



Commercial Pellet Systems and Pellet Storage

Heating the Midwest
October 2016



Agenda

- Specifications
- Pellet boiler designs/features
- Boiler controls
- Pellet storage
- Potential customers



Specifications

- ASME certified pressure vessels
 - or Atmospheric systems
- Made in the USA
 - or imported



Commercial Boilers

Small scale

Medium scale

Large scale

< 350 MBTU

350-3,500 MBTU

> 3,500 MBTU

Residential

Schools

Schools

Churches

Hotels

Nursing Homes

Small Commercial

Community Center

Hospitals

Greenhouses

Greenhouses

Campuses

Poultry/Hog Barns

Poultry/Hog Barns

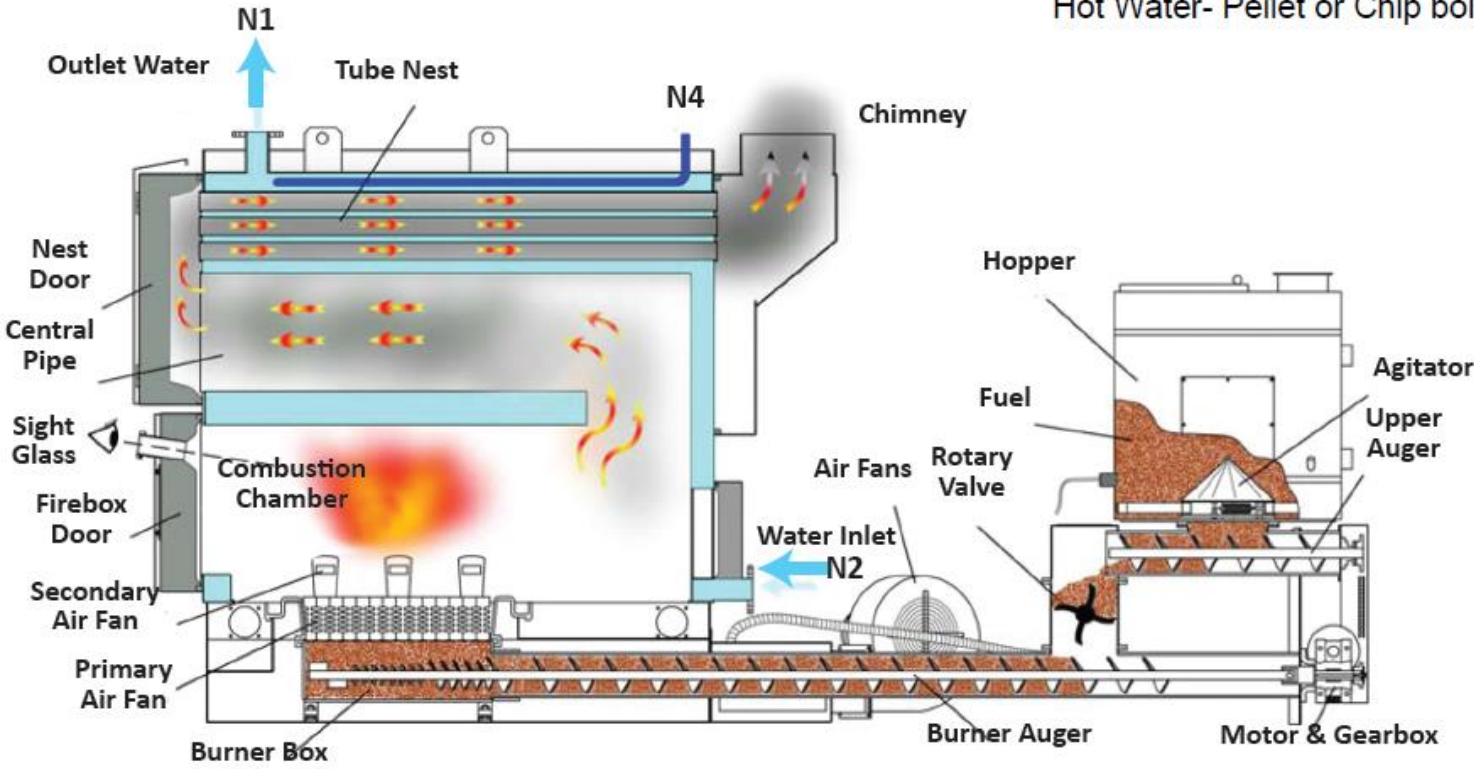
District Heat



Underfed stoker

WoodMaster CS/A Series

Hot Water- Pellet or Chip boiler



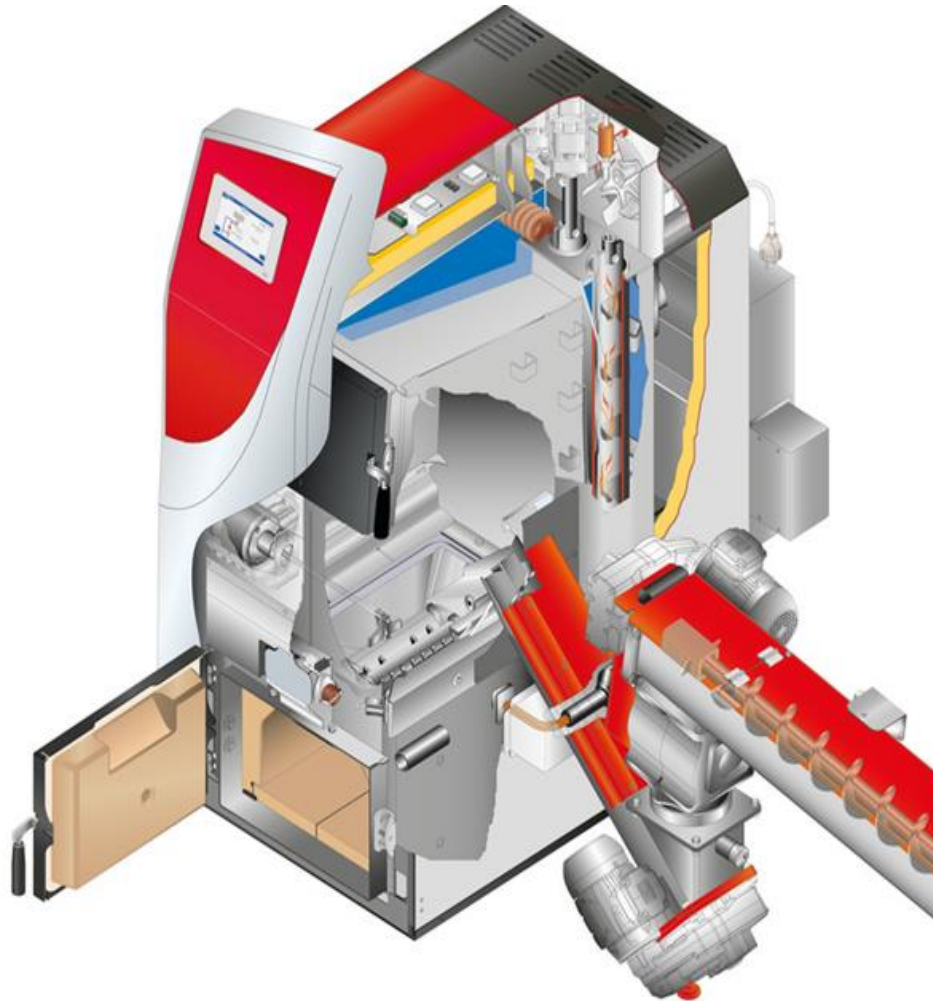
Fixed grate- top feed



Pellet feed from internal hopper
Into rotary valve onto fixed grate.

