
- Shop towels
- Flashlight
- Vacuum cleaner
- Soft bristle or non-metallic brush
- Hardened plastic or non-metallic scraper

TASK LIST

List the planned preventive or predictive tasks in sequential order.

SEQUENCE	TASK
10	Verify asset is de-energized in accordance with site policies and procedures.
20	Open or remove fan/blower access door or panel.
30	Using a vacuum cleaner and brush, remove all dirt and debris from blades or fins, shroud (if applicable), and surrounding areas.
40	Use a scraper to remove hardened buildup. Vacuum out all debris and cleaning residue.
50	Visually inspect blades or fins for signs of cracks, corrosion, pitting, or other defects that may cause an imbalance condition.
60	If shrouded, measure and record the blower outer edge diameter.
70	If shrouded, measure and record the bottom center clearance between the outer edge of the blade or fin and the shroud.
80	If shrouded, manually rotate the blower 90 degrees.
90	If shrouded, measure and record the bottom center clearance between the outer edge of the blade or fin and the shroud.
100	Remove tools and materials from fan/blower and surrounding areas.
110	Close or reinstall fan/blower access door or panel.

120	Visually inspect fan/blower foundation fasteners for evidence of elongation or mechanical looseness, including galled threads.
130	Record observed unacceptable or abnormal conditions for engineering analysis.
140	Remove Lockout/Tagout in accordance with approved procedures.
150	Energize and restore asset to normal operation. Note if unable to energize asset.

DATA CAPTURE

List data requested for engineering analysis. Enter "None" if no data is required.

METER READING	DATA	MANUAL MEASUREMENT	DATA
		Fan/Blower Diameter (feet)	
		Bottom Clearance #1 (inches)	
		Bottom Clearance #2 (inches)	

NOTES

Describe the observed unacceptable or abnormal conditions needed for engineering analysis.

Clean, Inspect, and Lubricate Damper

VERSION HISTORY				
VERSION	APPROVED BY	REVISION DATE	DESCRIPTION OF CHANGE	AUTHOR

SCOPE

Describe for what or to whom the task plan applies.

This procedure applies to controlled valves or plates that are used to regulate air flow through a VAV box, chimney, duct, or other air-handling equipment.

PURPOSE

Describe the reason for the task plan.

To identify defects that may limit or prevent the damper from regulating or stopping air flow when controlled or actuated.

TERMS AND DEFINITIONS

Define any acronyms, jargon, or terms that might have multiple meanings.

TERM	DEFINITION
Damper	A controlled valve or plate that stops or regulates the flow of air inside a duct, chimney, VAV box, air handler, or other air-handling equipment.

WARNINGS

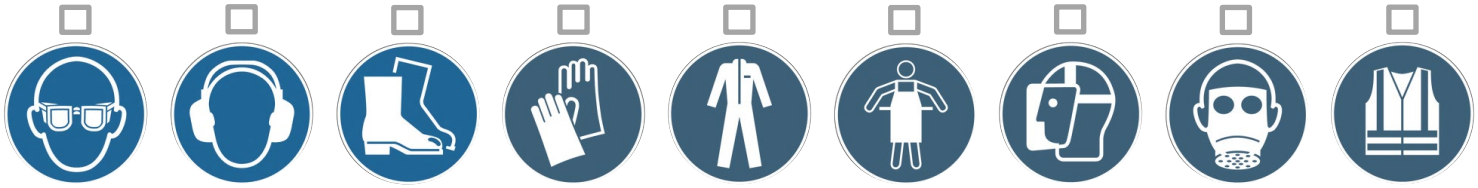
Asset MUST BE SHUTDOWN and de-energized prior to commencing this procedure to avoid serious injury or death. Follow the Lockout/Tagout/Tryout procedure approved for the assigned asset.

CAUTIONS

Use caution not to bend or distort control linkages while cleaning to prevent damaging control functions.

PERSONAL PROTECTIVE EQUIPMENT

Select the PPE required by your site safety regulations.



