Operations and Maintenance

Recommendation 1.3

April 2001

Handbook for School Facilities

Alberta Infrastructure

Alberta Learning

Operations & Maintenance Sub-Committee

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1.0 Introduction

1.1 GENERAL

This manual is intended to provide information and assistance to School Boards with respect to operations and maintenance of school facilities. The manual references activities that are normally included in a comprehensive plant operation and maintenance program.

Three categories of information are presented in this document: expectations, guidelines, and standards. 'Expectations' are utilized to inform the practitioner of the broad scope of opportunity available for each functional category. 'Guidelines' provide useful direction on operation and maintenance requirements. They are also used to introduce facility managers to the appropriate codes, bylaws, regulations referenced in the Standards. 'Standards' are legislative references that are non-negotiable in terms of compliance.

This document is part of a compendium of available information that collectively, will provide information to each School Board, in particular the facility operations and maintenance staff. The guidelines presented are not to be construed as prescriptive, where local practice meets or exceeds the guidelines common sense should prevail.

Feedback is encouraged and should be directed to the office of the Executive Director, c/o Alberta Learning and Housing Facilities Branch, 3rd Floor, 6950-113 Street, Edmonton, Alberta, T6H 5V7.

1.2 PURPOSE OF STANDARDS & GUIDELINES

School facility infrastructure is critical to excellence in teaching and learning opportunities. Classrooms, gymnasiums, playfields, playstructures are the physical learning environments which operations and maintenance are responsible for. The purpose therefore, for providing expectations, guidelines and standards is to ensure that the investment in infrastructure is protected in a consistent, measurable and sustainable manner.

The information contained within this document represents practices and procedures that are a framework, intended to guide and influence but not be prescriptive. Each school board is unique and must use these guidelines in a way that best meets their individual needs. Similarly this document is not all inclusive, the information is intended to be used in conjunction with professional judgement for situations which are unique, one of a kind. It is intended that this be a 'living' document, reviewed annually for relevance to the operations and maintenance professional.

It is intended that this will be a reference that stimulates professional discussion at many levels and communicates common school facility operations and maintenance issues throughout the province of Alberta in an effective and efficient manner.

1.0 Introduction

1.3 DEFINITION AND SCOPE

School facility operations and maintenance exists to support the primary purpose of K – 12 education: quality learning. The core business responsibility is to ensure that through the provision of quality operations and maintenance services that the student has an environment which is safe, healthy and environmentally friendly.

School facility operations and maintenance encompasses all the traditional trades (carpentry, plumbing, electrical, grounds etc.) as well as building operations (energy management, heating, ventilation, air conditioning etc.) and custodial services (caretaking, cleaning, mowing etc.). The complexity of the school environment demands a high degree of knowledge and professionalism. School boards may have schools ranging in age from new to 90 years. Facility professionals must know how to operate, maintain and manage this broad spectrum of school infrastructure.

Physical plant operation and maintenance provides for the repair, replacement and renewal of failed infrastructure elements including associated equipment and materials used in day to day routine operations/maintenance procedures. Replacement or upgrading of significant building or landscape components or systems up to $100,000 is funded through the Building Quality Restoration Program (BQRP). Plant operations and maintenance funding is not directed towards instructional or administrative equipment or projects.

Operating and maintaining the status quo is no longer an option given the pace of change in today's society. Facility professionals must be constantly challenging their services, striving to continually improve. Parents and educators are more knowledgeable today and more involved in the 'look' and 'feel' of their school environment.

2.1 ADMINISTRATION

2.1.1 Daily Operations & Maintenance

Expectations

Operations and maintenance functions will be delivered within the context of a comprehensive business plan/maintenance manual.

Guidelines

- Daily administer operations and maintenance
  - Work scheduling/estimating/managing
  - Budget management
  - Communications
  - Project management
  - Contract management
  - Safety
  - Human resources
  - Site inspections
  - Emergency response
  - Monitor utilities

- Annually plan/review operations and maintenance
  - Develop strategic, long range plans for BQRP, modernizations, new construction
  - Forecast budget needs
  - Plan staff training
  - Review emergency preparedness plan
  - Plan to incorporate new technology into the workplace
    - CMMS (computerized maintenance management)
    - CAFM (computer assisted facility management)
  - Ensure services are aligned with school board vision, mission and purpose
  - Review preventive maintenance program
  - Liaise with schools, develop communication strategy
  - Review business plan, update
  - Review maintenance manual, update
  - Review energy management strategy, update

2.2 FACILITIES & EQUIPMENT

2.2.1 Maintenance Shop & Office Space

Expectations

Shop and office space associated with the performance of maintenance and operations of schools shall be maintained and operated consistent with service delivery expectations and guidelines for schools.

Guidelines

- Annually inspect all shop and office space, log results. Budget for repairs/renovations as required.

2.2.2 Vehicles, Equipment & Tools

Expectations

School board owned and operated vehicles, equipment and tools shall be supplied as necessary in order to meet expectations for efficient and effective delivery of maintenance and operations services.

Guidelines

- Standard policies and procedures for use, repair, maintenance and replacement of board owned vehicles, equipment and tools shall be developed.
- Annually review policies and procedures to ensure maximum benefit is achieved from vehicles, equipment and tools.

2.2.3 Purchasing, Warehousing and Distribution (Materials & Supplies)

Expectations

Purchasing, warehousing and distribution of materials and supplies should be managed in support of efficient and effective delivery of operations and maintenance services.

Guidelines

- Standard policies and procedures for the purchasing, warehousing and distribution functions should be developed.
- Annually review policies and procedures to ensure accountability and effective stewardship of resources.

2.3 RISK MANAGEMENT

2.3.1 Property Insurance/Liability Insurance

Expectations

That all school boards will employ effective risk management practices (the process by which consequences of loss through damage, vandalism, fire, flood etc. are managed).

Guidelines

- School boards will hold insurance liability policies in accordance with best industry practices for public school facilities, equipment, vehicles, and employees.

2.4 HAZARDOUS MATERIALS/ SAFETY MANAGEMENT

2.4.1 WHMIS (Workplace Hazardous Materials Information System)

Expectations

All products and processes involving workplace hazardous materials must conform to current legislation. All staff handling hazardous materials in schools will be trained and certified in the proper use and storage of these materials.

Guidelines

- Current (less than 3 years old) MSDS (material safety data sheets) sheets must be kept in a binder in each school for all controlled products.
- All controlled products must be clearly labeled in conformance with the WHMIS guidelines.
- All staff should receive copies of new MSDS sheets and be briefed on new controlled products being used in the schools.
- All staff must be trained and certified to handle controlled products in a school environment
- A copy of the WHMIS regulations must be available in all schools and workshops.

Standards

- Canada Labour Code Part ll (federal health and safety legislation)
- Alberta Occupational Health and Safety Act

2.4.2 Asbestos Abatement and Control

Expectations

Policies and procedures for handling asbestos containing products must meet with appropriate legislative compliance standards.

Guidelines

- Conduct an audit of all schools for asbestos containing products. A log of all asbestos containing products in schools should be kept.
- Annually inspect all asbestos containing products for damage, log results and take any necessary actions to prevent contamination of the school environment.
- Compliance with appropriate standards is mandatory when handling asbestos containing products

Standards

- Canada Labour Code Part ll

- Alberta Occupational Health and Safety Act
- Asbestos Abatement Manual, Current Edition

2.4.3 TDGR (Transportation of Dangerous Goods)

Expectations

All dangerous goods transported within school districts must be carried by certified handlers in conformance with appropriate legislative standards.

Guidelines

- All staff handling and transporting dangerous goods must be trained and certified for such purpose.
- All vehicles used for transportation of dangerous goods must be clearly marked and have the necessary transportation documentation in them.
- All dangerous goods must be stored and secured in accordance with legislative standards established for that purpose.

Standards

- Canada Labour Code Part ll
- Alberta Occupational Health and Safety Act

2.4.4 Fire Safety

Expectations

Exit routes must be kept clear whenever the building is occupied. Nothing must be allowed to obstruct any doorway, passage or stairway that might be used as an exit route. Any such dangers should be brought to the attention of the principal or his/her designate.

Guidelines

When a fire is noticed:

- Sound alarm
- Make certain the fire department has been notified
- Make use of fire hose or extinguishers to eliminate fire if possible (ensure your escape route is unobstructed)
- Proceed to front entrance to meet fire department officials and assist as required if fire is beyond your control

2.4.5 Gas Odors/Hazardous Materials

Expectations

All staff will be thoroughly familiar with emergency evacuation procedures for gas odours or hazardous materials spills

Guidelines

Immediately upon being aware of a gas odour or hazardous materials spill notify school principal. Assist with preliminary investigation. Notify appropriate agency once source and location is determined. Assist as required for evacuation of school and subsequent clean up.

