

# WOODMASTER COMMERCIAL SERIES

Retain this manual



## Cyclone Separator

[www.woodmaster.com](http://www.woodmaster.com) / 800-932-3629 / Manual PN: 7994-405

Northwest Manufacturing, Inc / 600 Polk Ave SW / Red Lake Falls, MN 56750

Rev: 2.1

Obadiah's • 406-300-1776

# *Table of Contents*

|                                |       |
|--------------------------------|-------|
| General Information .....      | 3-4   |
| Safety .....                   | 5-6   |
| Features .....                 | 7-9   |
| Transport & Installation ..... | 10    |
| Operation .....                | 11    |
| Cleaning .....                 | 12    |
| Maintenance .....              | 13    |
| Notes .....                    | 14    |
| Warranty .....                 | 15-18 |
| Notes .....                    | 19    |

## **IMPORTANT!**

**THIS MANUAL CONTAINS ALL THE NECESSARY INFORMATION FOR THE CORRECT AND SAFE OPERATION OF THE CYCLONE SEPARATOR. IT MUST BE CAREFULLY READ BEFORE INSTALLATION, AND ALL MAINTENANCE AND REPAIR OPERATIONS.**

# ***General Information***

## **Identification of the document**

This Use and Maintenance Guide contains the main information for storing, moving, installing, using, monitoring, maintenance and disposal of the Cyclone Separator. This manual reflects the state of the Cyclone Separator at the time of delivery and cannot be considered inadequate because subsequently updated on the basis of new experience acquired by WoodMaster. WoodMaster reserves the right to modify the products and the manuals without updating the booklets referring to previous productions and without prior notice to the users of previously supplied Cyclone Separators. Prior notice regarding future updating of the manual and/or the Cyclone Separator's is to be considered

a courtesy only. Our customer service is always available for providing information on updates of WoodMaster Cyclone Separators upon request.

## **Aim of the document**

This Instruction Manual has been written to provide the user and the installer with a general knowledge of the Cyclone Separator and the assembly, use and maintenance instructions that are necessary for operating the Cyclone Separator with maximum safety for the operators. This manual is an integral part of the Cyclone Separator and must be kept with it until its decommissioning as a reference for all future updates.

For safe operation, all Cyclone Separator operators (installers, drivers, maintenance personnel) must be familiar with all the instructions contained in this manual. In particular, personnel must:

- Be familiar with and observe all instructions included in the present manual in order to operate the Cyclone Separator safely
- Respect the Laws relating to the prevention of accidents in the workplace

# ***General Information***

## **Intended use**

The Cyclone Separator is exclusively intended for the removal of solid particles contained in fumes given off by heat generators.

## **Improper use**

Use of the Cyclone Separator for other purposes or in different ways than those described in this manual constitutes improper use.

**WARNING**  
**TO AVOID IRREPARABLE DAMAGE TO THE**  
**CYCLONE SEPARATOR, THE**  
**TEMPERATURE OF THE FUMES MUST NOT EXCEED 536 °F.**

## **Liability**

Guarantee of manufacturer liability cannot be called upon in case of damages to people or objects due to:

- a. improper Cyclone Separator use;
- b. use of the Cyclone Separator by untrained personnel;
- c. serious lack of maintenance;
- d. unauthorised modifications and interventions;
- e. use of non-original spare parts or not compatible with that model;
- f. total or partial failure to comply with the instructions;
- g. extraordinary events;
- h. use of the Cyclone Separator for purposes other than those specified;
- i. use of the Cyclone Separator without its safety devices or with them deactivated.

