



**Detroit Stoker
Company**

**Products &
Services**



“Our Opportunities Are Always Growing”™



The Detroit Stoker Value // Our Green Promise



Our mission is to provide cost effective energy solutions for our customers while responsibly supporting the evolving market for cleaner sustainable energy.

Since 1898, Detroit Stoker Company has been a leading supplier of Combustion Systems and Equipment which have been used worldwide. These Combustion Systems have been used for the production of steam used for heat, industrial processing and electric power generation. Detroit Stoker Company has taken a leadership role in the development of environmentally responsible systems that make power generating plants good neighbors in their communities.

Detroit Stoker Company has also led the way in unlocking the value of renewable energy sources. Industrial and Municipal Solid Waste can be recycled as renewable fuels which is both cost-effective and environmentally-friendly. Every day, more than 135,000 tons of biomass and refuse are burned on Detroit® Stokers, the largest of which produces more than 100 MWe.

**Detroit® Combustion Systems around the world generate power from diverse waste products like:
Bark • Sugar Cane • Sawdust • Sunflower Hulls • Palm Oil Residue • Grain Waste • Poultry Litter**

These otherwise non-recyclable materials produce insignificant levels of acid gas compared to the fossil fuels they replace and are considered CO₂-neutral. As the costs of conventional fuels rise, renewable fuels provide a sensible alternative.

Table of Contents

1 - Detroit® Combustion Systems // Stokers & Burners

Detroit® RotoGrate Stoker	9
Detroit® Hydrograte Stoker	10
Detroit® RotoStoker VCG	11
Detroit® Reciprograte Stoker.....	12
DSC-GTS Reciprocating Biomass Stoker	13
Detroit® DB Low NOx Burners.....	14
Vertically Fired Detroit® Burners	15

2 - Fuel Feed Equipment // Detroit® RotoGrate & Hydrograte Stoker

Detroit® Air Swept Distributor Spout.....	18
Detroit® Air Swept Distributor Spout - Wood or Bark Sizing	19
Detroit® Balanced Dampers.....	20
Rotary Air Damper	21

3 - Fuel Feed Equipment // Detroit® RotoGrate Stokers

Fuel Distributor Selection Guide.....	24
Detroit® Underthrow Fuel Distributor	25
Detroit® Underthrow Fuel Distributor - Coal Sizing	27
Detroit® Ultrafeed Coal Distributor	28
Detroit® Ultrafeed Coal Distributor - Coal Sizing	30
Detroit® Combination Fuel Feeder	31
Control Panels for Fuel Feeders	33
Individual Feeder Drives.....	34
Tachometer and Zero Speed Switches	36
Coal Distributor Feed Gates.....	37
Non-Segregating Coal Distributors	38

4 - Grate Drive Equipment // Detroit® Hydrograte Stokers

Old Style Grate Drive Replacement	40
Drive Arm Seal.....	41

5 - Grate Drive Equipment // Detroit® RotoGrate Stokers

Detroit® Planetary Grate Drive Arrangement	44
Detroit® RotoGrate Drive PIV Replacement.....	45

6 - Grate Components // Detroit® RotoGrate & Hydrograte Stokers

Boiler to Stoker Fabric Air Seals.....	48
Rear Wall Inner Air Seal Pillow.....	49
Stoker Fire Doors	50
Grate Thermocouple Arrangement.....	51

Extension Front Arrangement & Flat Arch Refractory Pans.....	52
Sand Classifiers	53
Overfire [Secondary] Air Control Systems	54
Flue Gas Recirculation [FGR] Systems.....	55
Computational Fluid Dynamics [CFD] Model.....	56

7 - Grate Components // Detroit® Hydrograte Stokers

Detroit® Hydrograte Rear Tuyeres	58
Cast Stainless Steel Inner Seals	59
Feedwater Tube Seal	60
Internal Feedwater Tubing Vibration Arrangement	61
Flex Strap Upgrade.....	62
Grid Tube Beef Up & Grid Tube Attachment	63

8 - Grate Components // Detroit® RotoGrate Stokers

Stainless Steel Grate Guides	66
Lower Front Air Seals.....	67
Heavy Duty Front Support Channels	68
Hardened Shafts and Bearings.....	69
Carbon Bearings	70
Abrasion Resistant Top Support Rails.....	71
Detroit® High Strength Grate Chains	72
Detroit® Grate Bars	73
Closure Plates	74
Detroit® RotoGrate Rear Tuyeres.....	75

9 - Ash & Material Handling Systems // Detroit Stokers

Detroit® Vacpak Ash Receiving Equipment	78
Detroit® Ultraflo Mixer	79
Detroit® Clinker Grinder.....	80
Detroit® Rotary Seal Feeders	81
Detroit® Rotary Seal Feeders - Low Capacity.....	82
Detroit® Rotary Seal Feeders - High Capacity	83
Detroit® Double Flap Airlock.....	84

