BUILDING PERFORMANCE INSTITUTE, INC.

TECHNICAL STANDARDS

FOR THE

MULTIFAMILY ENERGY EFFICIENT BUILDING OPERATOR

	Module	Category	Standard	Method or Technique	Special Materials or Equipment
General					
1.1	General	Recordkeeping	Maintain and post all professional licenses, certifications, and permits, at a minimum as required by governmental codes and regulations.	Local Codes	
1.2	General	Recordkeeping	Maintain a logbook or electronic database for each major building system that contains dates and descriptions of maintenance, service, and replacement		
1.3	General	Recordkeeping	Maintain a dated logbook of fuel usage, fuel deliveries, and system down times		
1.4	General	Recordkeeping	Develop and implement a standardized work order system which includes, at a minimum: ▪ Standardized work order forms ▪ Procedures for submission and authorization of work orders ▪ Allowable timeframes for completion of repairs based on a standardized prioritization system		
1.5	General	Recordkeeping	Maintain vendor files for storage of contracts, invoices, warranties, correspondence and other information pertinent to the vendor relationship. Develop a log to remind you when the critical end dates are approaching to provide sufficient time for negotiation of renewal.		

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1.6	General	Recordkeeping	Maintain a comprehensive inventory of all electrical equipment (including building-owned appliances and lighting fixtures) listing installation date and location, estimated life expectancy and replacement date. All operation, maintenance, and warranty information on all electric equipment shall be kept on file.	Manufacturer's Specifications, Equipment Manuals	
1.7	General	Preventive Maintenance	Develop and implement a preventive maintenance plan for the building envelope, mechanical and electrical equipment including provisions for a capital replacement plan.		
	General	Preventive Maintenance	Develop and maintain a logbook listing acquisition dates, storage locations, and disposal instructions for all hazardous materials kept on site. At a minimum, ensure all local and federal regulations are met. This includes, but is not limited to: refrigerants, oils, solvents, cleaning solutions, light bulbs, ballasts, batteries.		
1.8	General	Preventive Maintenance	Service all building mechanical equipment as required per manufacturers' recommendation.	Manufacturer's Specifications	

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1.9	General	Preventive Maintenance	Conduct an annual inspection and occupant survey for all dwelling units for issues related to maintenance, indoor environment, safety, and comfort. A standardized format shall be used including, but not limited to items described in the checklist in the best practices. Problems identified during this process shall be responded to in accordance with the standardized response plan and using an established work order system.	Refer to BPI Best Practices Survey and Inspection protocol	
1.10	General	Communication	Treat building staff, tenants, outside contractors and vendor personnel in a professional, courteous, and respectful manner.		
1.11	General	Communication	Clearly define the responsibilities and policies regarding utility payments and appliance purchasing, installation, and maintenance and provide copies to all building occupants and staff.	Resident Manual, Staff Manual	
1.12	General	Communication	Educate building staff and residents on heating and cooling operation and energy efficiency as well as electricity and water efficiency measures and practices. Include phantom load education.	Resident Manual, Staff Manual	

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1.13	General	Sampling	When standards call for a sample of apartments to be tested, monitored, inspected, or analyzed, select the sample units in conformance with the guidelines set forth in the BPI Multifamily Building Analyst standards section 3.1 Unit Sampling Protocol.	BPI Multifamily Building Analyst standards section 3.1	

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Health and Safety					
2.1	Health & Safety	Personal Safety	Use tools and equipment properly, safely, and maintain and calibrate according to manufacturer's specifications.	Read and follow tool manufactures recommendations, OSHA Standards	
2.2	Health & Safety	Personal Safety	Building maintenance and cleaning workers follow applicable personal health and safety standards as provided by OSHA. Provide building workers with all necessary personal safety equipment and trained in required procedures for proper use, based on the tasks they engage in.	OSHA	
2.3	Health & Safety	Personal Safety	Take measures to maintain a secure building. Evaluate the performance of security measures annually and updated as needed, based on evaluation results.		
2.4	Health and Safety	Cleaning and Sanitation	Keep all recycling and refuse separated according to local codes and haulers specifications. Properly label all containers. Educate residents and maintenance staff about proper use and maintenance of these areas.		
2.5	Health and Safety	Cleaning and Sanitation	Establish cleaning and maintenance schedules for compactors, dumpsters, and trash chutes in accordance with manufacturer's recommendations and health codes; refuse and recycling areas are to be kept debris free and clean.		