2.4.6 Indoor Air Quality (IAQ)

Expectations

Building materials containing potentially hazardous chemical or biological agents will be controlled to prevent air contamination. Provide inspection and maintenance services to all environmental quality systems and ensure their compliance with health and safety standards; codes; by laws; and government regulations.

Guidelines

- Audit all school buildings for the location of building materials actually or potentially containing hazardous materials. Log results on a school x school basis.
- Ensure that potentially hazardous materials including building products, furnishings and cleaning chemicals are selected, stored and used a.) in a manner that minimizes airborne exposure to building occupants, and b.) in complete accordance with the manufacturer's specifications.
- Avoid excess moisture. Ensure that water leaks and water damaged materials are repaired and dried in a prompt manner. Inspect for mold growth, remove as required. Minimize the use of fragrance containing and scented products. Ensure all indoor environmental quality concerns and complaints are dealt with.
- Annually Inspect the condition of building materials containing or suspected of containing asbestos or potentially hazardous chemicals or biological contaminants.
- Inspect and clean ventilation ductwork and central air handling equipment as required to maintain healthy air quality.
    - **Note:** Ducts must be cleaned after major modification to existing ductwork.

2.4.7 Miscellaneous

Expectations

All hazardous materials e.g. PCB's, lead, mercury, dangerous chemicals will be stored, handled, transported and disposed of in compliance with appropriate legislated standards.

Guidelines

- Conduct an audit of all schools for non-instructional PCB's, lead or lead containing products, mercury or other dangerous chemicals, log results.
- Annually inspect all products for damage, leakage etc., log results. Take necessary actions to prevent contamination of school environment.
- Compliance with all legislative standards is mandatory when storing, handling, transporting or disposing of hazardous products.

Standards

- Canada Labour Code Part ll
- Alberta Occupational Health and Safety Act

2.5 AFTER HOURS SERVICE

2.5.1 Community Use

Expectations

Use of schools after regular hours should conform to acceptable standards for usage and not impose undue wear and tear on school infrastructure.

Guidelines

School boards should have a policy for acceptable uses of school facilities. This policy must be enforceable through a joint use agreement with local community user groups.

2.5.2 Response to Emergency Calls (fire, intrusion, equipment alarms)

Expectations

Standardized policies and procedures should exist for appropriate response to fire, intrusion and equipment alarms/call outs 24 hours a day , 7 days a week.

Guidelines

- Develop policies and procedures for monitoring of and response to fire alarms, intrusion alarms and equipment alarms.
- Annually review policies and procedures, adjust as required

2.6 PROVISION OF UTILITIES

2.6.1 Gas, Water, Electricity, Propane

Expectations

Gas, water, electricity and propane are a significant operating expense for school districts. Excellent stewardship of these resources should be employed to maximize value received for amount of utilities consumed. Deregulation of electricity and natural gas will allow the school districts to purchase their power and gas supply in order to obtain the best long term, stable source.

Guidelines

- Monthly, monitor all utilities. This means viewing consumption rates and logging results. Analyze to ensure unexplained increases in consumption rates are noted and explanations found to justify any significant changes.
- Annually, prepare consumption reports, analyze for deviations from previous trends. Employ principles and practices of energy conservation for all daily operating procedures involving utility consumption.

2.7 CARETAKING

2.7.1 Cleaning Duties

Expectations

Caretakers through their duties are responsible for a clean, safe and environmentally friendly school. The following chart represents those tasks that typically included in a school cleaning schedule. However, each school board may have slightly different operating procedures that vary with this chart. It is important to stress that ***this is a guideline*** and that other cleaning services may produce the same result – a clean, safe and environmentally friendly school.

GUIDELINES

Services Required	Daily	As Required	Weekly	Monthly	Annually
Exterior Duties					
Sweep entrances	x				
Put up and take down flag		x			

Services Required	Daily	As Required	Weekly	Monthly	Annually
Exterior Duties (Cont'd)					
Pick up garbage in playground & along fences		x			
Remove graffiti		x			
Fall cleanup (leaves, debris, lawn)					x
Classroom Servicing Schedule					
Empty waste receptacles	x				
Empty pencil sharpeners	x				
Secure doors & windows	x				
Clean student work stations	x				
Daily floor maintenance	x				
Clean chalk rails	x				
Clean sinks & fittings	x				
Clean telephones/hand sets	x				
Low dusting		x			
Spot wash walls/windows		x			
Replace burned out bulbs		x			
Wash doors/frames		x			
Clean chalk boards/white boards			x		
High dusting				x	
Damp mop floors				x	
Wash Walls					x
Wash Woodwork					x
Clean lights & fixtures					x
Clean blinds					x
Clean ventilation grills					x
Clean windows inside/outside					2x
Routine floor maintenance					2x
Clean furniture					x
Washroom Servicing Schedule					
Washroom inspections	3x				
Clean sinks & fittings	x				
Clean urinals & fittings	x				
Clean toilets & fittings	x				
Empty waste receptacles	x				
Damp mop floor	x				
Clean linen towel & soap dispensers	x				
Clean mirrors	x				
Wash light switches & door handles	x				
Fill hand towel & toilet tissue dispensers		x			
Replace burned out bulbs		x			
Wash partitions			x		
Low dusting			x		
High dusting				x	
Wash walls				x	
Clean windows				x	
Clean ventilation grills				x	
Flush floor drains				x	
Clean lights and fixtures					x
Routine floor maintenance					3x
Gymnasium Servicing Schedule					
Dust mop floor	x				
Dust mop stage	x				
Sweep/vacuum stairs & landings	x				
Wash doors	x				
Gym floor refinishing procedure		x			
Replace burned out bulbs		x			

Services Required	Daily	As Required	Weekly	Monthly	Annually
Gymnasium Servicing Schedule (Cont'd)					
Clean and inspect gym chairs (after usage)		x			
Clean bleachers (after usage)		x			
Clean ventilation grills		x			
Clean gym storage room			x		
Dust walls				x	
Dust backstops				x	
Scrub/damp mop/burnish gym floor				x	
Wash walls					x
Wash woodwork/trim					x
Clean under stage					x
Clean lights & fixtures					x
Fitness Area Servicing Schedule					
Empty waste receptacles	x				
Empty pencil sharpeners	x				
Secure doors & windows	x				
Clean sinks & fittings	x				
Spot wash walls & windows	x				
Clean chalk rails		x			
Floor maintenance			3x		
Low dusting			x		
Damp mop gymnasium floor mats			2x		
Clean chalk/white boards			x		
High dusting				x	
Damp mop floor				x	
Clean lights & fixtures					x
Clean windows inside/outside					x
Routine floor maintenance					x
Clean furniture					3x
Hallways & Stairways Schedule					
Daily floor maintenance	x				
Vacuum carpeted areas	x				
Sweep/vacuum stairs & landings	x				
Clean fountains & fittings	x				
Spot wash walls & windows	x				
Spot check & clean lockers	x				
Replace burned out bulbs		x			
Remove graffiti		x			
Dust lockers, ledges & exhibit cases			x		
Dust banisters			x		
Clean fountain drains			x		
Vacuum mat wells			x		
Damp mop/autoscrub floor			x		
Buff or burnish floor			x		
Wash woodwork, trim & railings				x	
Dust stairway walls				x	
Clean exhibit cases					x
Clean inside lockers					x
Routine floor maintenance					2x
Office & Staff Room Schedule					
Empty waste receptacles	x				
Spot wash walls & windows	x				
Secure doors & windows	x				
Empty pencil sharpeners	x				
Clean sinks & fittings	x				
Clean office furniture	x				