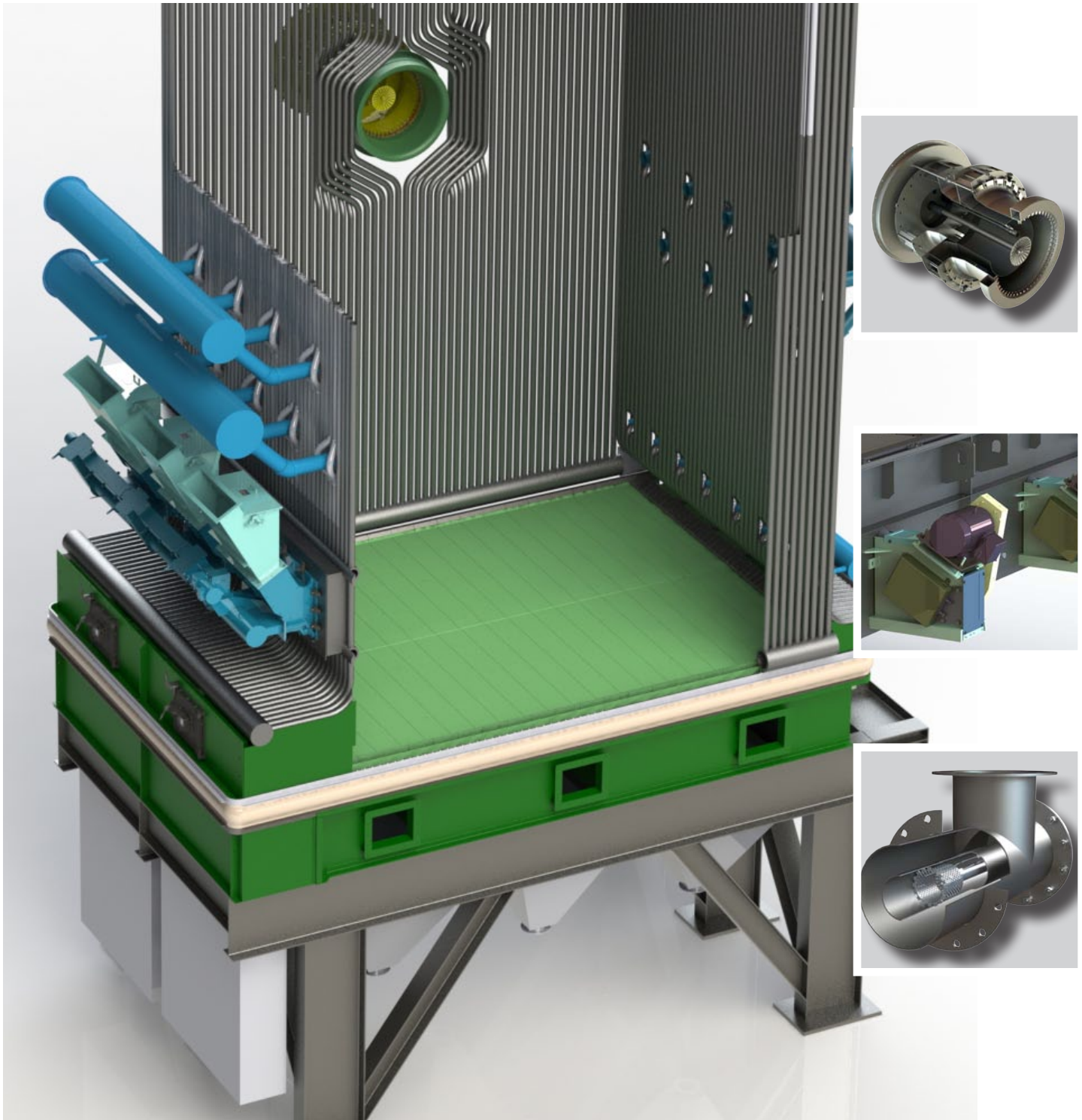
10 - Original Equipment Manufacturer // Replacement Parts

11 - Detroit Stoker Company // Customer Service Contacts.....



Detroit® Combustion Systems //

Stokers & Burners





Detroit® RotoGrate Stoker

The premier spreader stoker for high ash and low fusion fuels.

The Detroit® RotoGrate Stoker is a continuous ash discharge, traveling grate, spreader stoker that is perfect for a broad range of applications. It is recognized worldwide for its efficiency in generating steam and power.

Suited for many applications:

- Biomass and waste fuels
- Low ash poultry litter to high ash coal

Continuous ash discharge:

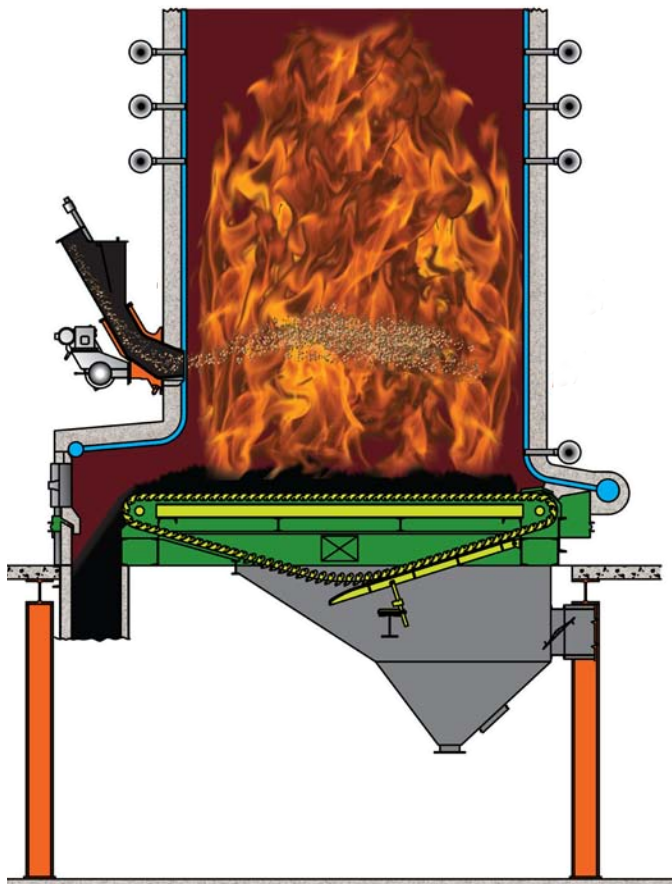
- Forward-moving, traveling grate
- Continuously discharges ash
- Heat-resistant grates available in several materials to suit specific requirements

Hinged bar facilitates air flow:

- Unique, hinged bar design permits bars to open at the lower portion of the catenary to discharge ash siftings
- Facilitates air flow to the fuel bed
- Catenary design provides automatic take-up or tensioning of grate chains to prevent jamming

Additional features:

- Automatic air seals allow accurate control of air flow to the grate surface
- High pressure Overfire/Secondary Air Control System provides effective staged combustion and thorough mixing of fuel gases and combustion air high in the furnace which allows the control of emissions
- Thermocouple assemblies allow monitoring of grate temperature



Detroit® Hydrograte Stoker

The Detroit® Hydrograte Stoker offers reliability and lower maintenance costs.

