

## TECHNICAL EXHIBIT NO. M-9

### Preventive maintenance

### Oil Fired Hydronic, Steam Hydronic, Gas Fired Hydronic Heating System and Domestic Hot Water system

#### **Oil Fired Hydronic Heating System Ft. Wainwright**

1. Replace burned out bulbs and fluorescent tubes.
2. Clean burner tubes and cadmium cell eye assembly. Inspect and clean boiler flue passages and vent piping as required.
3. Replace oil filter and burner nozzle and do combustion efficiency test at start of heating season after adjusting air and fuel mixture to manufactures specifications. Check oil pump pressure and adjust if necessary.
4. Check operating aquastat and high limit on boiler for proper operation.
5. Check room temperature controls system for proper operation. Calibrate if necessary or replace control.
6. Repair all leaks and replace any defective or missing pipe insulation with fiberglass insulation.
7. Repair or replace backflow preventer if leaking. Use Watts 9D backflow preventer.
8. Repair or replace defective make up water valve. Use Bell & Gosset FB-38TU valves.
9. Repair or replace defective 1/8" automatic air vent on air elimination devices. Install new 1/8" male/female ball vent before automatic air vent.
10. Replace faulty expansion tank. Install 1/2" ball valve before expansion tank.
11. Replace malfunctioning and defective pressure gauges. Use 1/4" male/female ball valve or gauges.
12. Check hydronic-circulating pump using amp meter. Replace defective pumps with Grundfos pump. All pumps will be operational.
13. All valves with gland and stuffing boxes will be lubricated with Teflon paste pipe dope and tightened properly.
14. Mechanical rooms will be left clean and free of debris.

#### **Steam Hydronic Heating System**

1. Check 125# and 15# steam traps for proper operation. Use infrared thermometer or pyrometer. Rebuild or replace traps.
2. Check pressure reducing valve for proper operation. Rebuild or replace as necessary.
3. Hot water hydronic generation adjust controller for correct temperature. Lubricate packing gland. Check coil for leaks by shutting off steam and open strainers.
4. Steam pressure relief valve replace if leaking.
5. Replace defective pressure and temperature gauges.
6. Steam control for domestic hot water generator adjust for proper temperature. Check coil for leaks. Shut off steam open strainer water coming out of strainer indicates leak in coil repair or replace.
7. Repair all leaks and replace defective and missing pipe insulation with fiberglass insulation.

8. Repair or replace backflow preventer if leaking. Use Watt 9D backflow preventer.
9. Repair or replace defective make up valve. Use Bell & Gosset FB-38TU valve.
10. Repair or replace defective 1/8" automatic air vents on air elimination devices. Install new 1/8" male/female ball valve before automatic air vent.
11. Replace faulty expansion tank. Install 1/2" ball valve before expansion tank.
12. Replace defective pressure gauge. Use 1/4" male/female ball valves on gauges.
13. Check hydronic-circulating pump using amp meter. Replace defective pumps with Grundfos pump. All pumps will be operational.
14. All valves with gland and stuffing boxes will be lubricated with Teflon paste pipe dope and properly tightened.
15. All areas/rooms will be left clean and free of debris.

### **Domestic Hot Water System**

1. Inspection of complete system to include tank controls safety devices and supply system accessories. Check temperature of recirculating lines, adjust balance cock if necessary. Check recirculating pump using amp meter. Replace with Grundfos UP15-18 SU or equal.

### **Hydronic Heating System Ft. Richardson**

1. Replace all burned out bulbs and fluorescent tubes.
2. Repair all leaks and replace defective or missing pipe insulation with fiberglass.
3. Repair or replace backflow preventer if leaking. If missing install Watts 9D before make up feed valve.
4. Repair or replace make up water valve. Use new brass body 12-pound fill valve with strainer. Use Bell & Gosset FB3870 valves.
5. Repair or replace defective 1/8" automatic air vents on air elimination system. Install new 1/8" male/female ball valve before automatic air vent.
6. Replace faulty expansion tanks. Install 1/2" ball valve before expansion tank.
7. Replace malfunctioning and defective pressure gauge. Use 1/4" male/female ball valves on gauges to isolate for test and replacement.
8. Check hydronic-circulating pump using amp meter. Replace defective pump with Grundfos pump. All pumps will be operational.
9. Check domestic hot water pump with amp meter. If defective replace with a brass or stainless body Grundfos UP15-18SU or equal. Maintain and set balancing cock using pyrometer or digital thermometer. Replace non-working in line thermometer with correct thermometer.
10. Install 1/2" ball valve before all 1/2"X3/4" hose bibbs.
11. Remove non-standard pump flange spacers and replace with copper pipe and male adapter.
12. All valves with gland and stuffing boxes will be lubricated with Teflon paste pipe dope and properly tightened.
13. All areas/rooms will be left clean and free of debris.

## **Birch Hill Hydronic System**

1. In making repairs save glycol and reinstall, test glycol for proper PH level and inhibitor. Install inhibitor as needed to maintain proper levels.
2. There will be one (1) User's Information Manual located at each boiler location.