SPECIAL TOOLS AND MATERIALS

- Mechanic's tool kit
- Shop towels
- Flashlight
- Metallic bristle brush
- Approved lubricant (grease gun or spray)

TASK LIST

List the planned preventive or predictive tasks in sequential order.

SEQUENCE	TASK
10	Verify asset is de-energized in accordance with site policies and procedures.
20	Using a wire brush, clean the damper control linkages, pins, and connecting hardware to remove hardened grease and debris.
30	Visually inspect the damper surface for pitting, corrosion, deformation, and other evidence of damage.
40	Tighten control linkage and damper fasteners hand tight. Note missing fasteners.
50	If grease fittings are installed, lubricate the damper pins with a ½-stroke of grease using a 12 oz grease gun.
60	Without grease fittings installed, lubricate the damper pins with an approved rust inhibiting lubricant spray.
70	Remove excess lubricant from damper pins, linkages, and surfaces with a shop towel.
80	Record observed unacceptable or abnormal conditions for engineering analysis.
90	Remove Lockout/Tagout in accordance with approved procedures.
100	Energize and restore asset to normal operation. Note if unable to energize asset.

DATA CAPTURE

List data requested for engineering analysis. Enter "None" if no data is required.

METER READING	DATA	MANUAL MEASUREMENT	DATA

NOTES

Describe the observed unacceptable or abnormal conditions needed for engineering analysis.

Collect Vibration Data for Analysis

VERSION HISTORY				
VERSION	APPROVED BY	REVISION DATE	DESCRIPTION OF CHANGE	AUTHOR

SCOPE

Describe for what or to whom the task plan applies.

This procedure is for the collection of vibration data for rotating assets, such as electric motors, fans and blowers, pumps, and gearboxes or gear sets.

PURPOSE

Describe the reason for the task plan.

To collect vertical and horizontal vibration data per bearing and axial vibration data per shaft for engineering analysis to identify component defects and corrective actions.

TERMS AND DEFINITIONS

Define any acronyms, jargon, or terms that might have multiple meanings.

TERM	DEFINITION
DE	Drive End
ODE	Opposite Drive End

WARNINGS

Use extreme caution when working around energized rotating equipment to avoid serious injury. Follow all site safety procedures applicable to the performance of this task.

CAUTIONS

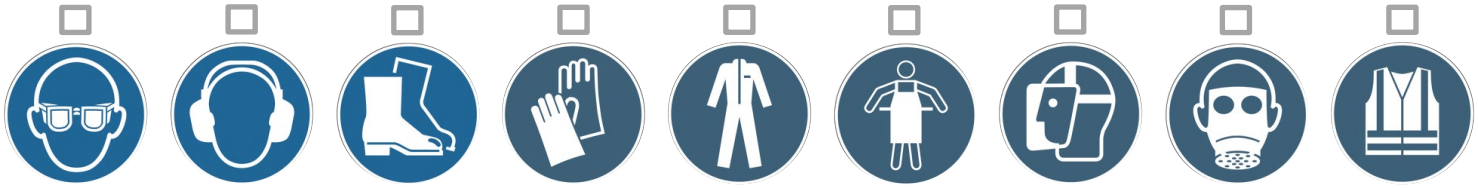
Equipment should be running under normal conditions for the duration of this procedure to ensure consistent data collection for engineering analysis.

ACCEPTANCE CRITERIA

Acceleration that is less than 0.20 in/sec is acceptable, between 0.20 in/sec and 0.35 in/sec requires additional monitoring to evaluate defect severity, and greater than 0.35 in/sec is unacceptable. Initiate follow-up corrective work order.

PERSONAL PROTECTIVE EQUIPMENT

Select the PPE required by your site safety regulations.



SPECIAL TOOLS AND MATERIALS

- Shop towels
- Flashlight
- Strobe tachometer
- Infrared thermometer
- Vibration monitoring equipment

TASK LIST

List the planned preventive or predictive tasks in sequential order.