Downdraft gasification technology

Fixed Grate- top feed



Pellets delivered by auger to
Fire pot

Combustion Chamber



Ceramic lined for increased heat in combustion chamber



Combustion Chamber



Primary and secondary air for better combustion

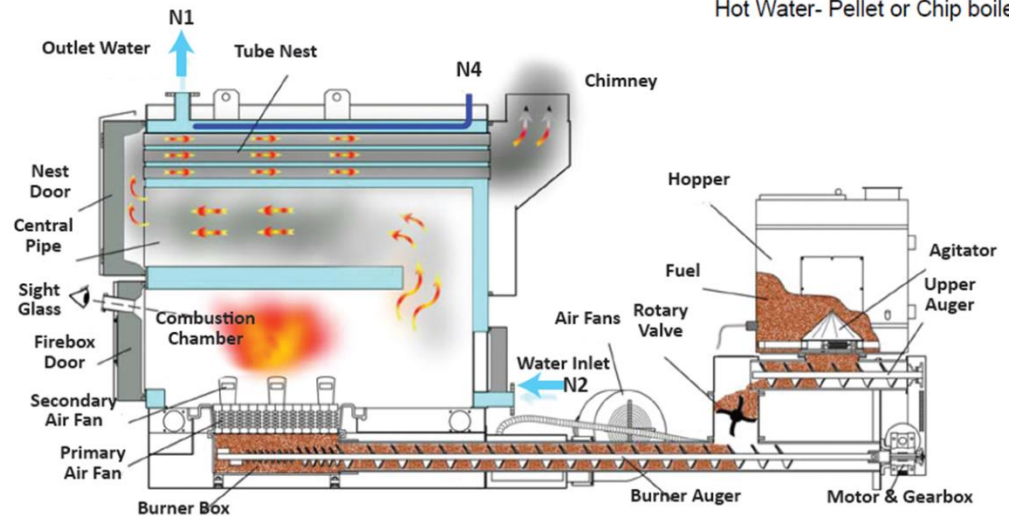
Vertical fire tube



Horizontal Fire Tube



WoodMaster CS/A Series
Hot Water- Pellet or Chip boiler



WWW



Turbulators

- Angular
- Twisted tape
- Coil



THE TURBULATOR

Improving Heat Transfer Efficiency
At the Least Cost

[Turbulator Configurations](#)

[Download and Print PDF](#)

Turbulators are available in a variety of configurations to fit most tube sizes and are used in many types of heat exchange equipment.

APPLICATIONS

Shell & Tube Heat Exchangers
Firetube Boilers
Radiant Heaters
Immersion Heaters
Line Heaters
Cast Iron Sectional Boilers
Hot Water Heaters



Fire tube Cleaning

- Soot blowing
 - Pneumatic blast, 60psi
- Motorized
 - Motor driven, 1/turbulator or multiple
- Frequency determined by intervals or by fuel consumption
- Minimizes manual cleaning
- Maintains boiler efficiency for longer period of time



Sootblowing



hoses deliver compressed air from Blue air receiver to fire tubes

Each hose pre-set to blast group of fire tubes



Motorized



#11 indicates the motors for fire tube cleaning
#12 indicates fire tubes

Ash Extraction



- Complete ash system to ash barrel
- Automatic
- Cleaning frequency by time or lbs