# Safety

- All installation and operations must follow STATE and LOCAL CODES These CODES may differ from this manual. Installation must be performed by a qualified installer.
- Never open the ash door during operation!
- Anyone who is not familiar with and/or has not been trained to operate the Ash Extraction System may not operate the system. Only responsible adults should operate the Cyclone Separator. If the Cyclone Separator is not operated properly, damage could result and the warranty may be voided.
- Never allow children to play near or tamper with the Cyclone Separator, or any part of the system.
- Always keep the area around and in front of the system clean and free from combustible materials.
- Keep animals away from the system.
- The operation may not be continued or restarted in the event of visible damages (for example, thermal distortion, traces of smoke or fire, mechanical damages, etc.). Any damages must be repaired. In the event of any doubts, please contact your authorized WoodMaster Dealer.
- Only touch the handles during the operation. Temperatures at other points (for example, chimney, ash door...) can be very high.
- The Cyclone must be operated exclusively according to the guidelines for planning, assembly, regulations, statutes and product related instructions. The manufacturer is not liable for damages and their results, if they occurred due to improper assembly, operation, application and also inadequate maintenance and cleaning.
- Read and follow these directions carefully. Retain this manual for as long as you own your Cyclone Separator.

# Safety

## Risks Connected To The Use Of The Cyclone Separator

Safety of this cyclone has been considered during the design stage, however, hazardous situations may arise if:

- The cyclone is used improperly.
- The cyclone is installed by non-qualified personnel.
- Instructions regarding safety contained in this manual are not complied with.

## Residual risks

The cyclone has been designed and built in compliance with all the current applicable Safety Standards. Although every possible risk has been considered, it is possible that besides the risks deriving from improper use, the following risks may occur:



### **BURNING HAZARD**

Risk of BURNS during operation, due to the passage of hot fumes inside the Cyclone Separator which results in the heating of its piping and surfaces.



### **ELECTROCUTION HAZARD**

Risk of ELECTRIC SHOCK as a result of indirect contact. The Cyclone Separator is connected to and controlled by an electrical panel equipped with all the protection devices against overloads and short circuits. To protect against the indirect contacts, we recommend powering the panel with a line protected by differential switch that has an intervention threshold no higher than 30 mA.



### **NOISE HAZARD**

Risk of NOISE due to uncleanly conditions of the fan vanes.



### **FINGER INJURY HAZARD**

During control and maintenance operations on chain transmission components located in correspondence of the gear motor.



### **SUSPENDED LOAD HAZARD**

During transport and handling operations



### **ASPHYXIATION HAZARD**

Risk of ASPHYXIA in the event of insufficient suction of fumes. We recommend conducting periodic check of the seal gaskets of the inspection doors, the flange, and the collection container fitting.



### **PROTECTIVE GLOVES ARE MANDATORY**

Protective gloves must be used during all maintenance and cleaning operations.



### **PROTECTIVE HELMET IS MANDATORY**

During every transport or handling operation



### **PROTECTIVE MASK IS MANDATORY**

During maintenance and cleaning operation on the flues.



### **EYE PROTECTION IS MANDATORY**

During every operation.

# Features

## Description of the Cyclone.

For the separation of suspended substances in a fluid current, the Cyclone Separator is based on the principle of mechanical separation by means of centrifugal force (Cyclone Separator Principle).

The fumes sucked by a fan located downstream of the Cyclone Separator are forced to move in a tangentially inside a cylinder.