SEQUENCE	TASK
10	Verify asset is running under normal load and at normal operating temperature for a minimum of 15 minutes.
20	Measure and record drive or input shaft RPM using a strobe tachometer.
30	Measure and record DE Bearing surface temperature for [Component 1] using an infrared thermometer.
40	Roll vibration transducer onto specified DE Bearing vertical reading test point and record data after 30 seconds.
50	Roll vibration transducer onto specified DE Bearing horizontal reading test point and record data after 30 seconds.
60	Measure and record ODE Bearing surface temperature for [Component 1] using an infrared thermometer.
70	Roll vibration transducer onto specified ODE Bearing vertical reading test point and record data after 30 seconds.
80	Roll vibration transducer onto specified ODE Bearing horizontal reading test point and record data after 30 seconds.
90	Repeat sequence 30-80 for [Component 2].
100	Roll vibration transducer onto specified axial reading test point and record data after 30 seconds.
110	Visually inspect components for evidence of damage, including deformation, discoloration, and product or material buildup.
120	Record observed unacceptable or abnormal conditions.
130	Remove all tools and materials, reinstall all safety guards (if applicable), and restore the asset to normal operation.

DATA CAPTURE

List data requested for engineering analysis. Enter "None" if no data is required.

METER READING	DATA	MANUAL MEASUREMENT	DATA
[Component 1] DE Bearing - Vertical		Drive or Input Shaft RPM	
[Component 1] DE Bearing - Horizontal		[Component 1] DE Bearing Surface Temperature	
[Component 1] ODE Bearing - Vertical		[Component 1] ODE Bearing Surface Temperature	
[Component 1] ODE Bearing - Horizontal		[Component 2] DE Bearing Surface Temperature	
[Component 2] DE Bearing - Vertical		[Component 2] ODE Bearing Surface Temperature	
[Component 2] DE Bearing - Horizontal			
[Component 2] ODE Bearing - Vertical			
[Component 2] ODE Bearing - Horizontal			
Axial Reading			

NOTES

Describe the observed unacceptable or abnormal conditions needed for engineering analysis.

Grease Rolling Element Bearings
(without Ultrasound)

VERSION HISTORY				
VERSION	APPROVED BY	REVISION DATE	DESCRIPTION OF CHANGE	AUTHOR

SCOPE

Describe for what or to whom the task plan applies.

This procedure is intended for the application of a calculated amount of grease to rolling element bearings that have a grease fitting and relief/purge fitting installed.

PURPOSE

Describe the reason for the task plan.

To ensure that bearings are properly lubricated based on a calculated grease volume to prevent component wear due to inadequate distribution of lubricant.

TERMS AND DEFINITIONS

Define any acronyms, jargon, or terms that might have multiple meanings.

TERM	DEFINITION

WARNINGS

Follow all safety procedures required by site safety regulations when working around energized and rotating equipment to prevent serious injury.

CAUTIONS

Equipment should be running under normal conditions for the duration of this procedure to ensure consistent distribution of lubricant.

Some grease types are incompatible and can induce premature component failure. Verify grease gun and grease is approved for use on rolling element bearings.

PERSONAL PROTECTIVE EQUIPMENT

Select the PPE required by your site safety regulations.

SPECIAL TOOLS AND MATERIALS

- Lint free clothes
- Recommended grease per site lubrication standards
- Foreign material exclusion grease fitting cap

TASK LIST

List the planned preventive or predictive tasks in sequential order.

