Procedure Description	Frequency									Comments
	Weekly	Monthly	Bi-Monthly	Quarterly	Semi-Annually	Annually	Bi-Annually	Tri-Annually	Quinquennial	
TVS Axial Fans										
Axial Fans										
Operate fans and motor-operated dampers and listen for unusual noises	X									
Check for undue vibration.	X									If present, stop the fan at the earliest opportunity, check impeller for any dirt build-up on the blades, and clean as necessary.
Fan internals should be visually inspected.		X								Cleaning can be done with air or, preferably with a soft brush and vacuum. All connections and fastenings – bolts, clamps etc should be checked to ensure nothing is loose.
Check all bolts for tightness.				X						
Inspect inside and outside of housing and impeller for wear, deterioration, or build-up of material.				X						
Verify damper interlocks and operates properly through all positions.				X						
Fans should be inspected to ensure that there is no build-up of dirt or other matter that would cause overheating of the motor or obstruct the impeller track.				X						
Grease-lubricated bearing should be cleaned out and grease renewed.							X			a) High temperature grease must be adopted according to the motor data sheet. b) The motors are supplied with loose leads. Where a terminal box is fitted, all cable terminations should be tightly secured.
Fan Motor										
Check and record bearing and winding temperatures.	X									If elevated temperature readings are found, investigate equipment condition and/or lubricant condition and level.
Clean up of fan motor.		X								Clear away the dust and dirt on outside surface of enclosure and measure.
Check connecting terminals.		X								Check the connecting bolts (nuts) in terminal box to see whether connecting bolts (nuts) are loose or not. Replace them when necessary.
Check the bolts (nuts).		X								Check earthing bolts (nuts), fastening bolts on end shield and internal and external bearing covers, connection of ground lead and setting.
Check bearing.		X								Dismounting bearing cap, check whether the grease in bearings has been dirty and dried up or not. It should be replenished as required if there is short of grease. Replace the bearings when necessary. High temperature grease must be adopted according to the motor data sheet.
Check motor fan.		X								Check motor fan to see whether it has been ruptured or damaged and fixed firmly, fastening bolts (nuts) loosened, damaged, worn and deformed. Replace them when necessary.
Check the appearance of motors to see whether it has been damaged. Clear away dust and dirt and repair damaged sections.						X				Yearly maintenance or overhaul consists of monthly maintenance or routine repair.

Procedure Description	Weekly	Monthly	Bi-Monthly	Quarterly	Semi-Annually	Annually	Bi-Annually	Tri-Annually	Quinquennial	Comments
							Frequency			
Clear the inside of motors.										a) Check to see whether the stator windings are dirt and damaged. Clean away dust and dirt on the stators. If oil dirt can be found on stators, clean them with dry cloth first and then with dry cloth dipped a bit oil. At the same time, check winding insulation carefully to see whether there is any aging or scale off traces. If these traces are present, the stators should be repaired and painted. b) Check rotor winding to see whether rotor windings are dirt or damaged, observed visually the rotor end ring or color comparison to see whether there is any crack, staining and damage. c) Check stator and rotor cores to see whether there is any deformation, otherwise the stator and rotor cores should be repaired.
Check windings.						X				a) Check the stator windings and rotor windings to see whether short circuit or open circuit between inter-phases or inter-turns, tip-off and burnt out occur. If any, solve these discovered problems. b) Measure insulation resistance on all live parts with a megger and the insulation resistance value should be larger than 1MΩ.
Bearing clean and check.						X				a) Put the bearings into a container filled with gasoline and stir them time and again. Then hold bearing inner circle by hand and rotate top circle. During rotating, put them into another container for cleaning. It is enable to adopt shrink-on method when mounting bearings but the oil temperature should not be higher than 100℃/212°F and bearings should be heated even. b) Check bearing surface roughness and ball or bearing race to see whether bearings have become purple and annealed by heating. Replace bearings if necessary. c) Measure bearing internal and external diameter and width, if the condition permits.
Isolation Dampers										
Fan Isolation Dampers										
Operate motor-operated dampers and listen for unusual noises and vibrations	X									Perform operational checkout (including cycle testing – opening and closing the damper a few times under electrical power) and verify position status with the main control panel – This can be waived if dampers are cycled on a daily basis during normal use.
Check bearings for wear and dampers for debris.				X						
Clean damper blades and linkages.				X						Clean dirt and debris from the damper and actuators.
Visually inspect dampers and actuators for the build up of dirt, debris, wear and corrosion.					X					In general, the dampers must be kept clean and free from foreign matter that may impede normal movement and/or seating of the blades and seals. Therefore, dampers should be cleaned and inspected for general physical and mechanical condition. This inspection should include checking the mechanical tightness of bolted connections, visual inspection for the buildup of dirt or debris that may prevent damper closure and a general inspection for any obvious maintenance.
Inspect jamb and blade seals for damage and proper sealing.					X					
Inspect the dampers for premature corrosion.					X					
Check tightness of mechanical connections					X					Manually check all the fasteners to ensure they are still tight. This can be done by checking with hands only. Generally if a fastener is loose, this will be a noticable check. Tighten all fasteners as necessary.
Southbound Tunnel Dampers										