The spreader firing principle is the most widely accepted, proven and user friendly means of burning biomass fuels. Fine particles of fuel are burned in suspension assisted by the Overfire/Secondary Air Control System. Coarser, heavier fuel is spread evenly on the grate forming a thin, fast-burning fuel bed. The combination of suspension and bed burning makes this method of firing extremely responsive to load demand.

Reliability under varying load conditions:

- Combines advanced spreader stoker technology with automatic ash discharge and water-cooled grates
- Handles a variety of high moisture, low ash fuels over a broad range of steaming capacities with high reliability
- Ideal for high moisture biomass fuels
- The higher combustion air temperature needed to burn high moisture fuels can be maintained without damaging the grates

Lower emissions:

- Ability to minimize Undergrate/Primary airflow reduces excess air
- Higher percentages of Overfire/Secondary Air are utilized for effective staged combustion, an important factor in controlling emissions

Lower maintenance costs:

- Result from a simple design
- Minimum number of moving parts

Continuous operation:

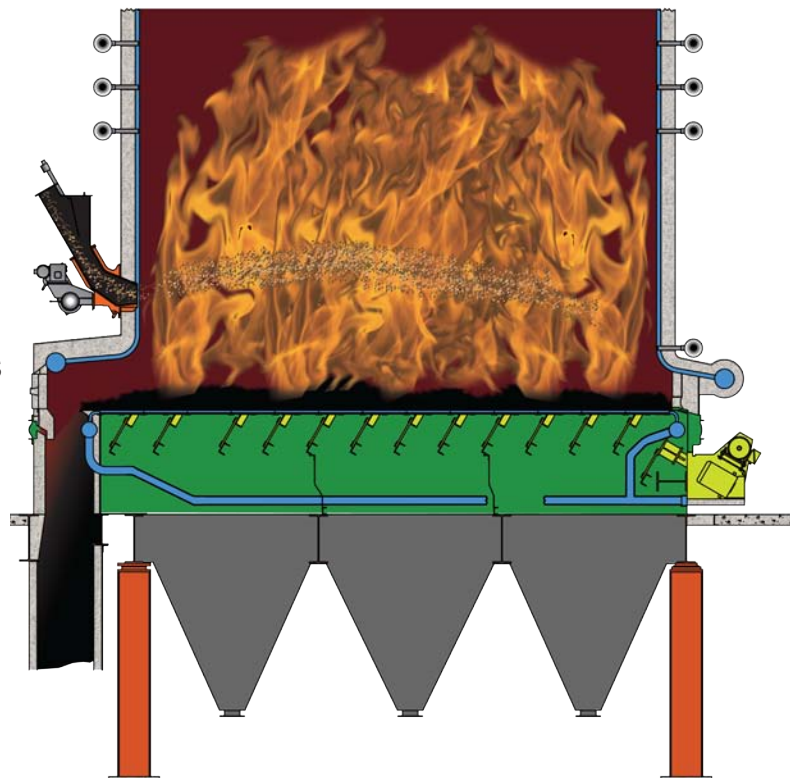
- Positive automatic ash discharge eliminates shutdowns to clean grates
- The cost of auxiliary fuel to maintain load during grate cleaning is eliminated

Retrofit applications:

- Inclined or horizontal grate surface
- The need for boiler modification is minimized in retrofit applications where space limitations exist
- Compatible with conventional power boiler designs in terms of grate heat releases

Reduced installation time:

- Shop-assembled in large modules
- Shorter installation schedules on new units
- Quicker turnaround times on retrofits



Detroit® RotoStoker VCG

The spreader stoker designed to handle a range of fuels.

The Detroit® RotoStoker VCG air-cooled grate offers many of the features and benefits of the Detroit® Hydrograte Stoker. It is designed to provide exceptional efficiency in burning a wide range of fuels ideally suited for both new and retrofit installations.

Low setting height:

- Low setting height great for retrofit applications
- Ideal for installation in plants without basements

Automatic ash discharge:

- Intermittent grate vibration moves the fuel bed forward
- Ashes are automatically discharged

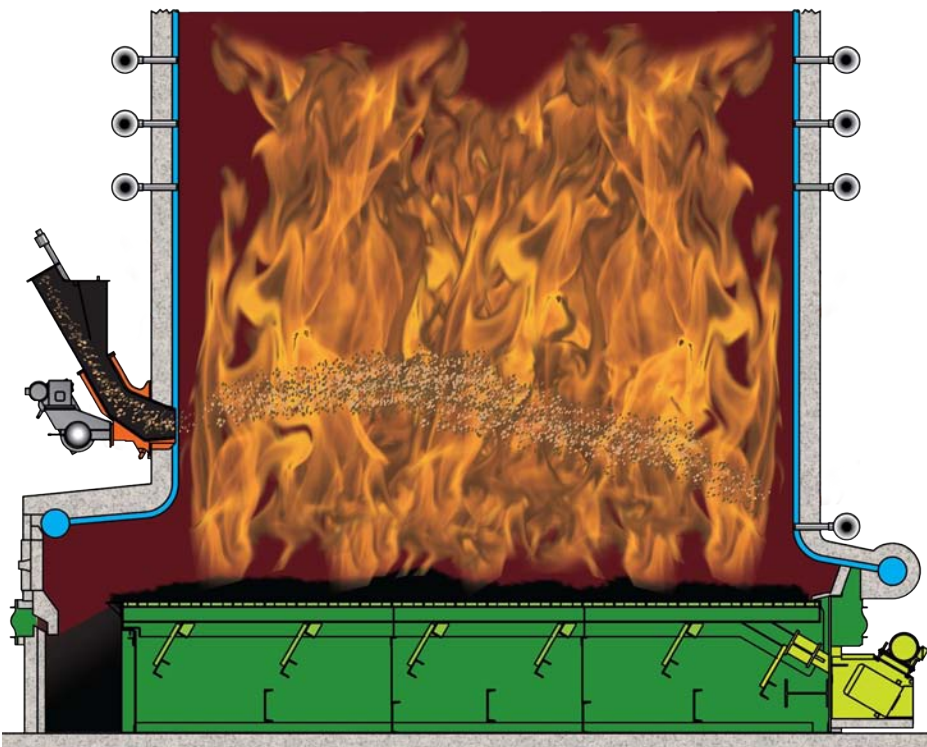
The grate is driven by the same eccentric mechanism as the Detroit® Hydrograte Stoker. Performance characteristics are fully-adjustable allowing the system to be optimized for specific operation conditions.