SEQUENCE	TASK
10	Remove grease fitting cover and clean fitting with a lint free cloth.
20	Inspect grease fittings for evidence of damage, blockage or any other conditions that would prevent grease application.
30	Clean area around relief/purge fitting and remove relief/purge fitting.
40	Purge a small amount of grease from grease gun.
50	Attach grease gun to grease fitting.
60	Slowly apply one (1) full stroke of grease. Stop applying grease if excessive back pressure is observed.
70	Add grease to bearing taking 3-5 seconds per stroke.
80	Stop adding grease under the following conditions: • Fresh grease is observed from relief fitting, • Excessive back pressure is observed, or • A predefined amount of grease is applied to the bearing.
90	Remove grease gun from grease fitting.
100	Clean grease fitting and relief/purge fitting to remove excess grease.
110	Place a new cap on grease fitting.
120	Reinstall relief/purge fitting.
130	Record applied grease amount.

DATA CAPTURE

List data requested for engineering analysis. Enter "None" if no data is required.

METER READING	DATA	MANUAL MEASUREMENT	DATA
Run Hours		BEFORE Grease Gun Weight (oz.)	
Operating Temperature		Number of Strokes	
		AFTER Grease Gun Weight (oz.)	

Inspect Drive Belt and Sheaves

VERSION HISTORY				
VERSION	APPROVED BY	REVISION DATE	DESCRIPTION OF CHANGE	AUTHOR

SCOPE

Describe for what or to whom the task plan applies.

This procedure applies to cogged and V-belt drives with single-belt or multi-belt configurations. This procedure is not applicable to webbed drive belt configurations.

PURPOSE

Describe the reason for the task plan.

To prevent drive belt glazing, slipping, or damage caused by improper belt installation, improper belt tension, and sheave wear.

TERMS AND DEFINITIONS

Define any acronyms, jargon, or terms that might have multiple meanings.

TERM	DEFINITION
kgF	Kilogram-force – a non-standard gravitational metric unit of force

WARNINGS

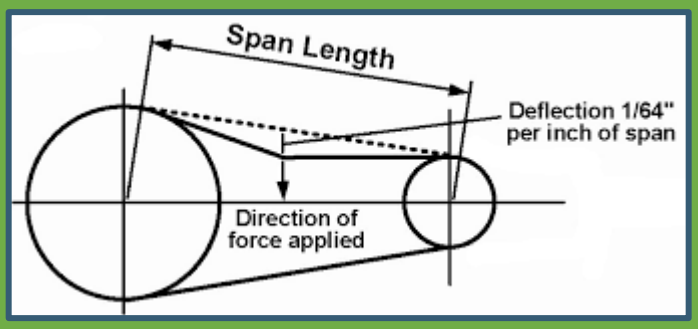
Asset MUST BE SHUTDOWN and de-energized prior to commencing this procedure to avoid serious injury or equipment damage. Follow the Lockout/Tagout/Tryout procedure approved for the assigned asset.

CAUTIONS

Refer to the drive belt Original Equipment Manufacturer's (OEM) Belt Tensioning Chart for a complete list of belt sizes and deflection force recommendations to prevent over tensioning.

ACCEPTANCE CRITERIA

Drive belt deflection should be approximately 1/64 inch (.016 in) per inch of span between center of sheaves.

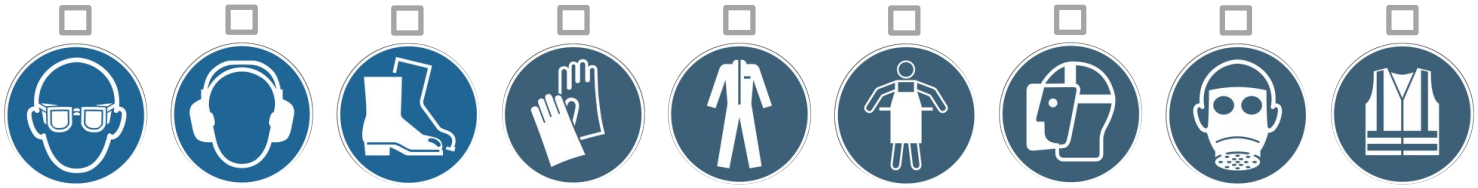


Sheave wear should not exceed the sheave gauge dimensions. Light should not be visible below or along the sides of the sheave gauge.