Services Required	Daily	As Required	Weekly	Monthly	Annually
Office & Staff Room Schedule (Cont'd)					
Clean telephones/hand sets	x				
Replace burned out bulbs		x			
Floor maintenance			3x		
Wash woodwork			x		
Wash doors & frames			x		
Low dusting			x		
High dusting				x	
Clean lights & fixtures					x
Clean windows inside/outside					x
Routine floor maintenance					x
Cafeteria & Kitchen Schedule					
Empty waste receptacles	x				
Daily floor maintenance	x				
Damp mop floor	x				
Wash floor in food prep area	x				
Clean linen towel & soap dispensers	x				
Spot wash walls & windows	x				
Wash doors	x				
Low dusting			x		
Clean canopy & hood			x		
Clean fridge/freezer coils				x	
Clean ventilation grills				x	
High dusting				x	
Wash chairs					x
Clean lights & fixtures					x
Routine floor maintenance					3x
Auxillary Area Schedule					
Empty waste receptacles	x				
Empty pencil sharpeners	x				
Secure doors & windows	x				
Spot wash walls & windows	x				
Clean sinks & fittings	x				
Clean student work stations	x				
Floor maintenance			3x		
Low dusting			x		
High dusting				x	
Clean windows inside/outside					x
Clean lights & fixtures					x
Routine floor maintenance					x
Shops Schedule					
Empty waste receptacles	x				
Clean sinks & fittings	x				
Clean linen towel & soap dispensers	x				
Fill linen towel & soap dispensers	x				
Low dusting			x		
Service dust collector unit				x	
High dusting					x
Routine floor maintenance					x
Mechanical Area Schedule					
Floor maintenance			x		
High dusting				x	
Caretaking Area Schedule					
Empty waste receptacles	x				
Clean sinks & fittings	x				

Services Required	Daily	As Required	Weekly	Monthly	Annually
Caretaking Area Schedule (Cont'd)					
Secure doors & fittings	x				
Spot wash walls & windows	x				
Floor maintenance			3x		
Low dusting			x		
High dusting			x		
Clean lights & fixtures					x
Clean windows inside/outside					x
Routine floor maintenance					x
Storage Area Schedule					
Secure doors	x				
Empty waste receptacles		x			
Floor maintenance				2x	
Low dusting				x	
High dusting				x	
Clean lights & fixtures					x
Routine floor maintenance					x

2.8 GROUNDS MAINTENANCE

2.8.1 Turf Maintenance

Expectations

Provide regular turf maintenance to all lawn areas to ensure optimal growing conditions and a safe play environment for students and community user groups.

Guidelines

- Daily inspect turf areas for litter and debris. Ensure turf areas are free of hazards such as broken glass, gopher holes etc. Ensure turf is mowed frequently enough that it should not exceed 100mm (4") in height.
- Apply fertilizers, pesticides, herbicides in accordance with regulatory (provincial/municipal) standards and school board policy.

Standards

- Weed Control Act (provincial)
- Agricultural Pests Act (provincial)
- Municipal/Municipal District bylaws and regulations

2.8.2 Snow Clearing

Expectations

Provide snow clearing services to ensure compliance with normally accepted standards for safety.

Guidelines

- Remove snow or ice from entrance sidewalks as required to ensure safe access/egress to and from school, keep a log of removal activities. Use snow fencing where possible to prevent drift accumulations.
- Remove snow from driveways, parking lots and drop off areas as required to ensure safe access to school.
- Utilize sand or other granular products as required to minimize slip hazards.
- Utilize de-icing products (non corrosive, environmentally friendly) as required to remove ice patches
- Ensure school staff are aware of snow/ice removal procedures.

2.8.3 Landscape Areas

Expectations

Provide inspection and maintenance services to ensure landscape areas are in good functional condition and are aesthetically pleasing.

Guidelines

- Daily inspect and remove litter.
- Prune shrubs and weed as required. Water in season as required
- Annually mulch beds for weed control. Inspect all site furniture, check for missing, broken or loose components.

2.8.4 Hard Surface Areas

Expectations

Provide inspection and maintenance services to ensure conformance with original design intent and compliance with health and safety standards.

Guidelines

- Daily inspect and remove litter. Check for trip hazards.
- Annually inspect for structural failure – settling, cracks, ridges.

2.8.5 Gravel Areas

Expectations

Provide inspection and maintenance services to ensure all gravel areas are in a safe and usable condition according to original design standards.

Guidelines

- Grade all gravel surfaces to ensure positive drainage as required. Ensure gravel surface is free of potholes or large depressions.
- Top up with gravel as required to achieve drainage and functional requirements.

2.8.6 Playgrounds

Expectations

Provide inspection and maintenance services to all playstructures and ensure compliance with life cycle, quality and regulatory expectations.

Guidelines

- Daily inspect playstructures and play surface. Check for unusual changes in structure e.g. broken components, loose fittings, missing components, vandalism. Check play surface for sharp objects, animal feces, or other elements which don't belong. Ensure depth of play surface material is up to design standards.
- Quarterly conduct preventive maintenance/safety inspection, log results. Check all connections, lubricate where required. Top up play surface material. Ensure drainage is functioning as designed.

Standards

- CAN/CSA Z7614-98 Children's Playspaces and Equipment

2.8.7 Fencing/Bollards

Expectations

Provide inspection and maintenance services to all fences and bollards to ensure their compliance with original design intent and conformance to safety standards.

Guidelines

- Weekly inspect fences/bollard & cables. Check for damage, vandalism, unsafe conditions. Remove debris trapped by fences.
- Annually conduct a preventive maintenance inspection. Check for excessive wear and tear, damage and vandalism. Check for stability, rotting. Check all fastenings and tension devices.

2.8.8 Backstops/Goal Posts/Bicycle Racks/Flag Poles/Railings

Expectations

Provide inspection and maintenance services to all backstops/goal posts/bicycle racks/flag poles/railings to ensure compliance with original design and conformance to safety standards.

Guidelines

- Weekly during spring, summer and fall outdoor play season inspect all equipment. Check for damage, vandalism, unsafe conditions.
- Semi annually conduct a preventive maintenance inspection. Check for excessive wear and tear, damage and vandalism. Check for stability, rotting, structural strength. Check all connections. Check for flaking paint and rust.

2.9 SOLID WASTE DISPOSAL

2.9.1 Garbage

Expectations

Provide garbage removal services to ensure compliance with cleanliness and hygiene standards normally associated with quality learning environments.

Guidelines

- Daily remove all accumulated garbage to a central collection location. Ensure outside garbage collection bins are sized to accommodate normal collection volumes. Keep central collection location clean and free of litter. Ensure bin lids are properly secured.
- Weekly have garbage bins emptied from central collection location. Ensure location is situated to minimize impact on landscaped areas, classroom environments, playgrounds. Establish pick up schedules that do not conflict with school opening/closing, recess, lunchtime.

2.9.2 Recycling

Expectations

Provide recycling as part of normal daily operations and maintenance procedures. Maximize opportunities for effective stewardship of operating budgets.

Guidelines

- Daily, collect and store for later removal all recyclable materials. Ensure operating procedures reflect good stewardship of natural resources e.g. water, oil. Utilize recyclable products where possible for cleaning purposes e.g. rags.

2.10 BUILDING EXTERIOR (ENVELOPE)

2.10.1 Roofs

Expectations

Provide inspection and maintenance services for all roofing sections to ensure their performance meets life cycle and quality expectations.

Guidelines

- Monthly remove debris, do not allow to accumulate.
- Annually and after storms conduct inspection, log observations - be specific in order to develop a roof 'history', for example locating on a roof plan when and where leaks have occurred and who made repairs. Storm damage should be immediately documented and further damage mitigated to preserve insurance claims.
    - Check roof gutters and drains, remove any blockages. Ensure positive drainage and that overflow devices are present on roofs which could accumulate water if drains plug.
    - Check for deteriorated lead flashings around roof drains and plumbing vents.
    - Check the rainwater leader piping if a leak occurs around or under a roof drain.
    - Check pitch pans, ensure the pans are topped up with modified plastic cement sloped to pitch water away from vents, pipes, conduits etc.
    - Inspect flashing, check for loose screws or other fasteners, ensure flashing is securely fastened.
    - Check for growths on roofing material, don't pull out – treat chemically.
    - Inspect gravity vents.
    - Check membrane condition, log results.
- Annually conduct full preventive maintenance inspection and log observations.
    - Check BUR roofs for condition of blisters, ridges, buckles and surface scouring. Avoid stepping on blisters, ridges or buckles. Spray paint major defects with enamel paint, repair as required.
    - Check torch on applications for flaws in laps

- Check metal roofs for loose screws, paint flaking, warping.
- Check caulking, ensure unbroken seam, recaulk as necessary.
- Check inverted roofs for displaced ballast, condition of scuppers, condition of filter fabric.
- Check concrete tile applications for ice damming, inspect for loose tiles

- Every 3 – 5 years have a qualified roofing inspector complete a condition inspection report. Maintain records.
- Generally ensure that equipment on the roof is not secured/anchored by penetrating through the roofing membrane. Inspect roof after any work is completed e.g. mechanical, gas etc. Check all skylights for signs of moisture penetration (discoloration etc.). Check for ice damming and snow build up. Ensure by-products from mechanical maintenance do not accumulate on roofing surface e.g. compressor oil.

2.10.2 Exterior Walls

Expectations

Provide inspection and maintenance services to all exterior walls and ensure their performance meets life cycle and quality expectations.