## **Before Each Heating Season**

1. A trained and qualified service technician should perform the inspections listed in these instructions at least once a year.
2. Air filter: Located in sheet metal box in front area of boiler. 1/4-turn fasteners hold air filter box cover on. Replace (recommended) or clean filter annually (more often if conditions dictate). Slant/Fin replacement air filter, part number 66-0515 must be used. Can be cleaned with soap and water; after drying, spray with an adhesive-type air filter spray, which will attract/hold airborne dust particles.
3. Vent Termination: Check and remove obstructions.
4. Closet installations: Check for and remove ventilation and/or combustion air opening obstructions.
5. Vent in: Check for and repair tubing separation, leaks or sagging
6. Vent tubing (externally): Check for corrosion of vent material. If corrosion is present, replace and reseal exhaust tubing assembly. If corrosion is present on galvanized vent material (approved for use on Category I installations only), this material should be replaced with #29-4C stainless steel.
7. Vent and air intake tubing (internally): Check for and remove obstructions. To inspect, remove tubing from boiler. When finished, reseal all removed tubing parts with manufacturer's specified sealant.
8. Heat exchanger: In the unlikely event of boiler flue passage blockage, service to remedy situation must be performed only by an authorized Slant/Fin representative.
9. Burner: Annual service of the burner is not necessary. Follow the burner removal procedure on page 27 when improper operation of the boiler necessitates inspection' of this part.
10. System water: Check if full of water and properly pressurized. Check for and correct radiation system air "noise".
11. Water piping: Check for and repair any leaks.

12. Gas piping: Check for and repair any leaks.
13. Clear plastic tubing: Located around burner enclosure area. Check for cracked, loose or blocked conditions. Replace if necessary.
14. Safety shutdown controls: Check operation as detailed on page 21 in this manual.
15. Blower: This is a sealed component, which does not require lubrication. Check convoluted boot on blower outlet for air leakage.
16. Circulator: Some models require lubrication. S.A.E. #20 oil recommended.

### **Water Treatment**

1. A good water treatment program will extend the useful life of the boiler and is especially recommended in areas where water quality is a problem. A reputable water treatment company should be consulted for determining the best overall treatment program for this equipment.

### **Providing Protection From Freezing**

1. Anti-freeze is sometimes used in hydronic heating systems to protect against freeze-up in the event of power failure or control shutdown when the building is unoccupied. It should be recognized that unless the building is kept above freezing temperature by some means, the plumbing system is not protected. Two types of anti-freeze may be used: ETHYLENE GLYCOL, used in automobiles, has desirable properties, but is toxic. Its use may be prohibited when system water/glycol solution is in contact with a potable water vessel (as with a tank-less heater). PROPYLENE GLYCOL is used in the quick-freeze food industry; it is practically non-toxic. Its use may be permitted when tank-less heaters are used. When anti-freeze must be used, inhibited propylene glycol is recommended. Useful information on the characteristics, mixing proportions, etc. of glycol in heating systems is given in Technical Topics No. 2A, available from the Hydronics Institute, 34 Russo Place, Berkeley Heights, NJ 07922. Consult glycol manufacturers for sources of propylene glycol.

### **If Replacement Parts Are Needed.**

1. When parts are needed, refer to boiler model and serial number shown on the boiler name/rating plate. Refer to publication number CB-1 0PL Concept 21 Replacement Parts for part numbers. Whenever possible refer to the original order by number and date.
2. Control identification and replacement should not be attempted by unskilled personnel. Only simple, easily identified controls and parts may be obtained locally. All other controls and parts should be identified by and ordered from Slant/Fin. Relief/Safety valves must be ASME rated for the pressure and gross output of the boiler.

3. This boiler is equipped with an unconventional gas control. If this control is replaced, it must be replaced with an identical gas control and calibrated as specified in the Operation Procedures.
4. For replacement parts, heating contractors should contact their Slant/Fin boiler distributor.

### **Duplex Maintenance**

#### **Hydronic Heating System Maintenance**

1. Service Honeywell Q60102X1 three way modulating valve or equal. Lubricate sleeve assembly and valve stem with silicone grease or super lube. Repack valve bonnet and packing gland.
2. Check Grundfos circulating pump with amp meter to ascertain proper operation.
3. Service all gate valves. Clean stems and replace packing in packing gland. Lubricate stuffing box and valve stem with Teflon based joint pipe compound and tighten packing gland.
4. "A" apartment- Check hot water heater for proper operation. Service Honeywell Q601D2X three way modulating valve or equal. Check Honeywell T915C temperature controller for proper operation. Replace thermometer if necessary. If heating coil is defective replace hot water storage tank with 80 gallon Amtrol hot water tank. Use brass or copper pipe.

#### **Exterior Mechanical Room**

1. Service Bell & Gosset circulating pumps. Lubricate motor and bearing assembly. Check motor for proper amperage draw and rotation. Rotate pump every three months(3). Check and service make up water controls. Change out automatic air vents. If necessary service gate valves. Replace thermometer on supply and return piping if defective.