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2.6	Health and Safety	Cleaning and Sanitation	Use environmentally safe cleaning products and procedures.	Use Green Seal labeled products or equivalent	
2.7	Health and Safety	Cleaning and Sanitation	Establish a general cleaning schedule that emphasizes overall cleanliness throughout the building and ensures health, safety, and cleanliness of the areas. Note when these schedules are not met. Provide for seasonal variations and other conditions that are unique to the building in the cleaning schedule. Local sanitary codes must be met in all cases.		
2.8	Health and Safety	Cleaning and Sanitation	Maintain sidewalks, parking areas and other exterior spaces in a clean, safe, and passable condition, including removal of snow, ice, dirt, and other debris.		
2.9	Health & Safety	IAQ	Develop a tobacco smoke response strategy based on the existing conditions of the building structure and mechanical systems and implemented. Mitigation of smoke transfer may include air sealing and/or ventilation system modifications.		

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2.10	Health & Safety	IAQ	Develop and implement a VOC management plan. Use low VOC paints and follow manufactures instructions. Use of adhesives in the installation of carpeting shall be minimized. Store hazardous chemicals outdoors or isolated from living and common space		Low VOC paints, carpets, and adhesives
2.11	Health & Safety	IAQ	Inspect building air intake systems daily to prevent potentially hazardous airborne contamination. Mitigate problems where identified. Establish a filter replacement schedule using HEPA filters where possible and available.		MERV rated filters (need recommended minimum rating)
2.12	Health & Safety	Combustion Safety	Conduct combustion safety testing for all combustion appliances in the building on an annual basis or more frequently if conditions warrant. Develop and implement carbon monoxide monitoring and response strategies.	BPI BA1 standard	CO detectors/ diagnostic tools
2.13	Health & Safety	Combustion Safety	Investigate suspected natural gas leaks immediately, and repaired immediately when found. Combustion appliances in the area must be shut down until the leak is repaired.	Contact gas utility to repair gas leaks.	Digital gas leak detector, soapy water

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2.14	Health and Safety	Combustion Safety	The heating plant combustion air intake(s) may never be obstructed. Inspect the combustion air intake(s) daily to ensure proper clearance from obstructions and adequate airflow.		
2.15	Health & Safety	Thermal Comfort	Maintain common area thermal comfort and equip dwelling units to allow residents to maintain thermal comfort conditions per ASHRAE 2004-55 guidelines	Monitor temperature, humidity in common areas and a sample of dwelling units. Set HVAC controls to meet ASHRAE standard	Hobo dataloggers, survey questions, EMS sensors in building
2.16	Health and Safety	Thermal Comfort	Enter and inspect dwelling units when responding to tenant complaints regarding heating or cooling. Log complaint details, the observed conditions including the ambient apartment temperature, and corrective action as indicated. The annual apartment inspection may be conducted at this time.		

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2.17	Health and Safety	Hazard Management	Establish and enforce an Integrated Pest Management (IPM) program throughout the building, including, but not limited to: ▪ Provide resident IPM resource kits / educational material ▪ airsealing to prevent pest intrusion ▪ reduced use of harmful chemicals by IPM methodologies and standards		
2.18	Health & Safety	Hazard Management	Develop and implement a standardized inspection protocol for routine evaluation of dwelling units and hazard identification. Inspect dwelling units using these protocols at a minimum on an annual basis. Document and maintain on file, the results of unit inspections.	Refer to BPI Best Practices for recommended dwelling unit inspection checklist, CEHRC moisture and lead identification protocols, OSHA lead identification standards, HUD Healthy Homes Protocols	mitigation, airsealing, moisture meter

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2.19	Health & Safety	Hazard Management	Develop and administer a standardized resident survey on an annual basis to ask relevant questions of the residents as related to building management and related health issues in the areas of general comfort and health conditions, air quality and appliance function/performance. Remedy problems identified according to the standardized hazard response plan.		