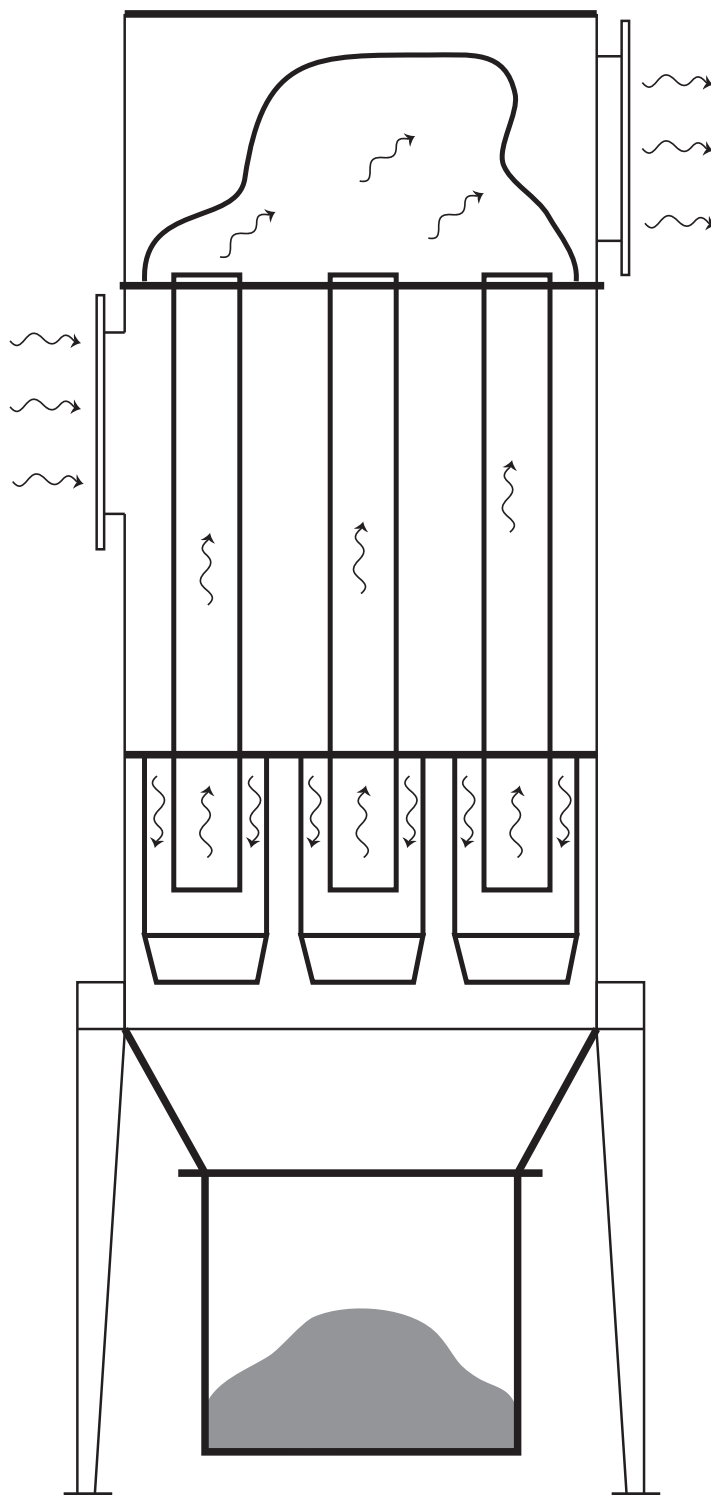
The solid particles, carried by the fluid current, are launched against the cylinder walls where, due to the force of gravity acting against them, they lose speed and fall.

It is possible to improve the separation capacity of a cyclone separator sub-dividing it into multiple smaller cyclones, considering that if the walls travel at the same speed, the angular speed of the particles is inversely proportional to the wall's radius. The centrifugal force increases with the angular speed square, therefore the friction on the walls of a cyclone with a smaller diameter also increase.

The Cyclone Separator consists of a fume input chamber in which small cylinders, composed of cylindrical hoppers equipped with a system that forces the fluid current to move in a rotary manner, are installed at the bottom.

The fumes, after having traveled a certain part of the cylindrical hopper, are forced to change direction and go up into vertical ducts that, crossing over the input chamber, release them into a plenum from which they are then sucked by a centrifugal fan.

The solid parts, separated from the fumes by the centrifugal force and by the abrupt change in direction are accumulated in a bucket placed at the base of the cylinder outlets.



# Features

## Performance

The capacity to remove particles via centrifuge separation is directly proportional to the average diameter and weight of the particles. The efficiency of separation of this type of Cyclone Separator is influenced by many factors including the following:

- size of the suspended solid particles
- average weight of the solid particles
- humidity content of the fumes
- ambient air temperature
- temperature of the fumes

The Cyclone Separator is designed to remove dust deriving from the biomass combustion fumes in special heat generators. The term "biomass" in generic terms, refers to a number of products of plant origin that, often times, only have one thing in common, that is, that they contain a mass of plant fibres and a more or less elevated humidity content.