WM

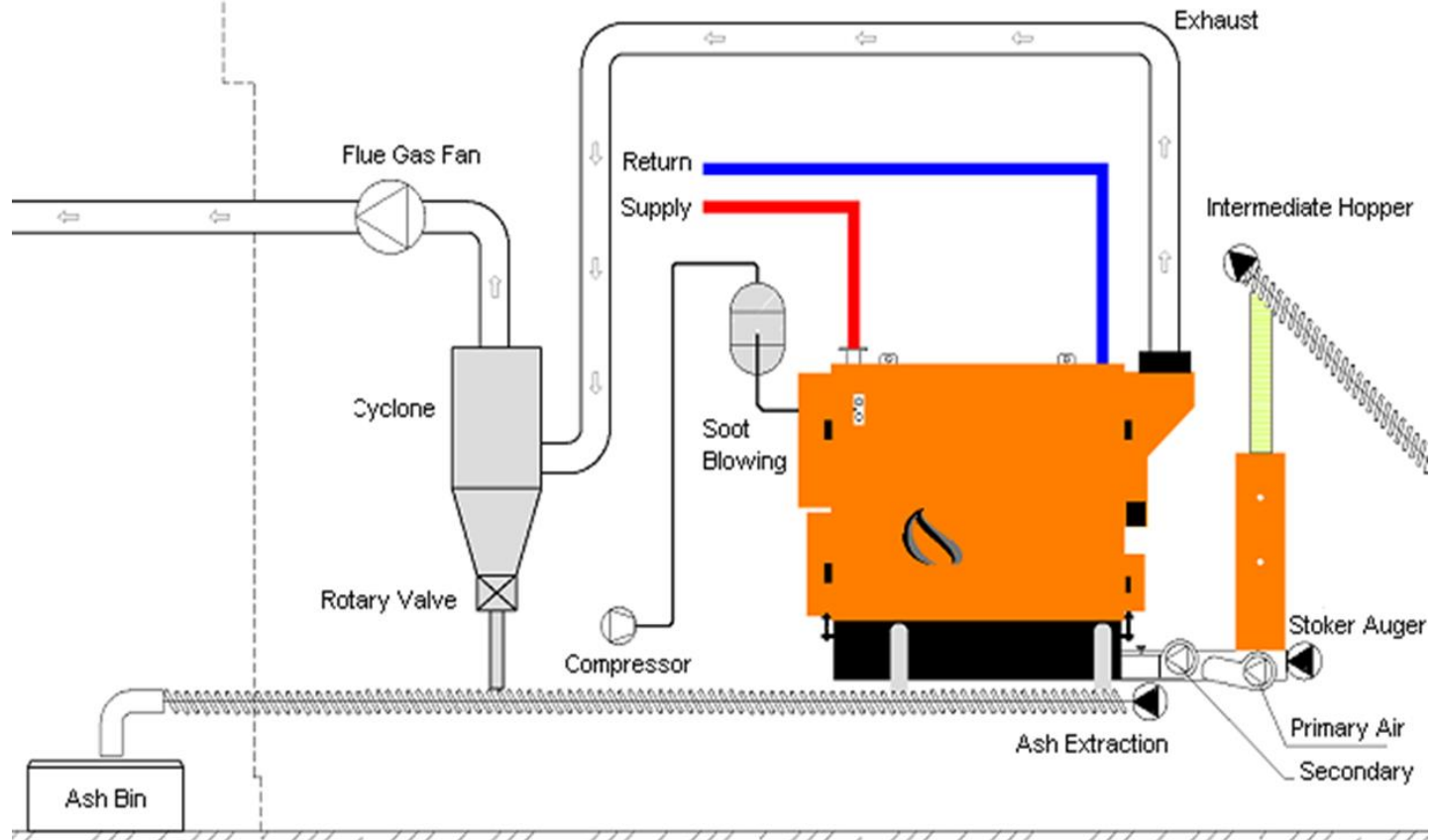
Ash extraction



Smaller commercial boilers will be equipped with ash box

Less ash with smaller boilers, not as many pellets being consumed

Particulate separation



- Cyclone to reduce particulate emissions
- Removed through rotary valve into ash extraction

Boiler controls

- Touch screen PLC
- Building management
- Web enabled, online management
- Easy navigation