The drive belt should ride just above the highest point of the sheave. If the drive belt bottoms-out below the lip of the sheave, the drive belt will slip and glaze.

PERSONAL PROTECTIVE EQUIPMENT

Select the PPE required by your site safety regulations.



SPECIAL TOOLS AND MATERIALS

- Mechanic's tool kit
- Shop towels
- Belt tension gauge
- Sheave gauge

TASK LIST

List the planned preventive or predictive tasks in sequential order.

SEQUENCE	TASK
10	Verify asset is de-energized in accordance with site policies and procedures.
20	Remove safety guard to gain access to drive belt and sheaves.
30	Visually inspect drive belt for frayed edges, cracks, shiny spots, or other evidence of accelerated wear.
40	Using the sheave gauge, visually inspect the Drive End sheave for wear. Note unacceptable conditions.
50	Using the sheave gauge, visually inspect the Opposite Drive End sheave for wear. Note unacceptable conditions.
60	Measure and record the center-to-center span length between sheaves.
70	Calculate, record, and set the belt tension gauge depth to 1/64 inch (.016 in) per span length.
80	Deflect drive belt perpendicular to floor or baseplate using the belt tension gauge and record force applied.

90	Adjust drive belt tension to within OEM recommended limits.
100	Repeat sequence 60-80 to verify belt tension after adjustment. Note if unable to adjust drive belt tension within OEM limits.
110	Record observed unacceptable or abnormal conditions for engineering analysis.
120	Install safety guard and tighten fasteners hand tight.
130	Remove Lockout/Tagout in accordance with approved procedures.
140	Energize and restore asset to normal operation. Note if unable to energize asset.

DATA CAPTURE

List data requested for engineering analysis. Enter "None" if no data is required.

METER READING	DATA	MANUAL MEASUREMENT	DATA
		BEFORE - Span Length (inches)	
		BEFORE - Belt Deflection Depth (inches)	
		BEFORE - Belt Tension Force (kgF)	
		AFTER - Span Length (inches)	
		AFTER - Belt Deflection Depth (inches)	
		AFTER - Belt Tension Force (kgF)	

NOTES

Describe the observed unacceptable or abnormal conditions needed for engineering analysis.

Measure AC Motor Insulation Resistance

VERSION HISTORY				
VERSION	APPROVED BY	REVISION DATE	DESCRIPTION OF CHANGE	AUTHOR

SCOPE

Describe for what or to whom the task plan applies.

This procedure applies to AC motors greater than 25 horsepower with a motor controller.

PURPOSE

Describe the reason for the task plan.

To measure resistance, in megohm, from the motor controller through the AC motor to evaluate the impact of moisture, high-temperatures, and contamination on motor winding insulation.

TERMS AND DEFINITIONS

Define any acronyms, jargon, or terms that might have multiple meanings.

TERM	DEFINITION
Ohm	A measure of electrical resistance.
1 Megohm	Equal to 1,000,000 ohms.
Insulation Resistance	A condition of the material used, rated voltage, and wire size and length.
kV	Kilovolt – a measure of electric potential energy.

WARNINGS

Asset MUST BE SHUTDOWN and de-energized prior to commencing this procedure to avoid serious injury or death. Follow the Lockout/Tagout/Tryout procedure approved for the assigned asset.

Dangerous voltages may be present when Motor Controller is open or removed. Observe all electrical safety precautions required by site, local, and federal regulations.

Dangerous voltages may be present when energized using a megohmmeter. Do not touch the Motor Controller immediately after the megohmmeter test to avoid electrical shock.

CAUTIONS

DISCLAIMER

None

ACCEPTANCE CRITERIA

The Load to Ground insulation resistance of a new, clean, and dry motor is 10 Megohm or more. The Minimum Insulation Resistance (R) can be calculated by multiplying the rated voltage by a constant factor of 0.5 Megohm/kV.

PERSONAL PROTECTIVE EQUIPMENT

Select the PPE required by your site safety regulations.

