MODINE

76-500J

- *General maintenance*
- *Air movers*
- *Heat exchangers*
- *Gas burners*
- *Gas controls*
- *Thermostats*
- *Vent systems*
- *Gas supply*
- *Start-up*
- *Combustion air*
- *Redundancy/alarms*
- *Corrosives*
- *Record keeping*

Greenhouse Heating Tips

Heating Division
Bulletin No. GT-1-93 Heating Division Fall 1993

Pre-season Checklist

End of summer maintenance

Summer is over and it is time to crank up the heating system. It is also time to make the routine checks necessary to insure that your heating equipment is going to function properly.

Here is a check list that will make this task a little easier and will remind you what items to check.

General maintenance and visual Checks

1. Check equipment for any physical damage that may have occurred over the summer. This should include damage to sheet metal, fans and air movers, wiring, gas piping, and vent system.
2. Check for cleanliness of heat exchanger and burners.
3. Check to make certain vent system is clear. Sometimes birds like to take up residence in unused vent pipes.

4. Check to make sure no obstructions block air inlet or air discharge of equipment.
5. Ensure unit supports are secure and unit hangs level.

CAUTION **All work on heating equipment should be performed by qualified service personnel.**

Air Movers

1. Check lubrication of motor bearings if they are not the permanently lubricated type. Lubricate if necessary.
2. With the power turned off, check to see that motor shaft turns freely and does not bind. This can be done by rotating the fan or blower wheel by hand.
3. Inspect the fan or blower wheel to make sure they are not damaged.
4. Check to make certain fan is not loose on motor shaft. If blower units are used, make certain the blower and motor pulleys are secure.
5. On blower units, check for proper belt tension and also look for signs of belt wear. (*See your installation manual.*)
6. Check power connections to motor to ensure they are secure and have not vibrated loose over the past heating seasons.

Note: Equipment using belt drives should have the belt tension checked on initial start-up. Periodic inspection should be made during the heating season to ensure continued proper operation.

Heat Exchangers

1. Check heat exchangers for any signs of cracks or corrosion. It is best to use a flashlight and inspect the inside of the heat exchanger tubes as well as the outside.
2. Check cleanliness of heat exchanger. If required, clean inside tube surfaces with a stiff brush. Do **Not** use a wire brush as it may scratch metal surfaces and make them more prone to corrosive attack.
3. Inspect heat exchanger for signs of over-heating. Metal which has been overheated will have a dark discoloration at the areas of overheating. If dis-coloration is evident, it may mean that the gas pressure to the unitis incorrect, air movers are not properly adjusted,venting is inadequate, combustion air is inadequate,or structions are blocking the air inlet or air dischargeof the heating equipment.

Ask your greenhouse supply company for Modine Bulletin 10-508 if your units are installed with fan jet systems.

Gas Burners

1. Inspect the burner for general cleanliness. If the burner requires cleaning, clean with a stiff brush (not a wire brush).
2. Inspect inside of burner tubes as much as is possible. During the summer months it is not uncommon to find that spiders or mice have taken up residence inside the burner.
3. Inspect burner for proper location making sure that it is properly aligned and securely fastened.

Gas Controls

1. Inspect all gas connections for good tight fits. This includes pipe connections to the equipment as well as pilot tubing connections at the gas valve and at the pilot burner.
2. Inspect the main burner gas orifices to make sure they are not blocked with spider webs. Check pilot orifice for obstructions if pilot cannot be lit or will not stay lit.
3. After visual and physical inspection of the gas connection, turn on the gas and check for gas leaks using a water/soap solution.

MODINE

⚠ CAUTION—DO NOT CHECK FOR LEAKS WITH AN OPEN FLAME

4. Check electrical connections to gas valve.
5. Check thermocouple for cleanliness and tight connections. Replace as needed.

Thermostats

1. Check thermostat for general cleanliness.
2. Check wiring to and from thermostat.
3. Check thermostat for proper temperature setting.
4. Check to make sure the thermostat is in an appropriate location. The thermostat should be installed away from outside walls in a location free from drafts and shaded from the sun. The location should be varied for different crop heights so the thermostat senses the temperature at crop level.

Vent Systems

1. Check to make certain vent system is clear and free of any obstructions.
2. Check to make certain all connections are secure and tight.
3. Check vent support system to make certain it is secure and has not been damaged.
4. On gravity vented (PAE/BAE) products, make sure the blocked vent safety switch has not tripped. Refer to Service and Installation Bulletin 6-551 for details.
5. Check joints of vent for signs of condensate leakage. Water marks down the outside of the vent pipe may indicate inadequate venting and/or improper vent insulation in unheated spaces. Using double-walled vent pipe will reduce the likelihood of condensation in the vent pipe and will promote better venting.
6. Check vent pipe drip leg and cleanout cap, and clean if necessary.
7. Use approved weather caps.

Gas Supply

1. Check to make sure that gas mains are turned on.
2. Check inlet pressure and manifold gas pressure to heating equipment to make sure it is properly set.

Note: Gas pressures with all equipment being supplied by a single source, operating at the same time, to ensure there is no fluctuation in gas pressure as the load on the gas system changes.

3. Check gas regulators to be certain regulator vents are not plugged.

Note: On propane gas systems, main gas system regulators should be vented to the outdoors if the regulator is located inside the building.

4. If propane is being used, check main regulators on tanks for proper pressure settings and check for damage to regulators.
5. Check propane tanks for proper size and liquid propane levels.
6. The latest generation of controls on Modine units prevent lockout problems. Contact your greenhouse supply company for information on upgrading your units.

Start-up

1. Turn the gas on, light all pilots and make sure the stay lit. Turn the power on and cycle the equipment to ensure proper operation.
2. Observe burner flame to ensure that it is burning clean, and is not wavering, rolling out, lifting or fluctuating. If an abnormal flame is observed, refer to the installation and service manual for proper adjustments.

Combustion air

1. Check to ensure that the combustion air inlets in your greenhouse are clear of debris (leaves, birds nests, etc.) so that your unit heater will receive a steady flow of combustion air. Allow 1-sq.-inch of free area per 1000 BTUH of input.

   Note: You can avoid the need for combustion air inlets in your greenhouse by using a Modine High-Efficiency Separated Combustion unit heater. This type of unit heater uses outside air for combustion. Ask your greenhouse supply company about the many advantages this unit can offer you.

Redundancy/Alarm systems

Does your greenhouse have an alarm system? Such a system can prevent severe financial loss in the event of a quick, unexpected freeze.

Multiple smaller heaters, rather than a single, larger heater, also makes "cents" (and dollars!) if one unit fails or doesn't light.

Contact your greenhouse supply company for information on the merits of redundant heaters and alarm systems.

Corrosives

Some of the commonly used fertilizers and herbicides are corrosive to heat exchangers in oil and gas heating units.

Here is a list of some common offenders.

- Ambush
- Bravo
- Chipco
- Chlorine bleach
- Dacon
- Dowco 179
- Drann VK-1
- Dursban (2) RE
- Ectiban
- Ent 2711
- Exotherm Termil
- Forturf
- Lorsban
- Mavrik
- Pentac Aquaflow
- Pounce
- Pyrinex
- Rovral
- Talstar
- Termil

Record keeping

It is recommended that a record be kept of the date the heating equipment was last checked and serviced. It is also recommended that service checks be made on a periodic basis throughout the heating season. By keeping a service record and updating it, it is less likely that this important maintenance will be overlooked.

Note: For additional information of servicing your Modine heating equipment, request 75-551, Service Diagnosis.

Contact BFG Supply Co.
for more information .