Other benefits:

- Low installation cost
- Simple design
- Shop-assembled modules reduces installation time and expense

Easy maintenance:

- Has few moving parts
- No bearings or shafts
- Undergrate area is readily accessible
- Effective air seals between stationary and moving surfaces allow accurate control of excess air

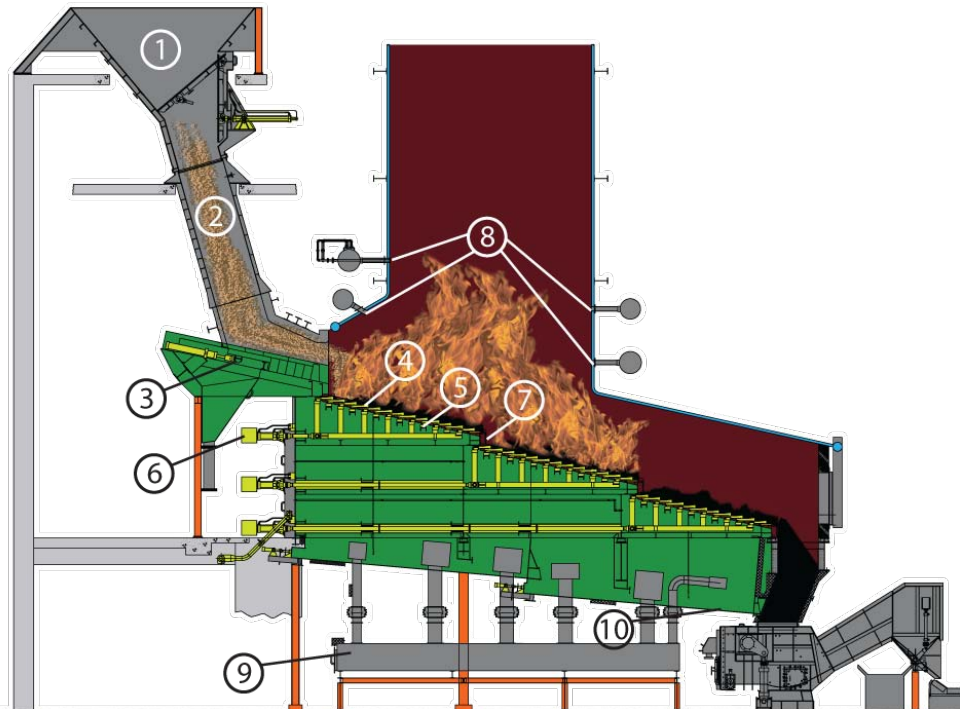


Detroit® Reciprograte Stoker

The Detroit® Reciprograte Stoker has met wide approval for burning unprepared Municipal & Industrial Solid Waste as fuel.

Mass burning:

The Detroit® Reciprograte Stoker is designed to be utilized in the mass burning of refuse fuels where all of the refuse is burned directly on the grates with the burned out residue being discharged from the back end of the stoker. Refuse does not require preparation before burning.



1. **Refuse Charging Hopper** - Refuse is brought from the storage pit to the charging hopper.
2. **Refuse Charging Throat** - Refractory lined or water cooled to protect it from the heat of the furnace and insure long service life.
3. **Charging Ram** - Hydraulically operated ram feeder forces refuse uniformly into the furnace & onto the first burning grate section.
4. **Grates** - Cast from a special high chrome/nickel alloy for long life, alternate rows of grates are moving or stationary. The moving grates reciprocate continuously over the stationary grates and push the refuse through the furnace.
5. **Roller Bearings** - The grate frame is supported on rollers with tapered roller bearings to reduce friction and wear.
6. **Hydraulic Power Cylinders and Control Valves** - Provided for each longitudinal grate section and feed ram allowing each to be individually driven and controlled by a solid state electronic controller.
7. **Vertical Drop Off** - Is lined with air admitting high chrome/nickel alloy tuyeres.
8. **Overfire/Secondary Air** - Strategically located to provide turbulence and mixing of the volatile gases to assure complete combustion.
9. **Combustion Air** - Is fed to the underside of each grate section. Each section or module has a separate air supply to provide optimum control of air flow.
10. **Automatic Sifting Removal System** - Conveys siftings from underneath the ram and each grate section to the discharge end of the unit into the main residue conveyor or hopper.