Biomass products may include those with low moisture content, such as dry wood, sawdust, wood chips, pellets, nutshells, nuts etc. or products that have an average humidity content including pruning, branches, corn etc. of products with high humidity content such as grass, leaves, and grape-seeds etc.

During combustion, each of these products produces fumes that contain solid particles with varying quantities and dimensions.

Particle removal efficiency is determined using the ratio of the weight of the dust entering and that exiting; the removal tests carried out with the test fuel have shown an average efficiency that exceeds 50% for particles of dimensions exceeding 0.002".

**Since it is not possible to predict all operation conditions with regard to the combustible used, the removal efficiency declared by the Manufacturer refers to the test combustible as established by table 8 of Law EN 303-5 included in part C "compressed wood" (pellets).**

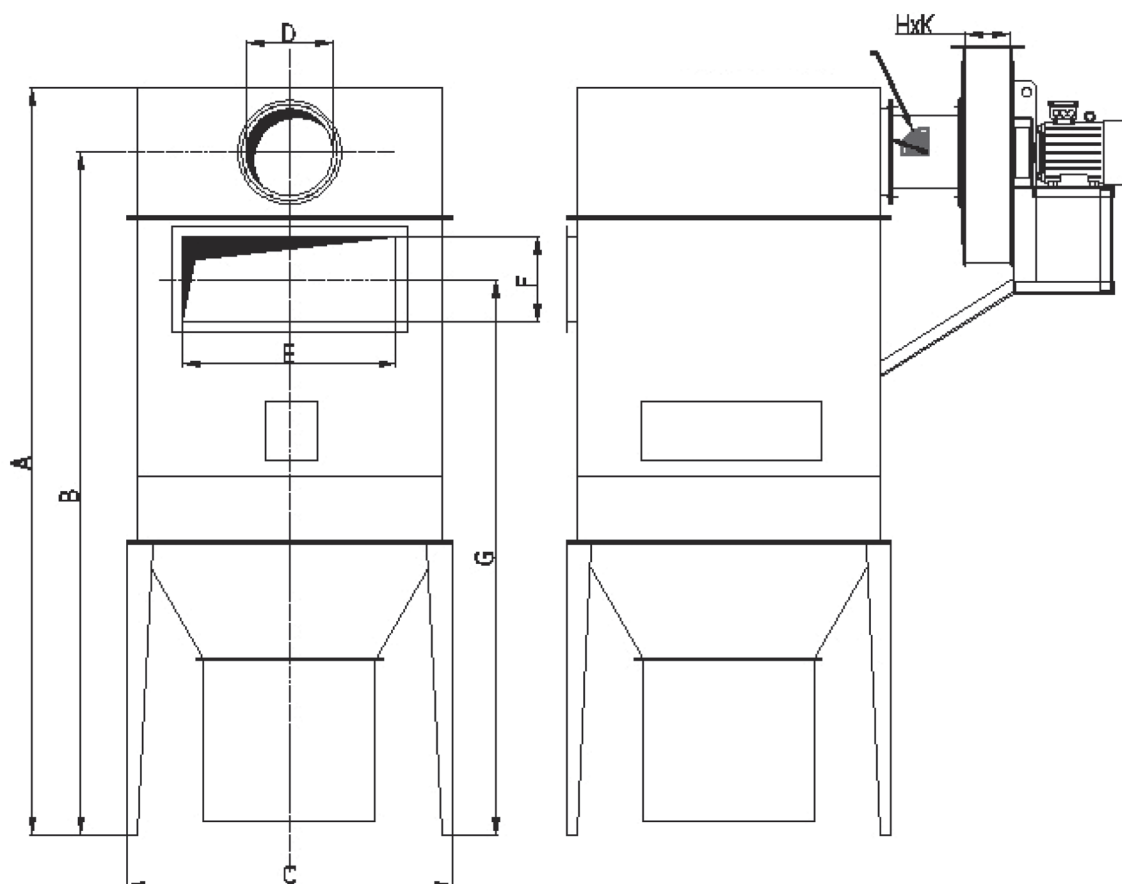


# Features

## GENERAL DATA

The range of Cyclone Separators manufactured by WoodMaster consists of 5 models with the following features:

| Model   | A<br>mm | B<br>mm | C<br>mm | D<br>mm | E<br>mm | F<br>mm | G<br>mm | H x K   | Cyclone<br>N° | Weight<br>daN | kW   |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------------|---------------|------|
| MTC500  | 1510    | 1260    | 500     | 140     | 250     | 150     | 1150    | 100x140 | 2             | 300           | 0.18 |
| MTC1000 | 1600    | 1200    | 580     | 185     | 350     | 200     | 1100    | 112x160 | 4             | 400           | 1.1  |
| MTC2000 | 2200    | 1900    | 780     | 205     | 500     | 250     | 1600    | 125x180 | 9             | 600           | 2.2  |
| MTC4000 | 2600    | 2300    | 1000    | 255     | 750     | 300     | 2000    | 200x280 | 16            | 850           | 3    |
| MTC8000 | 3300    | 3000    | 1400    | 405     | 1000    | 400     | 2500    | 280x400 | 36            | 1150          | 5.5  |



# ***Transport & Installation***

## **General information**

Cyclone Separators MTC 500,1000, MTC 2000 and MTC 4000 assembled and ready for installation when supplied. To facilitate transport, Cyclone Separator model MTC 8000 can be supplied in two pieces.

## **Transport and Handling**

Handling operations must be carried out with adequate vehicles that have a capacity equal to or exceeding the weight indicated on the identification plate.

## **Installation and testing**

Testing may be carried out only once the Cyclone Separator has been installed completely, that is, positioned and levelled out, and connected to the electrical panel, heat generator and chimney vent.

**Cyclone Separator installation must be completed by qualified personnel.**

# Operation

## START-UP

### Checks before Start-up

Before starting up the Cyclone it is important to:

- Ensure that the heat generator is ready to be switched-on.
- Make sure that the flow control valve is not closed.

### Start-up

Unless otherwise specified, the fan and multi-cyclone start-up controls are located on the control panel of the heat generator. Therefore, start-up the Cyclone Separator is the result of a command coordinated by and dependent on the heat generator.

## ADJUSTMENT

### General information

The efficiency of filtration, as explained on page 7, depends on many factors that are difficult to influence (humidity and weight of the combustible, outside air temperature) or that can be influenced by adjusting the heat generator (temperature of fumes, flow of fumes).

The efficiency of dust removal is connected to the fume flow and consequently its speed of passage through the Cyclone Separator:

A speed that is too low results in:

- an accumulation of ashes in the fume tubes and in the fume fittings of the heat generator
- poor filtration due to a lack of centrifugation on the cyclone walls

A speed that is too high results in:

- the excessive transport of hot ashes in the Cyclone Separator
- poor filtration due to the transport of average sized solid particles for the current fluid flow effect

# ***Cleaning***

The Cyclone Separator, given its unique function, must be periodically emptied and the solid parts that have been eliminated must be removed.

## **Cleaning the Cylinder-holder plates**

Given the geometric arrangement of the cyclones within the suction chamber, it is possible that during adjustment some suspended particles may be deposited before being centrifuged. The side seal doors allow for access to the suction chamber for ash removal.

## **Cleaning the suction plenum**

The fumes, after having passed through the cyclones, are collected in an upper plenum on which the fan connection fitting is located. The reduction in speed, consequent of the passage from the return tubes, of a restricted diameter, to the plenum chamber, may cause the depositing of residual ash on the plenum plate. To clean the plate, remove the fitting with the valve that connects the filter to the fan.

## **Cleaning the fan**

The fan will need to be checked and cleaned regularly, to keep the system running properly and to prolong the life span of the parts. Disconnect power to the fan before cleaning or servicing, and allow to cool. Refer to the manual for the fan for proper cleaning procedures.

**WARNING!**  
**BEFORE CLEANING THE SEPARTOR, ENSURE THAT THE  
POWER IS DISCONNECTED**

# Maintenance

The filter must be subjected to regular maintenance. Maintenance must be carried out by qualified personnel.