The interface is divided into two main sections. The left section, titled 'Settings Menu', contains several control panels: 'Device Control' (Fuel Feed, Soot Blowing, Combustion Air, Ash Removal, Flue Gas, Circulation), 'Sensor Settings' (Return Water, Outlet Water, Flue Gas, Differential Pressure, O2 Lambda), and 'General' (Tuning, Alarm Alert, Save / Load System Settings). It also includes input fields for Maximum Burn Rate (100.00%), Minimum Burn (7.00%), Restart Hysteresis (2.0 F), Enter Boiler Temp Setpoint (160.0 F), Operating Temp Setpoint (160.0 F), and Total Run Time (4 Hrs). An 'Operation Mode' selector is set to 'Off'. The right section, titled 'Boiler Off', displays real-time data: Operating Setpoint (160.0 F), Flue gas Temp (79.10 F), Current O2 Level (20.02%), Boiler Outlet Temp (77.10 F), Boiler Return Temp (78.60 F), and Differential Pressure (-5 Pa). It also shows Output / Load Rate (0.00%) and Target Burn Rate (0.00%), along with Fuel Feed Rate (0.00%) and Current Burn Rate (0.00%). A 3D model of the boiler is shown below the data. The interface includes a 'Woodmaster' logo and navigation icons at the bottom.



Boiler controls

- Alarm sending/history
- Determine who gets alerts
- View history of customers alerts to see how well the system is maintained

The screenshot shows a control interface titled "Boiler Off" with a status bar at the top left displaying "01:54:31 PM 10/02/15" and a "Login: None" indicator at the top right. The main heading is "Alarm Alert Recipient Lists". Under "Primary Contacts", there is a text input field containing "BOILER@Woodmaster.com" and an "Alert Repeat Delay (HH:MM)" field set to "00:00". Below this are four sections for backup contacts: "Tier 1 Backup Contacts", "Tier 2 Backup Contacts", "Tier 3 Backup Contacts", and "Tier 4 Backup Contacts", each with two empty text input fields. At the bottom, there are two navigation buttons: a left-pointing arrow and a checkmark.

The screenshot shows an "Alarm History" interface with a yellow header bar. Below the header, there is a summary for "Boiler Door Open" with "ID: 032" and "Priority: Low". A "Group: 02" label is also present. The main content is a table with the following data:

Event	Date	Time	Duration
Trigger Rise	07/10/15	15:04:58	
Trigger Fall	07/10/15	15:04:58	00:00:00
Ack.	07/10/15	00:00:00	
Reset	07/10/15	15:05:38	00:00:40

At the bottom of the interface, there is a "Refresh" button and a navigation arrow.