Guidelines

- Semi Annually check rain water leaders ensure they are sloped and drain freely.
- Annually check clad-over materials for moisture retention, look for discoloration, stretching, splitting or other signs of material fatigue. Inspect all horizontal surfaces for signs of failure e.g. cracks, flaking, discoloration, or rotting. Check face seal on cavity walls inspect for damage caused by moisture. Check all construction joints, ensure they are sealed properly. Inspect for snow melt indicating heat loss e.g. wall discoloration, wettness in the spring or growth on interior walls (thermal bridge).
- Check wall cavities during renovations for possible damages (failures) not visible before wall was opened.

2.10.3 Exterior Doors

Expectations

Provide inspection and maintenance services to all exterior doors and ensure their performance meets life cycle and quality expectations.

Guidelines

- Daily check emergency doors

- Weekly check alignment of doors, ensure they swing freely. Check all hinges, panic bars and other door hardware for proper functioning, maintain as required. Check all locksets, maintain as required, inspect for possible failure.
- Semi annually check all door closures. Check alignment of arms and adjust tension as required. Inspect all fastenings.
- Annually inspect finishes. Check weatherstripping.

2.10.4 Windows and Skylights

Expectations

Provide inspection and maintenance services to all exterior windows and skylights and ensure their performance according to life cycle and quality expectations.

Guidelines

- Weekly inspect all windows for signs of failure e.g. cracks, condensation, discoloration of glass, dust markings. Check for proper drainage.
- Annually conduct audit of all windows and skylights, look for progressive deterioration of all surfaces e.g. paint flaking, discoloration, warping, jamming. Check all hardware for proper functionality. Inspect all fastenings. Inspect caulking. Assess condition of screens and storm windows.

2.10.5 Miscellaneous

Expectations

Provide inspection and maintenance services to all miscellaneous exterior building elements and ensure their performance according to life cycle and quality expectations.

Guidelines

- Check that all grading slopes away from the building to create positive drainage patterns.
- Inspect all foundations for signs of failure e.g. cracks, spalling
- Check masonry grout for failure
- Check irrigation to avoid unnecessary water on building envelope.
- Check for signs of termites or ants in close proximity to building envelope.

2.11 BUILDING INTERIOR

2.11.1 Ceilings, Walls, Floors

Expectations

Provide inspection and maintenance services to all ceilings, walls and floors and ensure their performance is in compliance with life cycle and quality expectations.

Guidelines

- Weekly inspect all ceilings, walls and floors. Check for damaged ceiling tiles, sagging T-bar systems, damaged plaster/drywall/plywood/masonry surfaces, loose flooring tiles, trip hazards e.g. lino/carpet seams lifting or carpet rippling, broken stair tread nosing, loose handrails, cracks or cupping on gym floors.
- Annually conduct an audit of all ceilings, walls and floors. Repair as required.

2.11.2 Chalkboards, Tack boards, Whiteboards

Expectations

Provide inspection and maintenance services to all chalkboards, tack boards and whiteboards and ensure their performance is in compliance with life cycle and quality expectations.

Guidelines

- Weekly inspect all chalkboards, tack boards and whiteboards, ensure they are properly secured and function as intended.
- Annually assess condition and recommend repair or replacement as required

2.12.3 Interior Doors, Glazing

Expectations

Provide inspection and maintenance services to all interior doors and glazing and ensure their performance is in compliance with life cycle and quality expectations.

Guidelines

- Weekly inspect all interior doors and glazing. Check all hinges, latches, locks, closers, hold-opens, panic bars for defects. Tighten all fastening devices. Check for proper alignment of doors and glazing, ensure free movement where necessary. Check for broken or cracked glass.

- Annually lubricate where appropriate. Audit condition of all doors/glazing. Repair as required.

2.11.4 Lockers/Totes

Expectations

Provide inspection and maintenance services to all lockers/totes and ensure their performance is in compliance with life cycle and quality expectations.

Guidelines

- Weekly inspect all lockers and totes, check for damage to doors, hinges, locking devices.

2.11.5 Millwork

Expectations

Provide inspection and maintenance services to all millwork and ensure its performance is in compliance with life cycle and quality expectations.

Guidelines

- Weekly inspect all millwork. Check for damage to operating components e.g. doors, drawers, shelves, locks. Check for proper fastening to walls for all cabinets, plaques etc.

2.12 MECHANICAL SYSTEMS

2.12.1 Heating

Expectations

Provide inspection and maintenance services for all heating equipment to ensure reliable operation and compliance with all safety and health standards.

a. Hot Water Heating Boilers

Guidelines

- Daily check pressures and temperatures. Check for gas odors and water leaks.
- Weekly check flame condition, clean and adjust fuel burning equipment as required. Inspect circulating pumps for proper operation.
- Monthly take water samples and perform appropriate tests to determine chemicals to be added. Consult with boiler water treatment specialist as required.

- Check the make-up water meter reading (should be negligible), log results.
- Check the sulphite concentration of the water, must be between 50 – 100 ppm SO_3 or 80 –160 ppm Na_2SO_3, log results
- Check the pH level of the water, must be between 8.5 – 9.5 (add caustic if it is low, blow down if it is high).
- Check the visual appearance of the water (must be clear and colourless)
- Check the by-pass filter cartridge, replace when the flow indicator shows a reduced flow. Log results. Change as required.
- Every 3 months check the TDS (or conductivity) must be less than 2000 ppm or less than 2500 micromhos/cm, blowdown as required. Check iron and copper corrosion coupons and replace as required.

- Monthly lift try-lever to full open and release it to snap shut. Check flame detection devices, limit controls, operating controls. Check boiler water circulating pump for leaks and level of oil in reservoir. Test floor drains to ensure proper drainage. Check fuel piping for leakage. Check stop valves, check valves, drain valves. Check linkages for damage or disconnection. Check combustion air supply for obstructions and adequacy of air flow.
- Annually check floats for leaks and clean. Check all electrical and gas connections. Inspect flue stack for corrosion. Check condition of temperature and pressure gauges. Check burner flame for colour, adjust gas mixture as required. Verify all operating and limit controls, interlocks and shutoffs.
- Every two years drain and flush out interior of boiler, remove all dirt, sludge or other deposits. Inspect tube and tube sheets for scale formation and pitting. Check the refractory for cracking and deterioration. Change man-hole and hand-hole gaskets. Remove safety valves and test. Inspect the fireside of tubes for soot and clean as required. Check heat exchangers. Have the boiler inspected by authorized inspector as required.
- Check the operation of controls as per section 2.12.7

Standards

- The Boiler and Pressure Vessels Act
- The Gas Code Regulation

b. Steam Heating Boilers

Guidelines

- Daily inspect water level in the water column sight glass. Record boiler pressure indicated by the gauge at the boiler.

Check for gas odors and water leaks. Repair faulty steam traps immediately.

- Test water for proper chemical treatment, establish guideline with local reputable chemical supply company.
  - Check the quantity of water softened/dealkalised between regenerations
  - Check the make-up water meter reading once/month
  - Once per day on large systems and three times per week on small systems: test boiler water samples and log results;
    - Neutralised total dissolved solids: 1500 – 3000ppm
    - Phosphate: 40 – 80 ppm PO_4
    - Hydroxide alkalinity: 150 – 300 ppm $CaCO_3$
    - Total alkalinity: less than 700 ppm $CaCO_3$
    - Sulphite: 30 – 60 ppm SO_3 (50 ppm Na_2So_3)
    - pH: 10.5 – 11.5
  - Once per day on large systems and three times per week on small systems, check and log the pH of the condensate return: must be between 8.5 – 9.5 for systems that are not used for humidity control and 8.0 – 8.5 for systems that use humidity control.
  - Once per day on large systems and three times per week on small systems, check and log the TDS concentration of the condensate return: must be less than 40 ppm
  - Once per day on large systems and three time per week on small systems, check and log the total hardness concentration of the condensate return and softener effluent: must be less than 2ppm $CaCo_3$
  - Check the general appearance of the water samples – boiler water samples may be colourless or amber, some sediment may be evident; condensate and softener samples must be clear & colourless with no sediment.
- Weekly drain float chamber while boiler is running to determine if the control will shut down the boiler. Close the lower gauge valve, then open drain cock, blow the glass clear. Close the drain cock and open the lower gauge glass valve, check to ensure water returns. Check flame condition, adjust as required.
- Monthly lift try-lever to full open and release it to snap shut. Check linkages for damage or disconnection. Check stop valves. Check the flue chimney breaching for signs of leakage, damage or deterioration.
  Check floor drains for proper drainage. Inspect flame detection device. Inspect fuel piping for leakage and damage. Check combustion air supply for obstructions and adequacy of air flow.