## **Routine maintenance**

The check and maintenance operations to be carried out periodically are as follows:

### **Fan**

At the beginning of every season, clean the fan vanes (The accumulation of dust and other material on the fan vanes decreases its efficiency and compromises balancing, causing vibrations and noise) according to the cleaning procedure that is in the manual that you fan came with.

### **Doors**

Check and clean the seals on the inspection door(s) to ensure a proper seal and to prevent leaks.

### **Rotary Valve**

If your Cyclone is equipped with a rotary valve it will need to be cleaned at the end of the season. To clean, allow the rotary valve to run until no ash is present. SHUT OFF the power to the rotary valve and allow to cool before manually cleaning. To clean, open the door on the cyclone and use a wire brush, or similar to clean the valve. Apply a rust inhibitor to the rotary valve to prevent corrosion during the off season.

### **Cyclone Separator**

The Cyclone should be emptied and cleaned of ash at the end of the season shutdown. SHUT OFF power and allow the Cyclone to cool before cleaning. Empty all ash from the cyclone and clean any ash from the sides of the cyclone. Apply a rust inhibitor to prevent corrosion during the off season.

## **DECOMMISSIONING and SCRAPPING**

The Cyclone Separator is built entirely using ferrous materials and does not contain any material considered dangerous for the environment.

### **Scrapping**

Once the Cyclone Separator has been decommissioned, it is considered "waste" as defined by national and European laws and must be handed over to companies that have a Regional Authorization to collect waster.

## Notes

[illegible]

# Warranty

## **TWO YEAR LIMITED WARRANTY**

This Warranty is provided by Northwest Manufacturing, Inc. only for the benefit of the, initial purchaser (Original Owner) of the Northwest Manufacturing, Inc. Cyclone Separator ("System") on the original site of installation (the "Site of Original Installation").

This Warranty provides specific legal rights. You may have other rights depending on where you live.

The rights in this warranty depend on the proper assembly, installation and commissioning of the System by a contractor or installer who is certified by Northwest Manufacturing, Inc. (the "Certified Contractor"); and proper operation and maintenance by a Certified Boiler Operator that is also certified by Northwest Manufacturing Inc. to operate the system. Proper maintenance must be preformed. Installation by an uncertified or unqualified contractor or installer and/or improper maintenance, operation, misuse or abuse of the system shall void this Warranty in whole or in part.

## **LIMITED TWO (2) YEAR WARRANTY**

Northwest Manufacturing, Inc. warrants that the components of the Cyclone Separator shall be free of defects in material and workmanship for TWO (2) YEARS from the Date of Original Installation. Once a defect is determined, repair or replacement of the defective parts, will be at the sole discretion of Northwest Manufacturing, Inc..

## **START OF WARRANTY PERIODS**

The Warranty Period shall begin on the date the System installation has been completed (the "Original Date of Installation"). In the event of dispute as to the Date of Original Installation, the shipping date of your System, as recorded by Northwest Manufacturing, Inc., shall be deemed to be the Date of Original Installation.

## **WARRANTY LIMITATIONS**

I. Damages for unsatisfactory performance caused by improper installation or any damages caused by or as a result of improper use of the System, incorrect start-up, incorrect or careless handling, improper control adjustment, disregard of the operating instructions and proper maintenance or disregard of any other instructions. Improper alteration and repairs/service by a third party not affiliated with Northwest Manufacturing, Inc. will not be covered under this warranty. All repairs must be performed by a Certified Contractor.

II. The workmanship, repairs or replacement of parts of the Certified Contractor will not be covered under this warranty.

III. Any costs for labor for the examination, removal or reinstallation of allegedly defective parts, transportation of the parts to and from Northwest Manufacturing, Inc. facilities will not be covered and will be the responsibility of the Original Owner. This includes any other labor and costs for any material necessary for the said examination, removal or re-installation.