Procedure Description	Frequency									Comments
	Weekly	Monthly	Bi-Monthly	Quarterly	Semi-Annually	Annually	Bi-Annually	Tri-Annually	Quinquennial	
Operate motor-operated dampers and listen for unusual noises and vibrations.	X									Perform operational checkout (including cycle testing – opening and closing the damper a few times under electrical power) and verify position status with the main control panel – This can be waived if dampers are cycled on a daily basis during normal use.
Check bearings for wear and dampers for debris.				X						
Clean damper blades and linkages.				X						Clean dirt and debris from the damper and actuators.
Visually Inspect dampers and actuators for the build up of dirt, debris, wear and corrosion					X					In general, the dampers must be kept clean and free from foreign matter that may impede normal movement and/or seating of the blades and seals. Therefore, dampers should be cleaned and inspected for general physical and mechanical condition. This inspection should include checking the mechanical tightness of bolted connections, visual inspection for the buildup of dirt or debris that may prevent damper closure and a general inspection for any obvious maintenance.
Inspect jamb and blade seals for damage and proper sealing.					X					
Inspect the dampers for premature corrosion.					X					
Check tightness of mechanical connections					X					Manually check all the fasteners to ensure they are still tight. This can be done by checking with hands only. Generally if a fastener is loose, this will be a noticable check. Tighten all fasteners as necessary.
Coffin Dampers (Damper Doors)										
Operate motor-operated dampers and listen for unusual noises and vibrations.		X								Perform operational checkout (including cycle testing – opening and closing the damper a few times under electrical power) and verify position status with the main control panel.
Grease bearings using a lithium or lithium complex grease for bearing lubrication.			X							
Chains are to be lubricated with SAE 10W 40 oil.			X							
Check actuator performance.			X							Covers should not be removed during routine maintenance.
Actuator battery replacement.								X		Refer to ROTORK maintenance manual for procedures.
Carbon Monoxide Detection System										
Visual inpection				X						
Zero Calibration.					X					Calibration and maintenance is carried out using a Magnetic Wand, this allows a single user to undertake routine maintenance without needing to access internal components.
Span Calibration					X					
Check signal read by PLC/SCADA.					X					Ensure signal read by the SCADA is same as displayed by the CO detectors at each transmitter.
Standpipe										
Fire Department Connections Capped and Clear					X					NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems outlines the maintenance criteria and testing procedures for a manual dry standpipe.
Confirm threads are undamaged and caps in place.					X					
Test flow hydrant.					X					
Confirm top nut and caps are tight but not over-torqued .					X					
Operate all control valves by closing and opening low point drains					X					
Drain all low point drains.					X					
Inspect piping, hose connections and couplings.						X				
Hydrostatic testing of the system.									X	Every 5 years as per NFPA 25.
Fire Hydrants										

Procedure Description	Frequency									Comments
	Weekly	Monthly	Bi-Monthly	Quarterly	Semi-Annually	Annually	Bi-Annually	Tri-Annually	Quinquennial	
Grease top nut					X					
Confirm cap's in place					X					
Test flow hydrant					X					
Confirm top nut and caps are tight but not over-torqued					X					
Soundproofing										
Fan Sound Attenuation										
Visually inspect fan sound attenators for the build up of dirt, debris, wear and corrosion.					X					
Soundproofing Boards										
Visually inspect fan sound attenators for the build up of dirt, debris, wear and corrosion.					X					
HVAC										
Commercial Electric Unit Heater										
Check the tightness of all visible bolts and nuts, in particular the support structure bolts and nuts. Similarly check the motor mounting bolts located in the top and back of the heater case.					X					Potentially lethal voltages are present. Be sure to lock the branch circuit disconnect switch in the OFF position and tag the circuit "Out for Maintenance" before working on this equipment.
Check the motor, fan, discharge openings, intake openings, heating elements and control compartment for cleanliness.					X					If necessary, clean by using a vacuum or compressed air. Be careful not to bend the fan blade propeller.
Check that the electric motors are permanently lubricated and thermally protected.					X					
Inspect all terminal connections, contactor and conductor insulation for damage, looseness, fraying, etc., as applicable. Tighten any loose terminals and replace or repair wire with damaged or deteriorated insulation.					X					Badly pitted, welded together, or burned shall be replaced.
Fans										
All fasteners should be checked for tightness each time maintenance checks					X					
Motor maintenance is generally limited to cleaning and lubrication (where					X					
Motors supplied with grease fittings should be greased in accordance with manufacturer's recommendations.					X					Where motor temperatures do not exceed 104°F (40°C), the grease should be replaced after 2000 hours of running time as a general rule. All bearings on standard Model BSQ fans are factory lubricated and require no further lubrication under normal use (between -20°F and 180°F in a relatively clean environment).
Belts should be checked periodically for wear and tightness.					X					For belt replacement, loosen the tensioning device far enough to allow removal of the belt by hand. Do not force belts on or off. This may cause cords to break, leading to premature belt failure. Once installed, adjust belts as shown in "Pre-Starting Checks."
Dampers										
Operate motor-operated dampers and listen for unusual noises and vibrations				X						
Check bearings for wear and dampers for debris.				X						

Procedure Description			Frequency									Comments
			Weekly	Monthly	Bi-Monthly	Quarterly	Semi-Annually	Annually	Bi-Annually	Tri-Annually	Quinquennial	
	Visually inspect dampers and actuators for the build up of dirt, debris, wear and corrosion.					X						a) If cleaning is necessary, use mild detergents or solvents. Clean with a non-oil based solvent. b) If lubrication is desired for components such as axle bearings, jackshaft bearings and jamb seals, do not use oil-based lubricants or any other lubricants that attract contaminants such as dust.
Split-System												
	Check certical centrifugal pump.						X					Ensure pump is automatically starting and stopping and performing as designed.
	Carry out a malfunction-diagnosis using the remote controller.						X					When a malfunction occurs to air conditioner, both indoor unit and outdoor unit will stop and operation lamp blinks to inform unusual stop.