- Annually check floats for leaks and clean. Check all electrical and gas connections. Inspect flue stack for corrosion. Check condition of all temperature and pressure gauges. Check burner flame for colour, adjust gas mixture as required.
- Every two years drain and flush out interior of boiler, remove all dirt, sludge or other deposits. Check the refractory for cracking and deterioration. Inspect tube and tube sheets for scale formation and pitting. Change man-hole and hand-hole gaskets. Remove safety valves and test. Inspect the fire side of tubes for soot and clean as required. Conduct flue gas analyses and adjust boiler for efficiency. Check heat exchangers. Have the boiler inspected by authorized inspector as required.
- Check the operation of controls as per section 2.12.7.

Standards:

- The Boiler and Pressure Vessels Act
- The Gas Code Regulation

c. Pumps

Guidelines

- Weekly check pump for unusual noise or vibration.
- Monthly check pump for leaks or corrosion build up and clean as required. Flush strainer. Check and record inlet and outlet pressures.
- Semi annually lubricate pump and motor bearings. Inspect wiring at motor terminals. check Amperage. Inspect pump coupling for wear and tear. Check alignment of drive coupling.
- Annually remove strainers and clean, blow out any accumulated material. Re-grease motor bearings, flush bearing reservoir and refill. Check magnetic starters. Check flexible connections. Check all pins, bushings and set screws. Check packing for leakage.

d. Expansion Tanks

Guidelines

- Daily check expansion tank level at gauge glass to evaluate fluctuation. Check system pressure; ensure operating pressure is maintained, log readings. Inspect leaks.
- Annually check lines for plugging, leaks or corrosion. Visually check condition of tank and piping. Check gauge glass – remove and clean or replace.

e. Heat Exchangers

Guidelines

- Daily check outlet temperature of heat exchanger. Check for cracks and leaks.
- For glycol system, test water for proper chemical treatment.
  - Monthly check the make up water meter reading (must be negligible).
  - Every 30 – 90 days replace the iron and copper corrosion coupons. Determine corrosion rates (for iron less than 0.5 mpy {mils per year}; for copper less than 0.2 mpy).
  - Annually check the glycol concentration against the following control limits:
    - For ethylene glycol cooling systems that are operational year round and for ethylene glycol heating systems, the glycol concentration must be 48 – 52 vol% with a corresponding freeze temperature of –34 to -40º C and a burst temperature of less than -50º C.
    - For propylene glycol cooling systems that are operational year round and for propylene glycol heating systems, the glycol concentration must be 50 – 54 vol% with a corresponding freeze temperature of –34 to -40º C and a burst temperature of less than -40º C.
    - For ethylene glycol cooling systems that are operational only during the cooling season, the glycol concentration must be 30 – 35 vol% with a corresponding freeze temperature of –16 to 19º C and a burst temperature of less than -50º C.
    - For propylene glycol cooling systems that are operational only during the cooling season, the glycol concentration must be 35 – 40 vol% with a corresponding freeze temperature of –16 to -19º C and a burst temperature of less than -40º C.
  - Annually check and log the pH level in the system: must be greater than 8.5. Check and log the reserve alkalinity level in the system: the RA (100%) level must be greater than 9.0.
  - Check the by-pass filter cartridge, replace when the flow indicator shows a reduced flow, log results
- Every 3 years inspect interior and exterior of all tube bundles, clean as required.

f. Finned Radiation

Guidelines

- Quarterly check for water leaks. Inspect for free flow air circulation (no object on or near cabinet).
- Annually check radiation cabinet and fins for damage, secure mountings. Vacuum clean fins as required, repair any damaged fin sections as required.

g. Radiant Panels

Guidelines

- Annually vacuum panel surface, clean with damp cloth and mild detergent as required.

h. Unit Ventilators

Guidelines

- Monthly inspect filters, replace as required. Check for unusual noise and water leaks. Inspect free flow air circulation (no objects on or near cabinet)
- Annually vacuum grill, coil, fan and unit interior. Lubricate fan and motor. Lubricate and adjust damper and linkage. Check and clean drain as required.

i. Unit/ Cabinet Heaters

Guidelines

- Monthly check units for unusual noise, vibration, leaks
- Annually lubricate, check fan alignment and blades. Operate room thermostat to ensure proper functioning. Check calibration. Inspect wiring and connections. Check cabinet and fins for damage.

j. Valves

Guidelines

- Monthly inspect all valves for leakage, rusting etc.
- Annually check all fastenings for leakage. Check for rust or sediment build up on the valve spindle. Check the operation of major valve spindles to travel from fully opened to fully closed. Check the spindle for leakage.

k. Roof Mounted Heating Units

Guidelines

- Monthly inspect unit, check motor oil levels. Check fan alignment and belt tension. Check filters
- Annually conduct full inspection of units. Check for noise, vibration, wear and tear, and cleanliness.

2.12.2 Ventilation

Expectations

Provide inspection and maintenance services for all ventilation systems to ensure reliable operation and compliance with all safety and health standards.

a. Air Handling Units

Guidelines

- Weekly check water levels where re-circulating air washer humidifier system is used. Ensure water-flow control is operational to keep constant level in the pan. Empty the pan of stagnant water, clean and refill. Take water samples:
    - Three times per week check and log the TDS concentration and adjust the continuous bleed-off valve as required. Check and log the pH . Check and log the poly phosphate concentration (must be 10 – 20 ppm PO_4).
    - Weekly check the make-up water meter reading, log results
    - Monthly check the bacteria concentration, log results (must be less than 10^3 cfu/ml {colony forming units/ml}). Check the visual appearance of the water, must be clear and colourless.
- Monthly check filters and replace as necessary. Check and clean drain pan.
- Semi annually check all operating assemblies, lubricate and clean as required. Check motors for abnormal noise, vibration or heating. Check supply, return and exhaust fans for fan blade tip clearance, free rotation and unusual noise or vibration. Check belt tension and condition. Check humidification equipment for cleanliness and proper operation.
- Annually check fan and motor bearings clean and lubricate; check all vibration pads, spring isolators, mounting brackets, flexible connections, temperature gauges. Check operation of all alarm or safety shutdown devices and adjust as required.

Inspect all damper sections for cleanliness, worn or damaged parts and proper operation. Inspect all heating/cooling coils for cleanliness, leaks, flattened fin or other damage. Check all pneumatic actuators on valves and damper sections for air leaks and proper operation. Check operation of all alarm or safety shutdown devices and adjust as required.

- Check the operation of controls as per section 2.12.7

b. Terminal Equipment

b.1 Gas Fired Furnaces

Guidelines

- Quarterly check filters. Check for unusual noise and vibration. Check operating cycle, ensure all dampers, motors, valves are operating. Check fan bearing. Check flame quality
- Annually check motor for proper lubrication, clean unit of all dust, grease etc. Vacuum inside of cabinet. Lubricate linkages. Check fan alignment. Check main burner orifices for blockages. Check integrity of heat exchangers. Check all electrical connections and wiring. Check operation and calibration of unit thermostat (per section 2.12.7– Controls). Check/test high limit safety interlocks.
- Check the operation of other controls as per section 2.12.7

b.2 VAV/Terminal Reheat Boxes

- Annually check operation of each terminal box. Check ductwork connection, lubricate and adjust damper and linkage. Inspect coil, clean as required.
- Check the operation of controls as per section 2.12.7

2.12.3 Cooling

Expectations

Provide inspection and maintenance services for all cooling equipment to ensure reliable operation and compliance with all safety and health standards

a. Chillers

Guidelines

- Weekly check vessel and pipe connections for leaks.
- Conduct seasonal start up and shut down services according to manufacturers' specifications.
- Take water samples on closed loop chilled water system:
    - Monthly check & log the make-up water reading (must be negligible); Check & log the sulphite concentration (must be 50 – 100 ppm SO_3 (80 – 160 ppm Na_2SO_3); do not blowdown if it is high; Check & log the pH level (must be 8.5 – 9.5 pH), add caustic if it is low, blowdown if it is high; Check & log the visual appearance of the water – must be clear and colourless.
    - Every one to three months replace the iron & copper corrosion coupons. Check the corrosion rates – iron must be less than 0.5 mpy (mils per year) and copper less than 0.2mpy.
    - Replace the by-pass filter cartridge when the flow indicator shows a reduced flow, log results.
- Annually inspect for rusting, leaks. Check gauges. Ensure isolation valves are free and functional. Check for excessive vibration. Ensure coils and sump are clean. Check amperage under load. Ensure motor is lubricated.
- Schedule chiller for major overhaul according to manufacturer's recommendations.
- Every 5 years calibrate gauges, inspect isolators. Replace or recertify pressure relief valves at intervals no longer than 5 years.
- Check operation of controls as per section 2.12.7.

b. Cooling Tower

Guidelines

- Weekly check for leaks, cracks or general deterioration.
- Take water samples on open cooling water system:
    - Weekly check the make-up water meter reading, log results
    - Three times/week check & log the TDS concentration; check & log the pH; check & log the total hardness of the water (must be 25 – 50ppm $CaCO_3$); check and log the poly phosphate concentration of the water (must be 10 – 20 ppm PO_4)

- Monthly check and log the bacteria concentration of the water (must be less than 10^3 cfu/ml (colony forming units/ml); check and log the visual appearance of the water (must be clear and colourless).
- Every one to three months remove and replace iron and copper corrosion coupons – maximum iron corrosion rate is 2 mpy (mils/year), maximum copper corrosion rate is 0.2 mpy.