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2.20	Health & Safety	Environmental Hazards	Develop standardized action plans based on pertinent codes and regulations to address: • Basic outdoor environment considerations, which may affect the indoor environment, including pertinent codes and regulations. • Basic indoor environment considerations, which may affect the outdoor environment, including pertinent codes and regulations. Implement action plans upon identification of potential environmental issues within stated response times and designated chain of command. Environmental considerations to be included in the action plans include, but are not limited to: ▪ Mold ▪ Lead ▪ VOC's ▪ Carbon Monoxide ▪ Fuel leaks		
2.21	Health & Safety	Environmental Hazards	Implement OSHA standards for handling and maintenance of areas where known or potential toxic substances are present in the building. For example lead, asbestos, etc.	OSHA standards	

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2.22	Health & Safety	Environmental Hazards	Inspect commercial and/or special use spaces, where they exist, at least annually and identified hazardous conditions corrected immediately.		
2.23	Health & Safety	Fuel Hazards	Develop an implement an action plan for oil spills and their cleanup to prevent oil contamination.	Dipstick readings, oil spill monitors on ground	
2.24	Health & Safety	Fire/ Smoke/ Burns/ Scalding Hazards	Install and maintain smoke and carbon monoxide detectors in accordance with local codes and regulations. Conduct an annual inspection to confirm proper placement and operation.		
2.25	Health & Safety	Fire/ Smoke/ Burns/ Scalding Hazards	Identify and inspect all ventilation system smoke/fire damper locations to ensure accessibility and conformance with local code requirements and design specifications. All dampers shall remain open. Reset any damper found closed. Repair or replace defective/ missing/ tripped smoke and fire dampers as required to ensure they are properly set and will activate under emergency conditions.		

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2.26	Health & Safety	Fire/ Smoke/ Burns/ Scalding Hazards	Correct burn hazards immediately upon identification including: ▪ DHW delivery temperatures in excess of 120°F ▪ Steam leaks ▪ Assess whether bare steam or DHW piping in the livable or public access areas need insulating		
2.27	Health & Safety	Structural / Physical Hazards	Implement measures to reduce fall, trip, and slip risk areas. Problems identified common areas shall be corrected and properly labeled. Educate residents on common fall, trip, and slip hazards.	Use signage where appropriate. Refer to NFPA brochure	
2.28	Health & Safety	Structural / Physical Hazards	Provide education material to residents about apartment/ resident health and safety maintenance requirements. Develop and implement a plan to periodically remind residents of requirements, including those dictated by local codes and regulations. Provide resident manuals and training as appropriate to new occupants when they move into the building.	Resident Manual	

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2.29	Health and Safety	Electrical Hazards	Purchase electrical system testing equipment and establish and implement electrical system safety inspection protocols to ensure electrical system safety and efficiency. Mitigate, in accordance with a standardized hazard response plan, hazardous conditions that are identified.		Multi-meter, GFI tester, Infrared camera
2.30	Health and Safety	Mechanical Hazards	Establish and implement a system for regular inspections of elevator controls, motors, suspension systems by the maintenance company and maintained in a dated log book. Respond to performance complaints immediately by shutting down the elevator until it can be inspected and repaired by the maintenance company.	Manufacturer's specification, Service Agreements, Local codes and regulations	
2.31	Health and Safety	Security Hazards	Inspect and maintain all building safety systems including but not limited to: smoke, fire, and CO detector systems, backup generator operation, emergency battery backup functions, emergency lighting, special needs and blackout preparedness equipment, shall be tested on at least an annual basis and maintained in operating condition at all times.		

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HVAC and Mechanical Systems					
3.1	HVAC and Mechanical Systems	Maintenance	Maintain current knowledge of industry standards for operating practices for HVAC equipment. Contact the manufacturer when in doubt regarding the proper operation and maintenance of any piece of equipment or system.	Trade Journals, Manufacturer's Specifications	
3.2	HVAC and Mechanical Systems	Maintenance	Establish and implement a standardized plan for replacement of motors and pumps to ensure purchase of energy efficient equipment and replacement prior to equipment failure.	Motor Master	
3.3	HVAC and Mechanical Systems	Central Heating Plant	Ensure that the heating plant is at a minimum, annually inspected and serviced by a qualified technician including: burner clean and tune, waterside treatment, fireside treatment, filter replacement, combustion efficiency test and understand reasonable test results.		