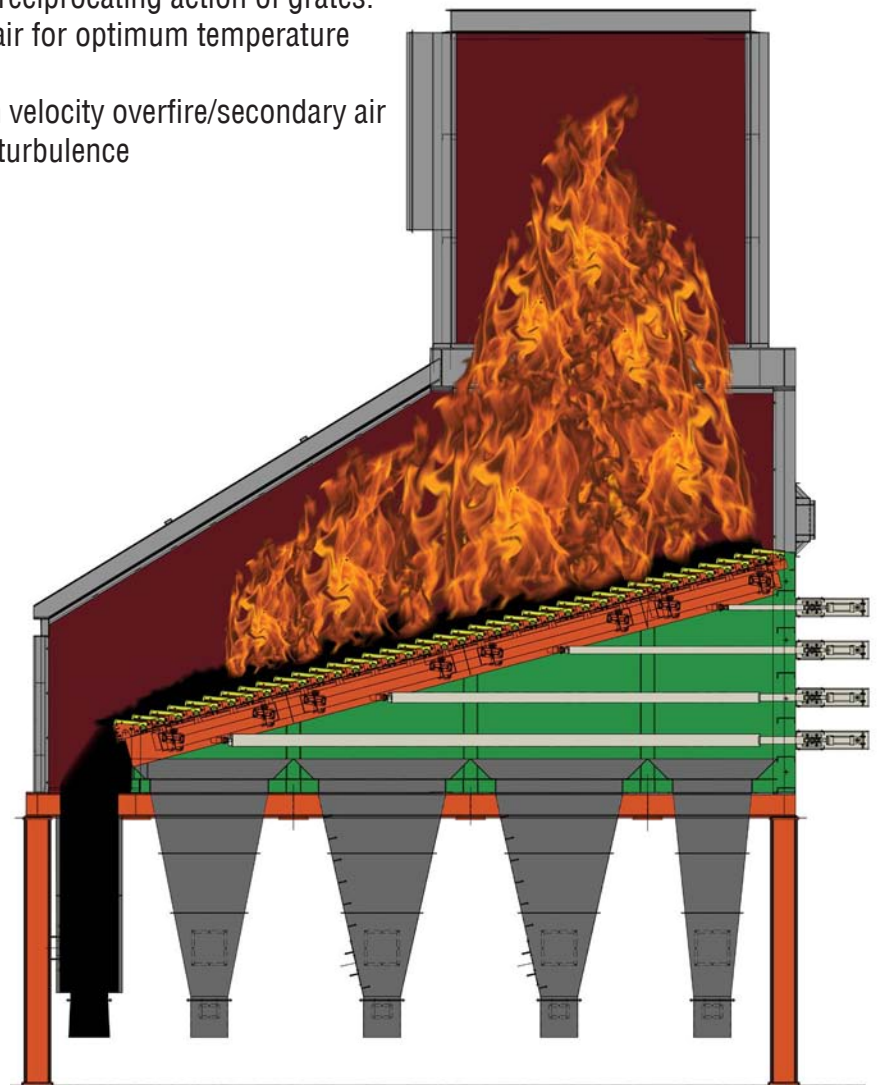
DSC-GTS Reciprocating Biomass Stoker

Detroit Stoker Company is now the Original Equipment Manufacturer of the GTS Energy Reciprocating Grate Combustion System technology. This tech is utilized in many of the world's leading MDF, OSB and particleboard plants. The GTS acquisition enhances the development and supply of small biomass combustion and gasification systems.

DSC/GTS inclined reciprocating grates push the fuel down the length of the grate through distinct drying, gasification, combustion and burn-out zones. The grates are high alloy material so air cooling is sufficient. The ash is automatically discharged off the end of the grate into an ash conveying system.

Features of our reciprocating grate:

- Handles wide range of feed materials including:
 - Wood Chips, Bark, Sawdust, Forest Waste, Agricultural Waste
- Handles low heat value fuels
- Conservative sizing for assured capacity and low emissions
- Heavy-duty design for long life and reliable operation
- High alloy air-cooled grate bars for long grate bar life
- Completely automatic ash removal by reciprocating action of grates.
- Multiple zones of undergrate/primary air for optimum temperature distribution, maximum ash burnout
- Low emissions through the use of high velocity overfire/secondary air injection and flue gas recirculation for turbulence



Detroit® DB Low NOx Burners

Environmentally Friendly Burner Systems.

There's a century of combustion experience behind every Detroit® DB low NOx burner system. These performance proven burners:

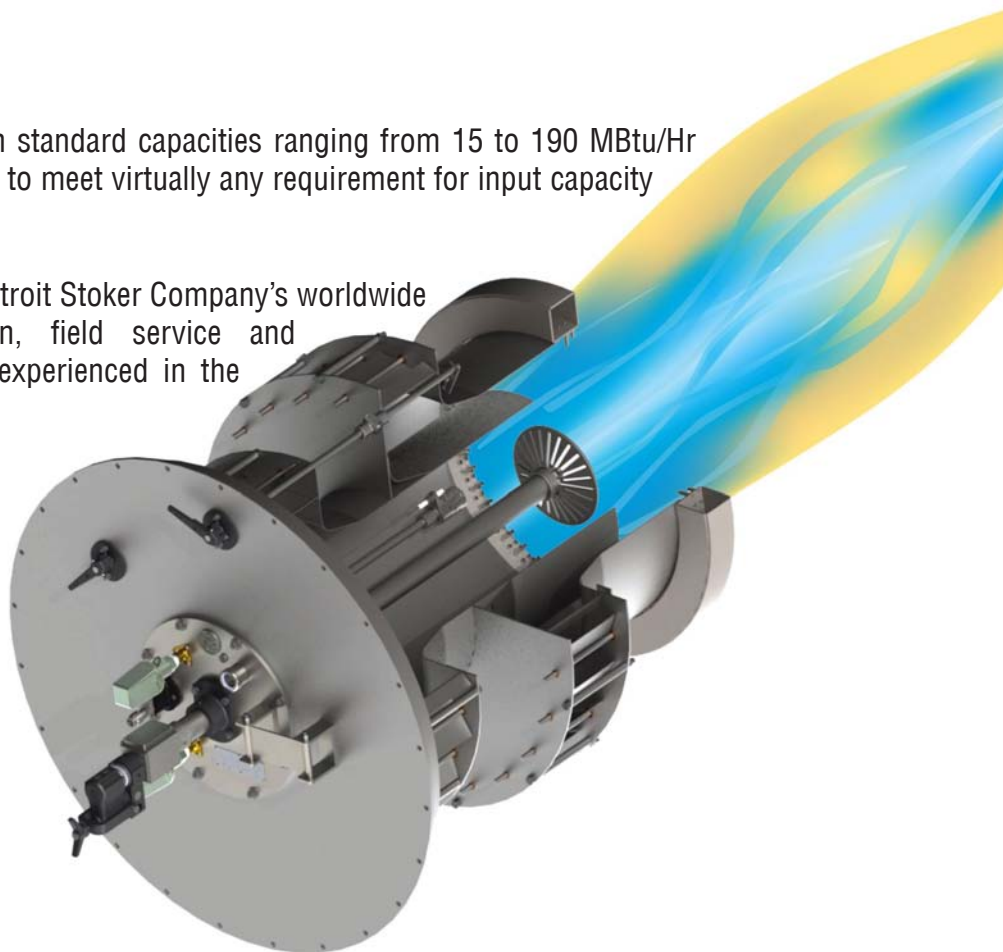
- Combine high efficiency and reliability
- Meet virtually all existing federal and state air quality standards