Commercial Furnaces



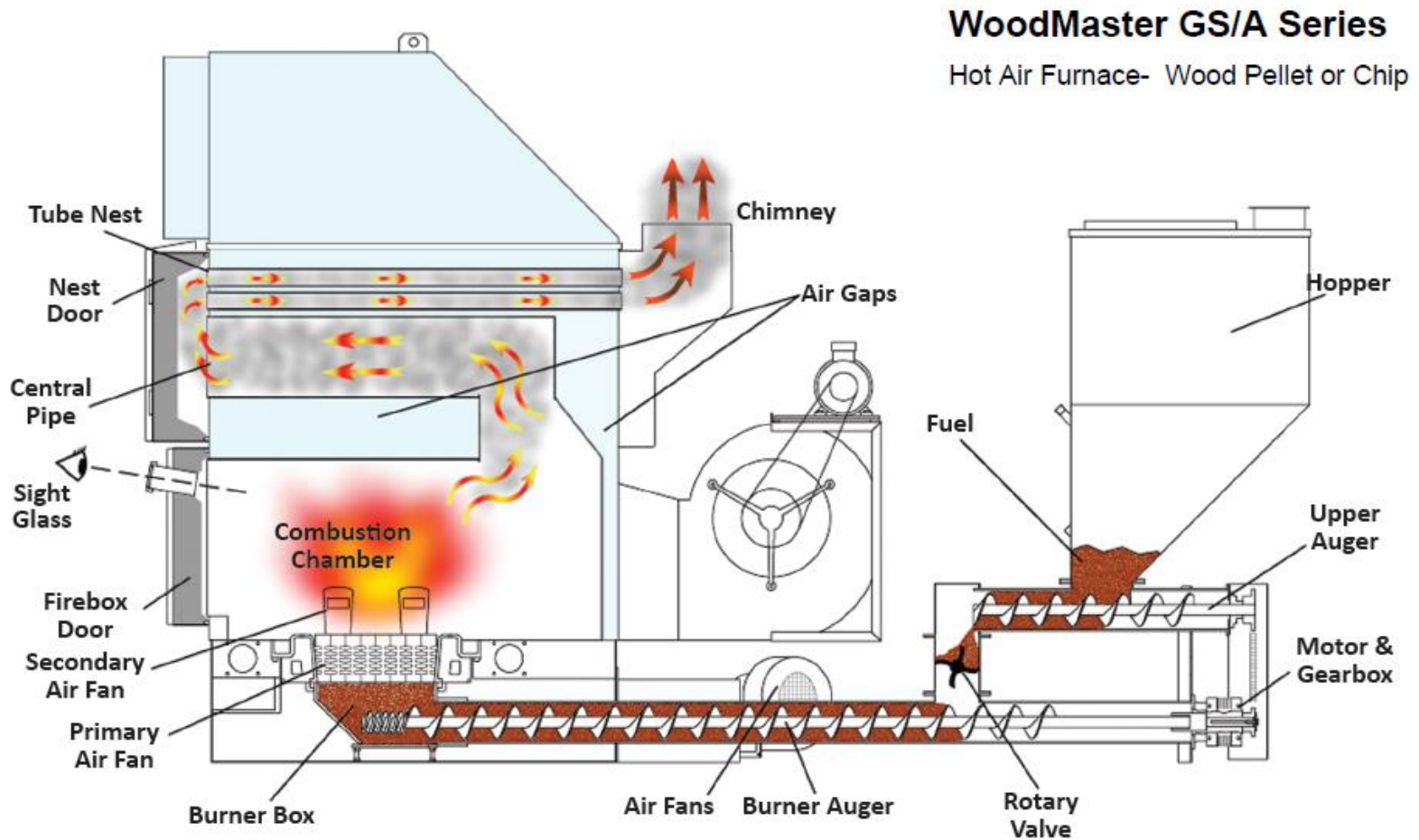
- 130 kW and 230 kW (up to 780,000 Btu/hr)
- Wood pellets or chips
- Automatic fuel feeding, ash extraction and soot blowing
- Made in the USA

WOOD
MASTER[®]