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3.4	HVAC and Mechanical Systems	Central Heating Plant	Complete a daily visual inspection of the heating plant and log key indices of performance, including system pressures, system temperatures, fuel pressure, make-up water, fuel consumption, and other indicators of performance such as flame rollout, smoke in the fire chamber and/or flue, etc. Observe equipment operation through one complete cycle. Confirm that all observations of equipment are within acceptable manufacturer specifications. Equipment found to be operating outside of manufacturer's specifications shall be serviced by a qualified technician.	Manufacturer's Specifications	
3.5	HVAC and Mechanical Systems	Central Heating Plant	Complete combustion efficiency testing of the heating plant at a minimum before, in the middle and toward the end of the heating season according to a standardized maintenance schedule by a qualified mechanic or staff person. Observe and log all maintenance, including annual clean & tune and emergency repairs, of the heating plant and/or distribution system.		

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3.6	HVAC	Central Cooling Plant	Conduct a visual inspection of the central cooling system daily and perform an efficiency test monthly and log key indices of performance. Correct conditions that are outside acceptable manufacturer specifications in accordance with an established response time policy.		
	HVAC	Central Heating and Cooling Systems	Develop a written plan for control operation and sequencing for all central heating and cooling systems. Inspect all HVAC controls monthly to verify proper setting and operation. Maintain logs of results of monthly inspections including adjustments and/or maintenance activities.		
3.7	HVAC	DHW	Conduct a visual inspection of the DHW system daily and log key indices of performance, including DHW supply temperature, flue temperature, etc. and quarterly inspection of preventative maintenance issues such as signs of physical deterioration including rust, pipe corrosion, failing insulation, etc. Complete corrective action for any observations not within acceptable ranges in accordance with an established response time policy.		

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3.8	HVAC	Distribution	Inspect the HVAC distribution terminal units at a minimum, annually, and serviced including: filter replacement; inspection and/or cleaning of the blower and/or heat exchanger; proper pitch of the radiators, proper operation of the air vents, steam traps, and/or radiator handles; etc.		
3.9	HVAC	Ventilation	Conduct a visual inspection of rooftop fan units daily and note any abnormal conditions. Verify that units are running when they are supposed to be and note any unusual noise or other performance issues. Verify that units are in good condition. Additional tests shall be conducted by a qualified technician, where problems are identified, to ensure ventilation is provided as required by local codes and design specifications.		Smoke stick
3.10	HVAC	Ventilation	At a minimum, test central ventilation systems monthly to ensure proper operation and maintenance as needed. Include a visual inspection of a sample of intake and supply registers to ensure they are clean and dampers are operating properly. Verify airflow with a tracer smoke test. Specify repairs by a qualified technician in accordance with an established response plan.		

Envelope

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4.1	Envelope	Codes	Follow all local codes pertaining to the building envelope.		
4.2	Envelope	Air Barrier	Maintain the integrity of the boundaries between interior conditioned spaces and attached and underground garages and mechanical rooms by ensuring an effective air barrier exists between these areas.		
4.3	Envelope	Materials	Select and use proper materials for repair and maintenance of all components of the building envelope, including but not limited to flashing, air, moisture and thermal barriers, weather-stripping, and caulk. Install products in accordance with manufacturer's specifications.	Manufacturer's Specifications	
4.4	Envelope	Roof	Complete a basic roof inspection, at a minimum, on a monthly basis.	Refer to BPI Best Practices for sample Roof Inspection checklist	
4.5	Envelope	Roof	Identify and implement routine maintenance tasks for the roof, relevant to the building roof type in accordance with a standardized maintenance plan.		

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4.6	Envelope	Walls	Inspect exterior walls, at a minimum, annually and/or more often as required by local code, to identify areas where damaged or worn materials or components may compromise the building's weather barrier. Repair problems that are identified in accordance with an established response plan.	Refer to BPI Best Practices for sample Wall Inspection Checklist	
4.7	Envelope	Walls	Inspect through the wall air conditioner sleeves at a minimum, annually to ensure seals are air and weather tight. If the sleeve is not used it should be sealed and insulated.		