Features & Benefits:

- Perfect for co-firing solid fuel installations
- Can be used as replacements for solid fuel boilers
- Auxiliary units for start-up and continuous operation during low-load periods
- Offered in both natural gas and oil-fired models
- Available as replacements, retrofits or turnkey combustion systems
- Features a unique design that creates a precisely controlled swirling process in the register's air/fuel zone ensuring proper mixing and reducing peak flame temperatures at critical locations in the combustion pattern which results in:
 - Reduction of excess air
 - Minimized CO levels
 - Low NOx emissions
 - High fuel efficiency

Detroit® Burners are available in standard capacities ranging from 15 to 190 MBtu/Hr and can be installed in multiples to meet virtually any requirement for input capacity or flame length.

Every burner is supported by Detroit Stoker Company's worldwide & knowledgeable construction, field service and engineering groups, the most experienced in the combustion industry.



Vertically Fired Detroit® Burners

The Sensible Approach to Fuel Conversion.

Detroit® Vertical Fire Technology utilizes a single, upward-firing burner in the furnace floor to eliminate the risk of flame impingement on boiler water walls. This lets a single burner provide the input capacity of several front or side wall burners. Multiple gas trains and complex burner management systems are eliminated. Heat transfer to water walls is optimized because the flame is placed symmetrically in the furnace cavity.

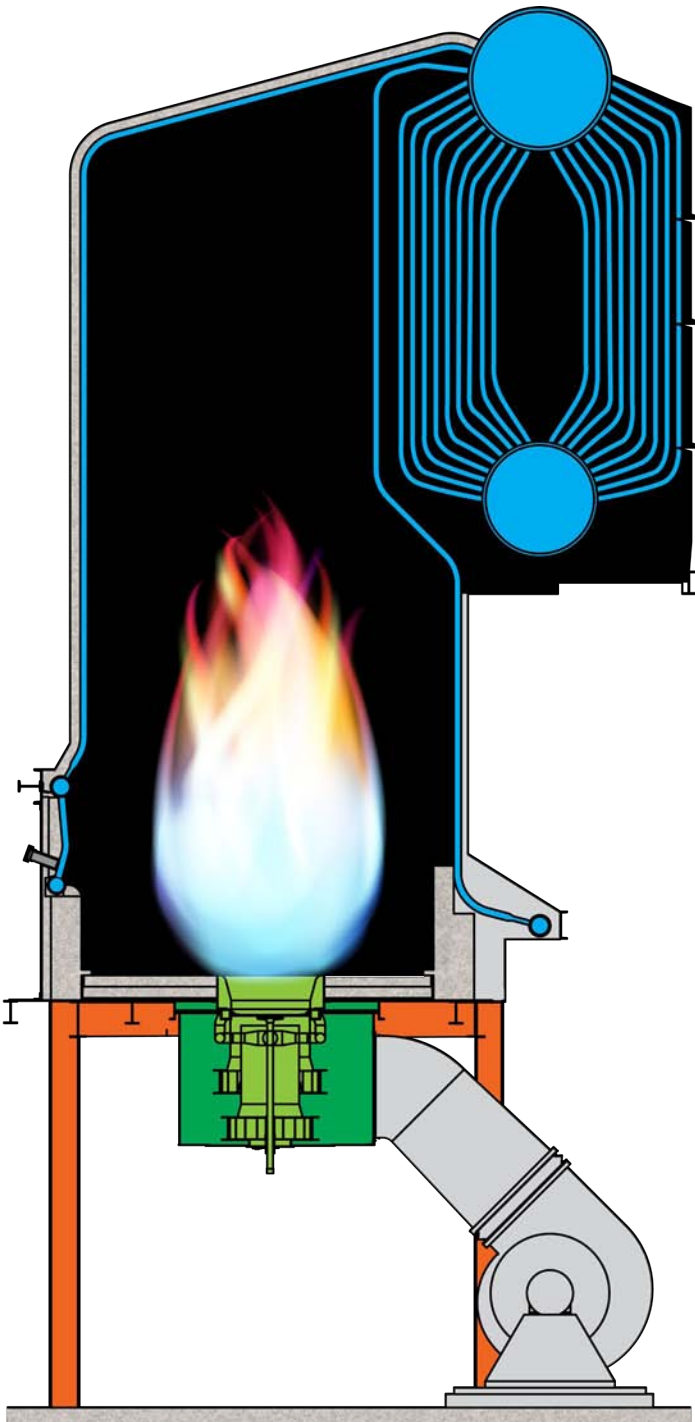
Detroit® Vertical Fire conversions are:

- Designed for accelerated installation
- Less expensive because it eliminates boiler tube modification, windbox and forced-draft fans can occupy space previously used by sifting hoppers

Conversions offer impressive long-term benefits:

- Built around our field-proven Detroit® DB Low NOx Burners
- Burners can provide in excess of 90% reduction in NOx emissions and 30% reduction in attendant labor costs

Detroit® Turnkey Conversions are designed by the most experienced combustion group in the industry. Detroit Stoker Company is supported by Field Engineering, Construction and Service all around the globe.