- Monthly check strainers, clean as required. Check motor for excessive vibration, heating, lubricate. Check fans for excessive vibration, clearance for fan blade tips, clean screens. Check water make-up valve assembly and float, adjust as required; Semi annually clean sumps
- Annually check entire system, repair and replace components as required.
- Check operation of controls as per section 2.12.7

c. Air Cooled Condensers

Guidelines

- Monthly inspect unit for noise, vibration and cleanliness.
- Annually lubricate fan bearings, check fan belts, fan blades, fins, clean as required. Inspect wiring and connections.

d. Expansion Tanks

Guidelines

- Weekly check expansion tank level at gauge glass to evaluate fluctuation. Check system pressure; ensure operating pressure is maintained, log readings. Inspect for leaks.
- Annually check lines for plugging, leaks or corrosion. Visually check condition of tank and piping. Check gauge glass – remove and clean or replace.

e. Heat Pumps

Guidelines

- Monthly inspect for proper operation.
- Every 3 months lubricate (unless sealed units). Check and change filters as required, clean strainer. Inspect condensate drain, top up traps with water as necessary.
- Annually check thermostat controls (see controls section 2.12.7). Check belts, adjust. Service per manufacturer's specification.

2.12.4 Mechanical Piping

Expectations

Provide inspection and maintenance services for all mechanical piping and accessories to ensure compliance with all health and safety standards; codes; by laws; and government regulations.

a. Backflow Prevention Devices

Guidelines

- Annually, visually check all backflow prevention devices. Inspect and test the following back flow devices as per code requirements with a certified tester:
  - Double check valve type
  - Reduced pressure principle type
  - Pressure type vacuum breakers

Standards

Maintain and test backflow preventers in conformance with CAN/CSA B64.10 "Manual for the Selection, Installation, Maintenance and Field Testing of Backflow Prevention Devices"

b. Pressure Regulators

Guidelines

- Monthly check gauges. Ensure gas vent is free
- Annually test gauges, calibrate
- Every two years inspect gas pressure regulators for downstream pressure.

c. Pressure Relief Valves

Guidelines

- Monthly ensure proper functioning
- Every two years provide certified test, re-stamp or replace as recommended by certified inspector. Log results.

d. Valves

Guidelines

- Monthly inspect all valves for leakage.
- Annually check all control valves for smooth operation. Lubricate as required. Check all fastenings for leakage. Check for rust or sediment build up on the valve spindle.

Check the operation of the valve spindle to travel from fully opened to fully closed. Check the spindle for leakage, repack stems if leaking. Electrical valves - check connections and wiring, check operator, ensure it is functional (see controls section 2.12.7).

- **Note:** Include all valves contained in terminal equipment such as finned radiation, radiant panels, unit heaters, unit ventilators, reheat coils, heat pumps etc.

2.12.5 Plumbing

Expectations

Provide inspection and maintenance services for all plumbing equipment and ensure compliance with all safety and health standards; codes; bylaws; and government regulations.

a. Domestic Water

Guidelines

- Wells – All wells must be registered with the province of Alberta. Daily check chlorinating system, check sample, log results. Check filters, strainers and clean as required. Monthly check flow rates, pressures and log results. Test amperage and log results. Every 5 years do shock treatment (pull pump and apply chlorine) after chemical analyses of water.
- Trucked In Water. Ensure chlorine rates are met off the truck, test and log. Daily test water supplies and log results. Test water once per week and log results for local health authority if have own treatment facility. If water is pretreated test every two weeks, ensure proper turnaround if water is stored on site (avoid stagnation).

Standards

- Health Canada: Guidelines for Canadian Drinking Water Quality

b. Sanitary Drainage

Guidelines

- Weekly inspect floor drains ensure they are clear and remain primed. Check roof vents.
- Annually ensure manholes are accessible, lids are properly placed and secure. Ensure cleanouts are operational. For all lift stations, septic fields or lagoons inspect pumps, motors, piping, for performance, apply normal maintenance procedures. Check electrical distribution and all wiring for excessive signs of wear or deterioration.

c. Storm Drainage

Guidelines

- Weekly ensure manholes and catchbasins are accessible, grill is free of debris. Ensure roof drain strainers are on and free of debris. Ensure scuppers and rain water leaders are free of debris and drain away from the building.
- Annually check storm retention ponds and dry wells. If lift pumps are utilized check all pumps, alarms, floats, gauges for performance. Apply normal maintenance procedures to mechanical equipment.

d. Sewage Lagoons

Guidelines

- Ensure adequate protective fencing exists
- Ensure appropriate safety/warning signage exists
- Quarterly inspect lagoon site. Check fencing, signage, weed control. Ensure gates are locked.
- Annually check for erosion of lagoon banks especially at discharge point. Check depth of sewage sludge, remove as required to maintain proper settlement/evaporation conditions. Ensure compliance with provincial environmental guidelines for removal and dispersal of sludge.

Standards

- Alberta Private Sewage Systems Standard of Practice
- Alberta Safety Codes

e. Laboratory Drainage

Guidelines

- Weekly ensure drain is free flowing.
- Annually clean dilution traps.

f. Hot Water Tanks

Guidelines

- Semi annually flush water tank until sediment is gone. Check safety relief valve. Check electrical connections, inspect wiring. Check operation of thermostat and contactors. Inspect burner and clean. Inspect draft hood, check for corrosion. Check burner flame for proper colour, adjust as required. Check isolation and drain valves, repack as required.

g. Fixtures

Guidelines

- Daily check for leaks, restricted drainage. Check for cracks or other physical damage.
- Monthly check fixtures to ensure proper working condition

h. Sump Pumps/Pumps

Guidelines

- Weekly inspect to ensure pump is operating properly. Check for excessive vibration or noise
- Monthly inspect strainer, clean & remove sludge. Inspect float. Check electrical connections and wiring.
- Semi annually lubricate, inspect connections at motor terminals and on contactor
- Annually perform volt and amp test. Check sump pit for cleanliness. Check float and alarms for proper operation. Check motor, clean out bearings and regrease. Check impeller, idler, bushing, head and pin. Check alternator.

Standards

- Alberta Plumbing and Drainage General Regulation 210
- National Plumbing Code of Canada
- Alberta Plumbing Code Regulation 219
- Alberta Safety Codes

2.12.6 Fire Protection

Expectations

Provide inspection and maintenance services for all fire protection equipment and ensure compliance with all safety and health standards; codes; by laws; and government regulations.

a. Sprinkler Systems

Guidelines

- Weekly ensure that the gauges on dry and wet systems register normal air and water pressures. Check all valves controlling sprinkler water supplies or alarms. Check and log the pressure in wet and dry sprinkler systems.
- Monthly ensure that control valves are secured in normal open position by means of a seal, lock or tamper switch. Ensure the fire department connections are visible and accessible. Ensure caps or plugs are in place, threads in good condition. Ensure valves are not leaking.

- Quarterly test alarm devices such as gongs, water flow devices, pressure switches.
- Semi annually test sprinkler system electrical supervisory devices.
- Annually ensure that sprinkler control valves are accessible and maintained in operable condition. Maintain dry pipe systems at the required pressure, ensure the priming water for dry-pipe valves is at the proper level.
- Every 5 years test gauges by comparison with a calibrated gauge. Recalibrate or replace gauges exceeding 3% accuracy.
- Every 15 years flush dry-pipe systems.