SPECIAL TOOLS AND MATERIALS

- Mechanic's tool kit
- Shop towels
- Flashlight
- Infrared thermometer
- Multimeter
- Megohmmeter

TASK LIST

List the planned preventive or predictive tasks in sequential order.

SEQUENCE	TASK
10	Verify asset is de-energized in accordance with site policies and procedures.
20	Open or rack-out motor controller.
30	Measure and record motor controller surface temperature using an infrared thermometer.
40	Using a multimeter, verify motor controller circuits are de-energized.
50	Connect megohmmeter between the Load side and Ground.
60	Operate megohmmeter for 60 seconds and record insulation resistance reading.
70	Remove megohmmeter and close or rack motor controller.
80	Visually inspect motor controller for evidence of contamination or overheating, including discoloration and corrosion.
90	Record observed unacceptable or abnormal conditions for engineering analysis.
100	Remove Lockout/Tagout in accordance with approved procedures.
110	Energize and restore asset to normal operation. Note if unable to energize asset.

DATA CAPTURE

List data requested for engineering analysis. Enter "None" if no data is required.

METER READING	DATA	MANUAL MEASUREMENT	DATA
Insulation Resistance (Megohm)		Motor Controller Surface Temperature (°C)	

NOTES

Describe the observed unacceptable or abnormal conditions needed for engineering analysis.

Replace Air Filter

VERSION HISTORY				
VERSION	APPROVED BY	REVISION DATE	DESCRIPTION OF CHANGE	AUTHOR

SCOPE

Describe for what or to whom the task plan applies.

This procedure applies to paper or cloth consumable air filters that cannot be cleaned using water or steam.

PURPOSE

Describe the reason for the task plan.

To replace and discard air filters that are restricting air flow due to a buildup of dust, debris, oil, moisture, and other contaminants.

TERMS AND DEFINITIONS

Define any acronyms, jargon, or terms that might have multiple meanings.

TERM	DEFINITION

WARNINGS

Asset MUST BE SHUTDOWN and de-energized prior to commencing this procedure to avoid serious injury or equipment damage. Follow the Lockout/Tagout/Tryout procedure approved for the assigned asset.

CAUTIONS

Some air filters are directional. Verify the direction of air flow through the filter prior to installation to prevent damage to the equipment caused by high differential pressure or restricted air flow.

ACCEPTANCE CRITERIA

Complete this procedure when differential pressure across the fan/blower exceeds engineering or Original Equipment Manufacturer recommendations.

PERSONAL PROTECTIVE EQUIPMENT

Select the PPE required by your site safety regulations.

SPECIAL TOOLS AND MATERIALS

- Mechanic's tool kit
- Shop towels
- Flashlight
- Replacement air filter(s)

TASK LIST

List the planned preventive or predictive tasks in sequential order.

SEQUENCE	TASK
10	Verify asset is de-energized in accordance with site policies and procedures.
20	Observe and record fan/blower differential pressure prior to removing air filter(s).
30	Remove air filter(s) from filter track or enclosure.
40	Inspect filter track or enclosure for damage, including bent Sheetmetal, that may puncture, rip, or damage air filter(s).
50	Using a clean, oil-free shop towel, clean the filter track or enclosure to remove dust, dirt, and other debris.
60	Verify filter air flow direction and install replacement air filter(s).
70	Record observed unacceptable or abnormal conditions for engineering analysis.
80	Remove Lockout/Tagout in accordance with approved procedures.
90	Energize and restore asset to normal operation. Note if unable to energize asset.
100	Observe and record fan/blower differential pressure after installing replacement air filter(s).

DATA CAPTURE

List data requested for engineering analysis. Enter "None" if no data is required.

METER READING	DATA	MANUAL MEASUREMENT	DATA
BEFORE - Differential Pressure			
AFTER - Differential Pressure			

NOTES

Describe the observed unacceptable or abnormal conditions needed for engineering analysis.