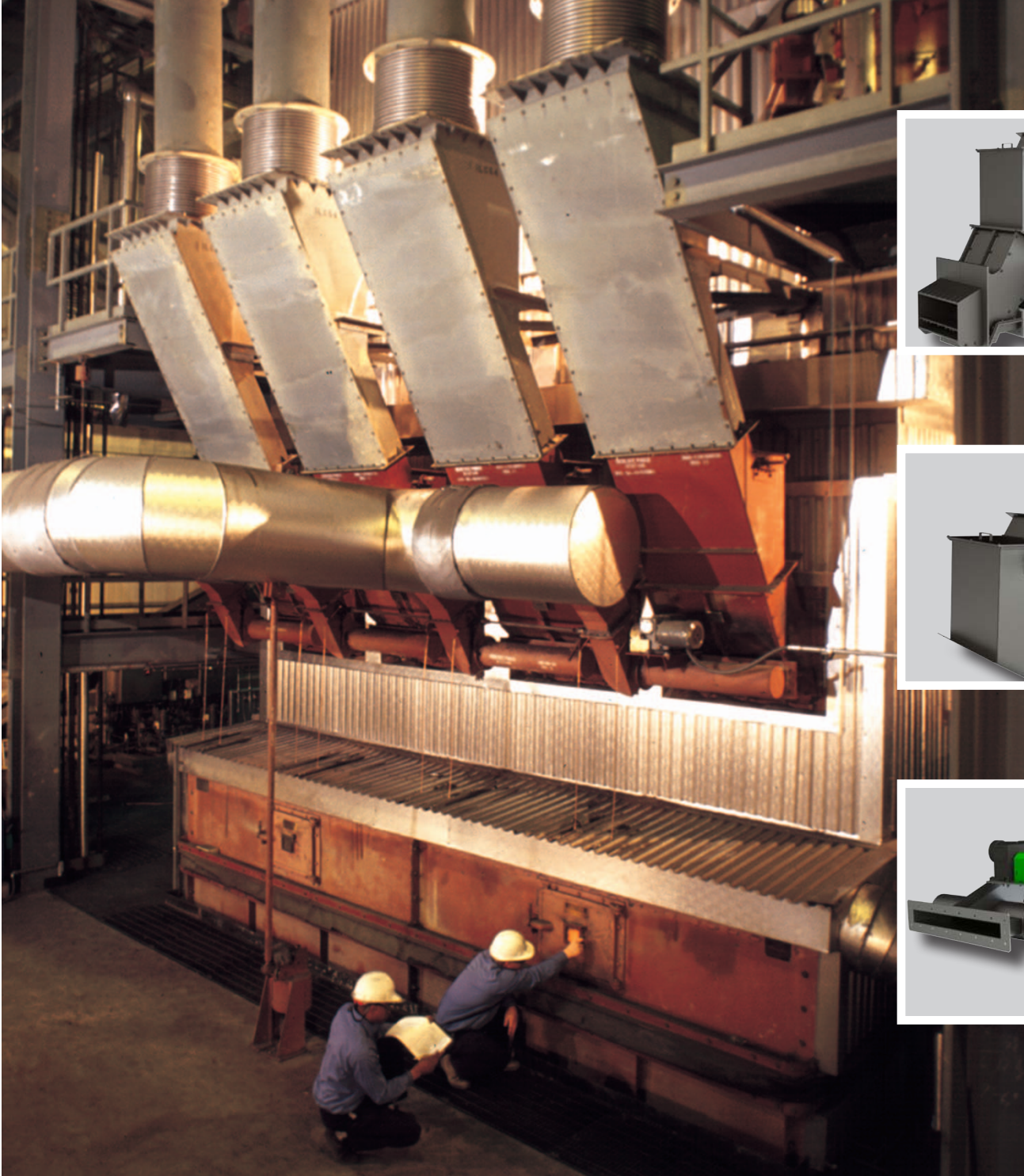


Detroit® Combustion Systems // Stokers & Burners



Fuel Feed Equipment //

Detroit® RotoGrate & Hydrograte Stokers



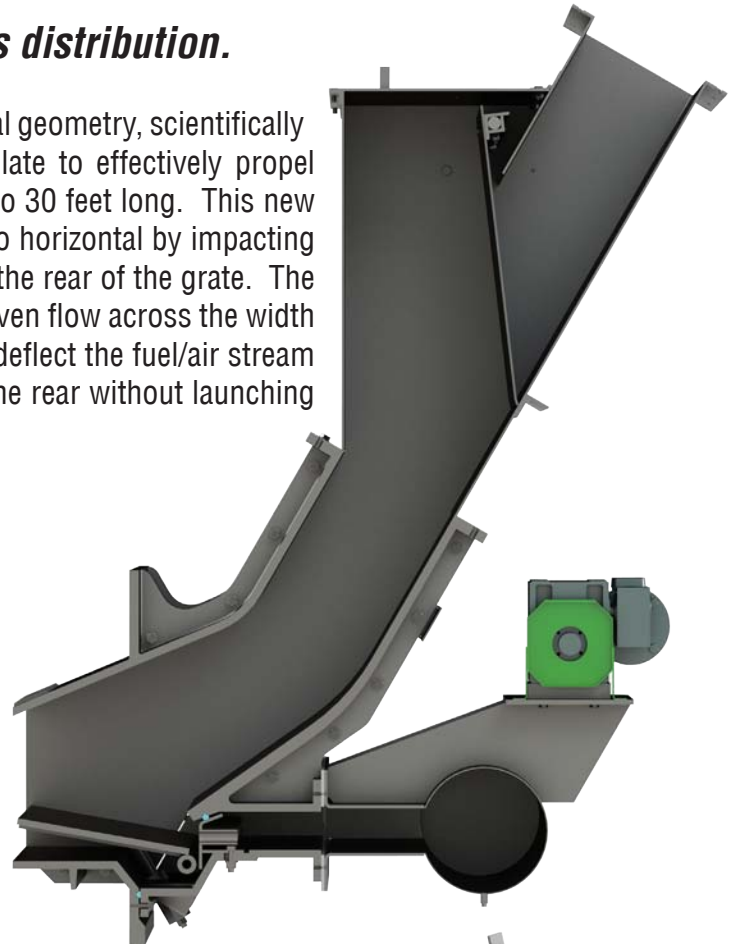
Detroit® Air Swept Distributor Spout

Rugged, reliable and effective biomass distribution.