Standards

Sprinkler systems are to be inspected and tested in accordance with the requirements of NFPA 13 Installation of Sprinkler Systems; NFPA 25 Inspection, Testing,and Maintenance of Water-Based Fire Protection Systems; the Alberta Fire Code; and the Alberta Safety Codes Act.

b. Portable Fire Extinguishers

Guidelines

- Monthly ensure extinguishers are located in the designated place and that there is no obstruction to access. Ensure that the operating instructions on the nameplate are legible and facing outwards. Check that seals and tamper indicators are not broken or missing. Check pressure gauge reading. Log monthly inspections.
- Annually ensure an approved tag is securely fastened to the extinguisher showing the maintenance or recharge date, the servicing agency and the signature of the service person. Ensure a certified technician thoroughly examines the mechanical parts, extinguisher agent and expelling means.
- Generally extinguishers out of service for maintenance or recharge are to be replaced by spare extinguishers of the same type and of at least the same rating. Recharge all extinguishers after any use or as indicated by an inspection or maintenance procedure. Extinguishers are to be recharged as follows:
    - Soda-acid, foam and pump-tank types, every 12 months
    - Wetting agent in stored pressure types, every 12 months
    - Liquid charged aqueous film forming types, every 3 years
    - Solid charged aqueous film forming foam types, every 5 years

Standards

Extinguishers are to be inspected and hydrostatically tested in accordance with the requirements of NFPA 10 Portable Fire Extinguishers; the Alberta Fire Code; and the Alberta Safety Codes Act.

c. Standpipe and Hose Systems

Guidelines

- Monthly inspect hose cabinets to ensure that the hose is in proper position and that all of the equipment is in place and in operable condition. Ensure signs are provided to identify which fire department connection serves a particular standpipe system.
- Annually inspect hose, couplings and nozzles
- Every 5 years conduct a flow test on standpipe system. Service test hose at intervals not exceeding 5 years from date of purchase and every 3 years thereafter.

Standards

Standpipe and hose systems shall be maintained in accordance with NFPA 14 Installation of Standpipe and Hose Systems; NFPA 25 Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems; ULC Standards; and the Alberta Fire Code.

d. Kitchen Fire Suppression Systems

Guidelines

- Monthly inspect the wet chemical extinguishing systems in accordance with NFPA 17a Wet Chemical Extinguishing Systems:
    - Check that the manual actuators are unobstructed
    - Check that tamper indicators and seals are intact
    - Check that the maintenance tag or certificate is in place
    - Check for obvious physical damage or conditions that would prevent operation
    - Check that the pressure gauge is in operation range
    - Check that the nozzle blowoff caps are intact and undamaged.
- Semi annually inspect and service wet chemical extinguishing systems by properly trained and qualified persons in accordance with NFPA 17a Wet Chemical Extinguishing Systems. Log all inspection records

Standards

- Fire suppression systems shall be maintained in accordance with NFPA 96 Ventilation Control and Fire Protection of Commercial Cooking Equipment; NFPA 17a Wet Chemical Extinguishing Systems; ULC Standards; and the Alberta Fire Code.

e. Water Supply

Guidelines

- Daily (during freezing conditions) inspect heating equipment and accessories. Ensure water systems are kept free of ice, water temperatures should not fall below 4 degrees Celsius.
- Weekly inspect valves to ensure they are fully open and are sealed or locked in that position. Inspect pressure tanks for water level and pressure. Test fire pump under no flow condition.
- Semi annually inspect hydrants
- Annually inspect tanks, supporting structures, piping, control valves, check valves, heating systems, gauges and expansion joints. Test fire pump under flow condition
- Every 2 years test tanks for corrosion
- Every 3 years test fire pumps at full rated capacity

Standards

Water supplies for fire protection shall be maintained in accordance with the requirements of NFPA 13 Installation of Sprinkler Systems; NFPA 14 Installation of Standpipe and Hose Systems; NFPA 25 Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems; the Alberta Fire Code; and the Alberta Safety Codes Act.

2.12.7 Controls

Expectations

Provide inspection and maintenance services for all control systems and ensure their compliance with all safety and health standards; codes; by laws; and government regulations.

a. Pneumatic Components and Controls

Guidelines

- Monthly:
    - Check air dryer and filters

- Annually:
  - Check all valve and damper actuators for air leaks and proper operation.
  - Calibrate all pneumatic controllers and actuator pilot positioners.
  - Check operation and calibration of all pneumatic interlocks and safety devices
  - Lubricate actuator shafts as applicable. Adjust damper linkages and lubricate.
  - Calibrate room stats every 3 years or as required.
  - Check control compressor bleed down time.
  - Ensure pneumatic tubing is isolated from moving parts or vibrating equipment. Check connections for leaks.
- Every two years:
  - Check calibration of all pneumatic sensors/transducers used on central mechanical equipment.

b. Electric Components and Controls

Guidelines

- Annually:
  - Check all valve and damper actuators for proper operation
  - Check all interlocks, refrigeration solenoid valves, and timing relays.
  - Lubricate actuators as applicable. Adjust actuator stroke. Adjust damper linkages and lubricate.
  - Ensure sensor wiring is isolated from moving parts or vibrating equipment.

c. Electronic/DDC Components and Controls

Guidelines

- Monthly:
  - Backup all changes to program
  - Check operation of UPS.
  - Clean keyboard and screen.
- Annually:
  - Check calibration of outdoor air temperature and humidity sensors.
  - Produce a hardcopy listing of all control programming and file.
  - Calibrate zero value of all differential pressure (flow rate) and static pressure sensors.
  - Check span of each analogue output device (actuator). Calibrate DDC output to ensure device strokes fully with tight shutoff.

- Calibrate all analogue input points every 3 years or as required.
- Check all interconnect cables (reseat each connector).
- Clean interior of all panels and auxiliary cabinets.

- Other:
  - Every 2 – 3 years, blow dust from circuit boards and internal surfaces of operator work station components.
  - Every 3 – 5 years, calibrate zero and span of all flow-rate stations using duct traverse. (3 rates minimum i.e. 30, 60, and 90% of rated flow). Enter calibration equations into programming. Interval depends upon stability of transducers.
  - Every 4 – 6 years, replace UPS batteries. Interval depends upon battery type (check manufacturer's recommendation.).
  - Note: Don't forget about the actuators, controls and interlocks contained in terminal equipment such as VAV boxes, heat pumps etc.

2.12.8 Miscellaneous

Expectations

Provide inspection and maintenance services to all miscellaneous systems and ensure their compliance with safety and health standards; codes; by laws; and government regulations.

a. Kitchen Exhaust

Guidelines

- Weekly check filters, clean or replace as required. Ensure system is operating properly.
- Annually check motors, lubricate. Inspect belts adjust as required. Check fan assembly.

b. Laboratory Fumehoods:

Guidelines

- Identify and label each laboratory fumehood.
- Semi-annually or whenever processes or equipment in the fumehood change significantly, trained staff shall conduct routine tests of fumehoods. Log results. Routine testing shall be done with sash or door fully open, and hood baffles in normal operating position; the operating range of monitoring devices shall be checked; no reverse flow (i.e. outward flow) of air or dead air spaces shall be permitted. Check exhaust air fan belts for fraying and excessive slack.

Check fan blades and housings for clearance, corrosion, unusual noise. Check outside exhaust duct and/or filters for blockage or damage. Provide maintenance as required.

- Annually fumehoods shall be tested and certified for performance only by certified personnel in fumehood testing, log results. Provide maintenance as required. When fumehood meets certification criteria ensure a current certification sticker is affixed to the unit.

Standards

1. Alberta Occupational Health and Safety Act
2. Alberta Personnel Administration Office – Fumehood Code of Practice

c. Vocational Area Exhaust

Guidelines

- Weekly check filters. Inspect exhaust fan for proper operation, lubricate. Check fan blade tips for clearances. Listen for unusual noises.
- Monthly check operation of control interlocks.

d. Dust Collection

Guidelines

- Weekly check debris in bottom of shaker unit, clean out as required. Refuse bins emptied. Check filter bags for tears, holes.
- Monthly check belts, motors. Check interlocks.
- Annually clean bags.

e. Air Compressors

Guidelines

- Daily drain the moisture from the air tank. Check piping, joints and valves for oil leaks.
- Monthly remove dust and grime from housing. Keep dry, check for overheating and excessive vibration. Check motor oil level. Check belt tension and alignment. Check refrigerated air dryer. Check running time vs nonrunning time. Test safety valve. Change filter as required.
- Annually provide complete inspection and servicing.

f. Paint Spray Booth

Guidelines

- Weekly inspect filters
- Monthly check fan alignment, fan blade tip clearance. Check motor oil level. Check belt tension and alignment. Check operation of control interlocks.
- Annually provide complete inspection and servicing.