IV. The warranty will not cover damage to the System or any of its original parts, replacement parts or other accessories or standard equipment caused by excessive temperatures, vandalism, fuel or gas explosion, electrical, chemical or electrochemical reaction, electrical failures, insurrection, riots, war, acts of God, combustion air contaminated externally, air impurities, sulfur or sulfuric action or reaction, dust particles, corrosive vapors, oxygen corrosion, and situating the System in an unsuitable location or continuing use of the System after onset of a malfunction or discovery of a defect.

V. This Warranty only covers manufactures defects and will not cover damage caused by ash corrosion.

# Warranty

## **WARRANTY TERMS**

The Warranty shall also be subject to the following terms and conditions:

- I. The System must have been installed by a Certified Contractor.
- II. The System must have been properly maintained, cleaned and serviced during the Warranty Periods by a certified boiler operator trained to operate a WoodMaster Commercial Series boiler.
- III. This Warranty is non transferable and only covers the Original Owner, at the original site of installation.
- IV. Northwest Manufacturing, Inc. shall have the time needed and unobstructed access to the System for the purpose of conducting tests of the System and for the making of repairs or installation of replacement parts.
- V. Repairs, replacement or the repair of replacement parts shall be subject to the terms and conditions of this Warranty as if they had been installed at the time of original installation.
- VI. This Warranty is limited to the provisions previously described and does not extend to any boiler, related parts or products that are (a) not sold in Canada or the United States; (b) not installed in Canada or the United States; or (c) not purchased from an Authorized Distributor.
- VII. Northwest Manufacturing, Inc. shall not be responsible for any consequential damages, direct or indirect caused by the products described in this Warranty.
- VIII. The Warranty for this System is also subject to the terms of the Warranty for the WoodMaster Commercial Series Boiler.

## **APPLICABLE LAW**

All disputes, claims or demands arising from or relating to Warranty described shall be determined in accordance with the laws of Red Lake County, Minnesota, USA.

## **WARRANTY CLAIM/SERVICE**

Notify the Certified Contractor who installed your System. The Contractor will then notify Northwest Manufacturing, Inc. who will make all warranty decisions. No warranty work can be carried out without approval from Northwest Manufacturing, Inc.. If the Certified Contractor fails to make a warranty claim, contact Northwest Manufacturing, Inc. directly.

Allegedly defective parts **MUST** be returned to Northwest Manufacturing, Inc. for the purpose of inspection to determine cause of failure.

Northwest Manufacturing, Inc. / 600 Polk Ave. SW / Red Lake Falls, MN 56750-5002  
(800) 932-3629 • Fax: (218) 253-4409 / [www.woodmaster.com](http://www.woodmaster.com)



---

Northwest Manufacturing Inc.  
600 Polk Ave. SW  
Red Lake Falls, MN 56750

PLACE  
POSTAGE  
HERE

Northwest Manufacturing Inc.  
600 Polk Ave. SW  
Red Lake Falls, MN 56750

# Warranty Registration Card

Please fill out the warranty registration card below and mail it back to us.

Failure to register may delay warranty claims.



Serial Number

Model Name

Owners Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Daytime Phone \_\_\_\_\_ Home Phone \_\_\_\_\_

Email \_\_\_\_\_ Date of Installation \_\_\_\_\_

Contractors Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_

How did you learn about our product?

Radio ☐ Newspaper ☐ Internet ☐ TV ☐ Print ☐ Other \_\_\_\_\_

Would you like information on other products from Northwest Manufacturing, Inc.? ☐ Yes ☐ No

I have read the owners manual and understand the proper usage of my Boiler.

Customer's Signature \_\_\_\_\_ Printed Name \_\_\_\_\_

Contractor's Signature \_\_\_\_\_ Printed Name \_\_\_\_\_

Thank you for purchasing a WoodMaster Commercial Series Boiler.

## Notes

[illegible]



[www.woodmaster.com](http://www.woodmaster.com) / 800-932-3629 / Manual PN: 7994-400  
Northwest Manufacturing, Inc / 600 Polk Ave SW / Red Lake Falls, MN 56750

Obadiah's • 406-300-1776