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Lighting and Appliances					
5.1	Lighting and Appliances	Energy Management	Develop and implement a standardized schedule for checking proper operation and settings of timers for all electrical equipment on timers or light/motion sensitive sensors. Check and reset all timers as needed after a power outage.		
5.2	Lighting and Appliances	Energy Management	Analyze electric and gas bills, at a minimum, annually for usage, demand, and load patterns to identify opportunities for conservation and energy management strategies. Use utility bill analysis to evaluate the success of energy management strategies.		
5.3	Lighting and Appliances	Energy Management	Install motion sensors in all equipment, storage, and public bathrooms to reduce lighting and other electrical usage without sacrificing public safety		
5.4	Lighting and Appliances	Lighting	Test lighting levels in all common areas, at a minimum, annually to ensure lumen output meets design standards and lighting requirements as specified by local code. Document Light levels with light meter, and correct light levels as needed.	Find light level monitoring guide to reference, IES, ALA, ASID	Light meter

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5.5	Lighting and Appliances	Lighting	Develop and implement protocols for lighting replacement in areas of building owner responsibility to ensure availability of necessary replacement parts and installation of energy efficient lamps and fixtures		
5.6	Lighting and Appliances	Lighting	Properly dispose all lighting, bulbs, tubes, ballasts and related equipment of and recycled as required by all codes.		
5.7	Lighting and Appliances	Appliances	Install gas appliances located in dwelling units in compliance with all applicable codes and in accordance with manufacturer's specifications. Test new gas connections for gas leaks upon installation of all new appliances and equipment. Provide CO detectors and mechanical ventilation as required by all codes and regulations.	OSHA, AGA, NFPA, Manufacturer's Specifications	
5.8	Lighting and Appliances	Appliances	Vent all clothes dryers, whether in common spaces or in dwelling units, to the exterior in accordance with manufacturer's specifications.	Manufacturer's Specifications	
5.9	Lighting and Appliances	Appliances	Ensure all common area and building purchased appliances and lighting, at a minimum, meet current Energy Star standards		

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5.10	Lighting and Appliances	Appliances	Properly recycle all discarded appliances at a minimum according to local codes. Ensure products are properly de-manufactured, including reclamation of refrigerant and proper disposal of parts which may adversely effect the environment (e.g. mercury switches, light fixture ballasts, batteries, electronic equipment and appliances, fluorescent light bulbs, etc.) Provide residents with a means to properly dispose of these items via a centralized drop-off area and/or sponsoring annual hazardous material collection events.	Refer to EPA website for list of common hazardous materials found in residential buildings.	
5.11	Lighting and Appliances	Appliances	Install dwelling unit air conditioning units according to safety standards as required by code; in master metered buildings require that tenants buy properly sized Energy Star room air conditioning units in apartments as directed by building staff		
Water					
6.1	Water	Conservation	Track and evaluate water consumption for unusual use patterns at each billing cycle. Ensure information collected in this evaluation directs necessary repairs and water conservation.		

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6.2	Water	Conservation	When replacing water-based systems, consult consumer standards for water-saving technologies.	AWWA	
6.3	Water	Leaks	Where water leaks are suspected an investigation must begin immediately. Once the source of the water is identified, the problem must be corrected immediately.		
	Water	Leaks	Inspect and test drain pains under washers and DHW tanks at a minimum, annually to ensure proper drainage is possible. Clogged drains and damaged/missing drain pans shall be repaired or replaced.		
6.4	Water	Leaks	Develop and implement a standardized moisture response program including procedures for moisture mitigation and drying after leaks occur. Implement moisture mitigation strategies immediately to ensure complete drying of all building components. Response immediately to reports of water discharge or appearance of water in inappropriate areas, 24 hours a day, 7 days a week.		

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6.5	Water	Plumbing	Perform as needed basic plumbing repairs, including but not limited to shut-off valve replacement, interior toilet tank parts, washer hookups, always using parts appropriate for each application.		
6.6	Water	Plumbing	Inspect, on a regular basis, plumbing systems to identify potential water leaks or condensation. Perform basic plumbing maintenance procedures such as drain cleaning using appropriate chemical and mechanical means. Sanitary drainage traps shall be primed and leaks repaired by a qualified technician.		
6.7	Water	Leaks	Use diagnostic equipment, moisture sensors, infrared meters in moisture discharge investigations. Use these readings to track water and locate water leaks.		Moisture meter
6.8	Water	Metering	Individually track and analyze water use in each sub-metered system (cooling towers, commercial spaces, lawn watering, and others) for savings opportunities.		

(Best Practices include individual checklists for various types of maintenance/inspection procedures: e.g. roof inspection, etc. These best practices are constantly a work in progress. Contact BPI for more information)