Standards

- NFPA 33 'Spray Application Using Flammable or Combustible Materials'

g. Carbon Monoxide Exhaust System

Guidelines

- Weekly check piping for excessive wear. Check for CO leakage.
- Monthly check fan alignment, fan blade tip clearance. Check motor oil level. Check belt tension and alignment. Check operation of control interlocks.
- Annually provide complete system inspection and servicing. Calibrate CO sensors.

h. Grease Traps

Guidelines

- Weekly inspect traps. Apply appropriate treatment with advice of reputable chemical supply company.
- Annually provide full inspection and service for operation.

2.13 ELECTRICAL SYSTEMS

2.13.1 Service and Power Distribution

Expectations

Provide inspection and maintenance services to all service and power distribution equipment and ensure its compliance with safety and health standards; codes; by laws; and government regulations. Carry out preventive maintenance inspections and procedures more frequently as equipment ages throughout its life cycle.

a. Transformers (dry type: 600 volts and below)

Guidelines

- Annually inspect for overheating, vibration, and deterioration of cabling. Check wiring and all electrical connections. Clean as required. Log inspection results.

b. Switchboard/Panels

Guidelines

- Annually inspect and clean. Log results .
- Every 3 years test, adjust and lubricate moving parts of serviceable disconnect switches and circuit breakers. Test and adjust settings of dashpot style overcurrent relays.
- Every 5 years visually inspect interior for deterioration. Test operation of all breakers, operating devices to confirm functionality. Test all cable, breaker and busbar connections to manufacturers recommended torque values. Verify setting of protective devices if applicable. Check fuse clips. Check cables for insulation deterioration. Log results.

2.13.2 Motor Control

Expectations

Provide inspection and maintenance services for all motor control equipment and ensure its compliance with safety and health standards; codes; by laws; and government regulations.

Guidelines

- Annually inspect all wiring for signs of deterioration (discoloring). Test all connections. Clean as required.
- Every two years check all contacts. Check and tighten all electrical connections.

2.13.3 Emergency Power System

Expectations

Provide inspection and maintenance services to all emergency power system equipment and ensure its compliance with health and safety standards; codes; by laws; and government regulations.

a. Standby Batteries

Guidelines

- Monthly inspect and test, replace if charge does not hold and log replacement date.

b. UPS (Uninterrupted Power Supply)

Guidelines

- Annually inspect and test, replace if charge does not hold.

c. Emergency Generators (including transfer equipment)

Guidelines

- Weekly inspect, test for performance.
- Monthly test on operating load, log results.
- Annually inspect and test stored fuel for signs of deterioration.
- Annually test to design load. Perform required maintenance e.g. lube, oil.
- Annually test starting battery and replace as required.

Standards

- SA-C282 Emergency Electrical Power Supply for Buildings

2.13.4. Lighting

Expectations

Provide inspection and maintenance services to all lighting equipment and ensure its compliance with health and safety standards; codes; by laws; and government regulations.

Guidelines

- Daily check for lighting failures. All burned out lights and faulty ballasts should be replaced at earliest opportunity (exception when scaffolding or hydraulic lift devices required). Check lighting controls (especially low voltage relays), ensure proper operation. Check diffusers for damage and inadequate support, replace as required.

2.13.5 Emergency Lighting and Exit signs

Expectations

Provide inspection and maintenance services to all emergency lighting and exit signs and ensure compliance with health and safety standards; codes; by laws; and government regulations.

Guidelines

- Daily inspect fire exit illuminated signage, ensure proper functioning.

- Monthly inspect self-contained emergency lighting units – pilot lights are functioning;. Test self contained emergency lighting units – ensure that the emergency lights will function upon the failure of the primary power supply, the emergency light heads are directionally correct and all lamps function properly (replace batteries as required).Test self contained emergency lighting units to ensure the unit will provide emergency lighting for a duration equal to the design criterion under simulated power failure conditions (replace batteries as required). Inspect light distribution patterns and adjust head aiming as required.
- Annually ensure terminal connections are clean, free of corrosion; terminal clamps are clean and tight; battery surface is dry.

2.13.6 Fire Alarm Systems

Expectations

Provide inspection and maintenance services to all fire alarm systems and ensure their compliance with health and safety standards; codes; by laws; and government regulations.

Guidelines

- Daily inspect the status of the main annunciator panel.
- Monthly inspect and test the system under emergency power conditions.
- Annually inspect and test the system in accordance with the requirements of CAN/ULC – S536 Standard for the Inspection and Testing of Fire Alarm Systems.
- Retain copies of all inspections reports and compliance certificates.

Standards

Fire alarm systems are to be inspected and tested at least once every twelve months, in accordance with the requirements of CAN/ULC – S536 Standard for the Inspection and Testing of Fire Alarm Systems; the Alberta Fire Code; and the Alberta Safety Codes Act.

2.13.7 Security System

Expectations

Provide inspection and maintenance services to all security system equipment and ensure their compliance with health and safety standards; codes; by laws; and government regulations.

Guidelines

- Weekly inspect security and personal safety systems, ensure full operation.

- Annually conduct transfer tests on battery back up components. Conduct walk test to confirm the correct operation of all components. Replace batteries on remote sensors.

2.13.8 Public Address & Intercom Systems

Expectations

Provide inspection and maintenance services to all communication systems.

Guidelines

- Annually test before school year begins. Repair or replace as required.

2.13.9 Miscellaneous

Expectations

Provide inspection and maintenance services to all miscellaneous systems and ensure their compliance with health and safety standards; codes; by laws; and government regulations.

a. Car Plug Ins

Guidelines

- Annually (at the start of the heating season) check receptacle and weather proof covers for damage. Test plug ins for power. Inspect time clock (if applicable).

b. External Lighting (wall mount/parking lot/ornamental)

Guidelines

- Weekly inspect all external light sources and test for functionality. Repair/replace as required.
- Annually check fixtures for corrosion, damage, vandalism.
- Every 5 years check all connections and wiring.

2.14 MISCELLANEOUS

2.14.1 Elevators and Lifts

Expectations

Provide inspection and maintenance services on all elevators and lifts and ensure compliance will all health and safety standards; codes; by laws; and government regulations.

Guidelines

- Daily check elevators and fixed wheelchair lifts for correct operation
- As required, have elevators and fixed wheelchair lifts inspected and re-certified by a qualified safety codes officer prior to the expiry date on the certificate of operation. A valid certificate of operations is required.

Standards

- CAN/CSA B44 Elevating Devices Code
- Alberta Safety Codes Act 261/97

3.0 Reference Documents

The following references are provided as a summary of standards listed in the preceding sections of the operations and maintenance manual. They are not intended to be an exhaustive, all-encompassing list for the operation and maintenance of K-12 schools.

- Canada Labour Code Part ll (federal health and safety legislation)
- Alberta Occupational Health and Safety Act
- Asbestos Abatement Manual, Current Edition
- Indoor Air Quality in Office Buildings: A Technical Guide, Current Edition
- Fungal Contamination in Public Buildings: A Guide to Recognition & Mgt.
- Provincial Weed Control Act
- Provincial Agricultural Pests Act
- The Boiler and Pressure Vessels Act
- The Gas Code Regulation
- Canadian Standards Association (CSA)
    - CSA B64.10 Manual for the Selection, Installation, Maintenance and Field Testing of Backflow Prevention Devices
    - CSA B52 Mechanical Refrigeration Code
    - CSA C282 Emergency Electrical Supply for Buildings
    - CSA B44 Elevating Devices Code
    - CSA Z7614-98 Manual of Children's Playspaces and Equipment

- Guidelines for Canadian Drinking Water Quality: Health Canada
- Alberta Plumbing and Drainage General Regulation 210
- National Plumbing Code of Canada
- Alberta Plumbing Code Regulation 219
- Alberta Private Sewage Systems Standard of Practice
- Alberta Safety Codes Act
- Alberta Fire Code
- National Fire Protection Association (NFPA)
    - NFPA 10 Portable Fire Extinguishers
    - NFPA 13 Installation of Sprinkler Systems
    - NFPA 14 Installation of Standpipe and Hose Systems
    - NFPA 17a Wet Chemical Extinguishing Systems
    - NFPA 25 Inspection, Testing and Maintenance of Water- Based Fire Protection Systems
    - NFPA 96 Ventilation Control and Fire Protection of Commercial Cooking Equipment.
- Canadian Gas Association (CGA)
    - CGA B149 Natural Gas Installation Code
    - CGA B149.2 Propane Installation Guide

- Underwriters Laboratory of Canada (ULC)
    - ULC S536 Standard for the Inspection and Testing of Fire Alarm Systems
- Fumehood Code of Practice
- Canadian Electrical Code, Part 1, Seventeenth Edition