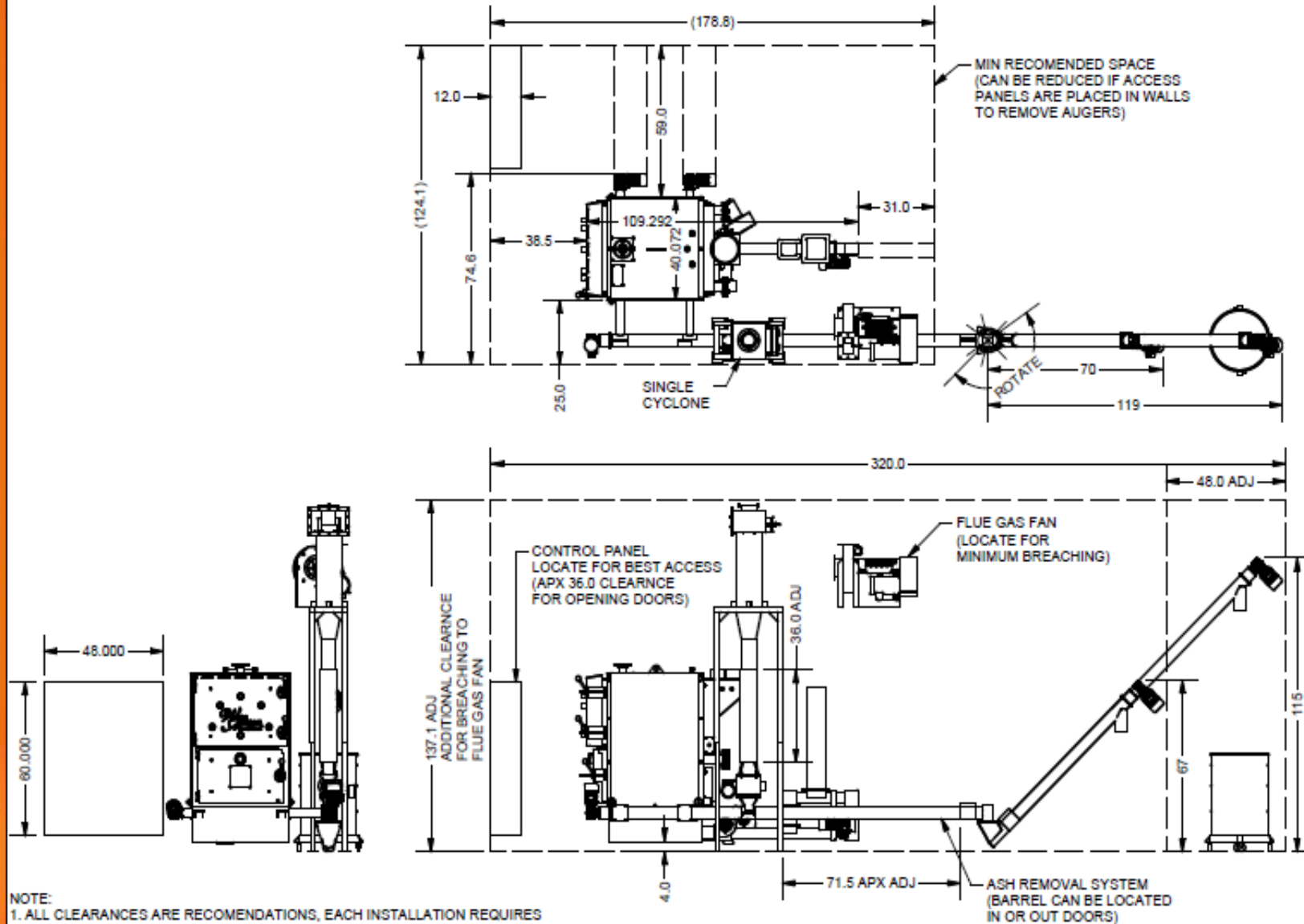
WM

www.woodmaster.com

GS/A Cut-away



General Boiler Layout



Intermediate Pellet Hopper



Designed to meter pellets in from bulk silo

Reduces amount of fuel to remove if problem occurs

Equipped with capacitive sensor and
Water deluge/sprinkler valve



Pellet storage

- Up to 4 ton
- Indoor application, basement/shop/garage
- Manual, auger, or pneumatic fill



Pellet storage



- 20' sea container conversion
- Pneumatic deliver
- Auger fuel feed to boiler



WM

Pellet storage



- Bulk pellet storage to be determined by pellet supplier and boiler output
- Install bulk silo larger than local delivery truck to keep system operational



Pellet Delivery

- Pneumatic



Pellet Delivery

- Auger truck



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Pellet Delivery

- Bulk sacks
 - Pellets filled manually or by auger
 - Lower delivery costs



Potential customers



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www.woodmaster.com

Potential customers



**United States Forest Service
Walker, MN**
wood pellet boiler conversion



Potential customers



Wolf Ridge Environmental Learning Center
Finland, Minnesota
wood pellet boiler plant



Potential customers



Potential customers



**Government Office Buildings
Yellowknife, NWT
wood pellet boiler conversion**

Yellowknife is taking positive steps to reduce their carbon footprint. With multiple wood pellet boilers operating in Yellowknife, they are displacing hundreds of thousands of gallons of fuel oil each year.



Thank You!

Grant Gagner
Commercial Sales Manager
Northwest Manufacturing, Inc. | WoodMaster
Direct Line: (218) 253-3142
Cell: (701) 866-7331
Toll Free: (800) 932-3629
Fax: (218) 253-4409
ggagner@woodmaster.com
www.woodmaster.com