Visually Inspect Heating/Cooling Coils

VERSION HISTORY				
VERSION	APPROVED BY	REVISION DATE	DESCRIPTION OF CHANGE	AUTHOR

SCOPE

Describe for what or to whom the task plan applies.

This procedure applies to both heating and cooling coils installed in air-handling enclosures. This procedure is not applicable to electric heating elements.

PURPOSE

Describe the reason for the task plan.

To prevent heat transfer loss caused by material thinning, erosion, and dirt, debris, or other contaminants.

TERMS AND DEFINITIONS

Define any acronyms, jargon, or terms that might have multiple meanings.

TERM	DEFINITION

WARNINGS

Asset MUST BE SHUTDOWN and de-energized prior to commencing this procedure to avoid serious injury or equipment damage. Follow the Lockout/Tagout/Tryout procedure approved for the assigned asset.

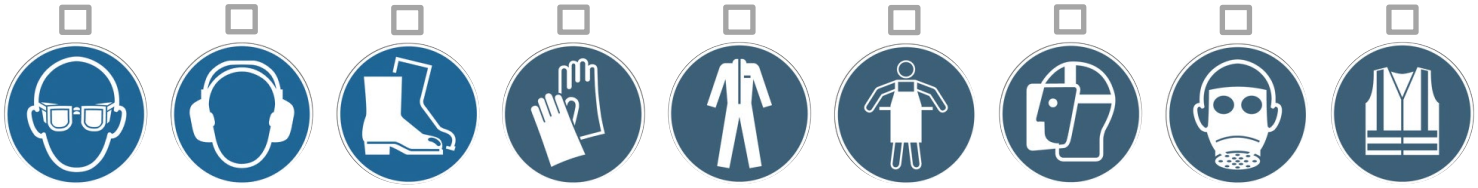
Use extreme caution when working around heating coils. High temperatures may exist after shutdown.

CAUTIONS

Use caution when cleaning coil fins or plates to prevent damage. DO NOT USE a wire brush to clean coil tubing, fins, or plates as this will cause thinning and may accelerate material corrosion or erosion.

PERSONAL PROTECTIVE EQUIPMENT

Select the PPE required by your site safety regulations.



SPECIAL TOOLS AND MATERIALS

- Mechanic's tool kit
- Shop towels
- Flashlight
- Soft bristle or non-metallic brush
- Vacuum cleaner

TASK LIST

List the planned preventive or predictive tasks in sequential order.

SEQUENCE	TASK
10	Verify asset is de-energized in accordance with site policies and procedures.
20	Open or remove access door or panel.
30	Visually inspect door or panel gasket for missing material, cracks, dry rot, or other evidence of fatigue.
40	Using a soft bristle brush, remove dirt and debris buildup from coil fins or plates.
50	Visually inspect coil fins or plates for evidence of erosion, including discoloration, pitting, or cracks.
60	Visually inspect coil tubing inlet/outlet flanges for moisture, discoloration, material buildup, or other evidence of external leaks.
70	Using a soft bristle brush, clean verdigris, or other evidence of corrosion, from coil tubing.
80	Visually Inspect each coil tubing plate passthrough for mechanical looseness, including shiny spots and wear grooves.
90	Vacuum loose debris and material from coil and surrounding areas.
100	Close or install access door or panel.
110	Visually inspect coil control valve for saturated lagging, standing water below the valve, or other evidence of external leaks.
120	Record observed unacceptable or abnormal conditions for engineering analysis.
130	Remove Lockout/Tagout in accordance with approved procedures.
140	Energize and restore asset to normal operation. Note if unable to energize asset.
150	Wait 15 minutes to each normal operating temperature and record coil inlet/outlet temperature for engineering analysis.

DATA CAPTURE

List data requested for engineering analysis. Enter "None" if no data is required.

METER READING	DATA	MANUAL MEASUREMENT	DATA
Inlet Temperature			
Outlet Temperature			

NOTES

Describe the observed unacceptable or abnormal conditions needed for engineering analysis.