The Detroit® Air Swept Distributor Spout utilizes special geometry, scientifically designed air nozzles and an adjustable distributor plate to effectively propel stringy, moist biomass to the rear of any furnace up to 30 feet long. This new spout changes the direction of the fuel from vertical to horizontal by impacting the fuel with pressurized air jets that carry the fuel to the rear of the grate. The nozzles regulate and meter the air resulting in a very even flow across the width of the spout. The adjustable distributor plate acts to deflect the fuel/air stream slightly upward, up to 10 degrees, to get the fuel to the rear without launching it into the gas stream.

Features & Benefits:

- Abrasion resistant cast stainless construction
- Replaceable wear sections
- Adjustable fuel distributor plate
- Fuel flexible – can handle a wide variety of fuels
- Scientifically designed air jets to propel fuel

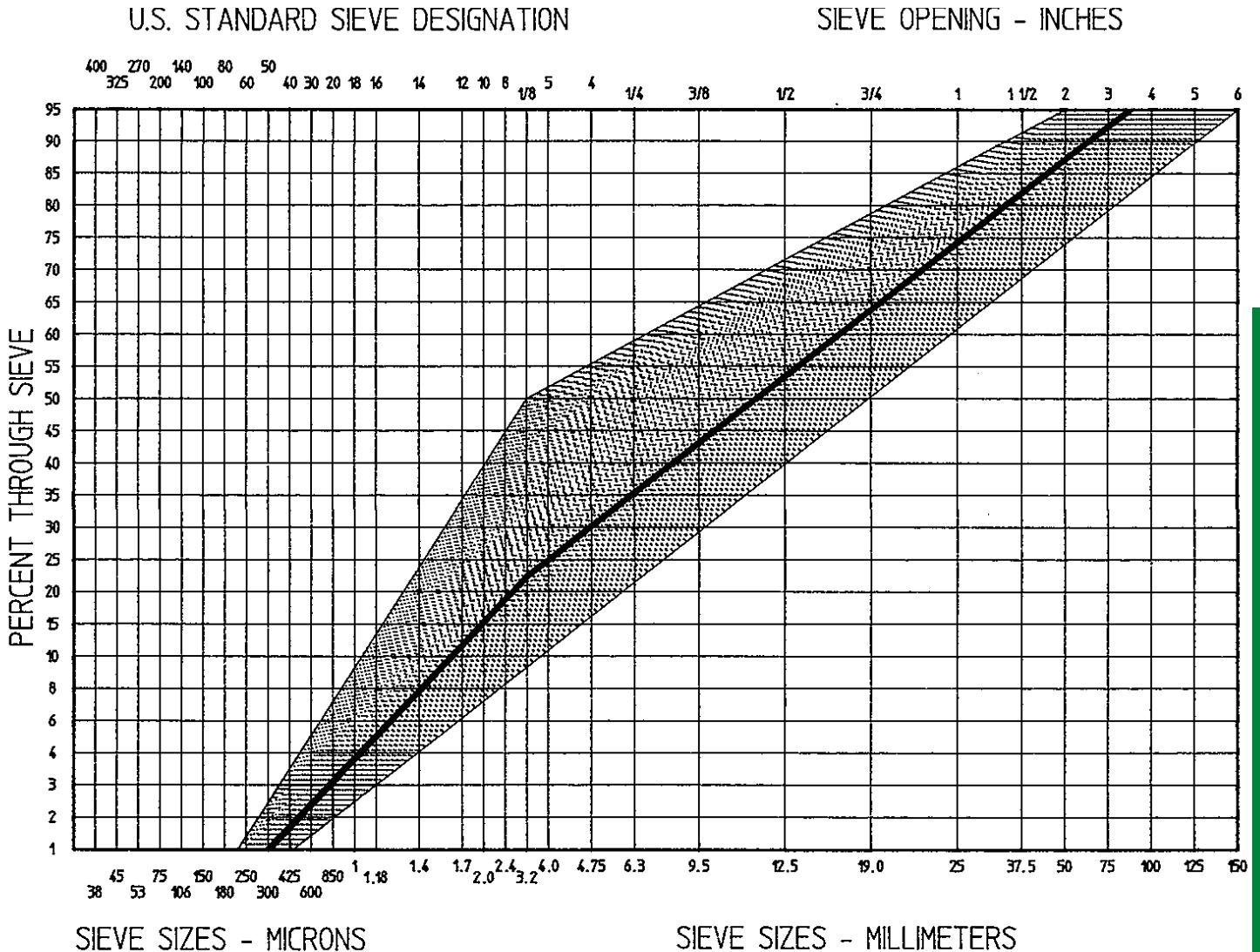


Fuel Feed Equipment // Detroit® RotoGrate & Hydrograte Stokers

Detroit® Air Swept Distributor Spout

Detroit® Air Swept Distributor Spout - Wood or Bark Sizing:

Recommended sizing for wood or bark for spreader stoker firing.



Recommended sizing is indicated by the dark line. Acceptable sizing is indicated by a shaded band. 100% should pass through a 6" grid. The above sizing recommendations are three dimensional sizes although 5% streamers or stringers up to 12" long in one dimensions is acceptable.

Fuel Feed Equipment // Detroit® RotoGrate & Hydrograte Stokers

Detroit® Balanced Damper

Balanced Dampers accentuate the effective Detroit® Air Swept Distributor Spout.

The Detroit® Balanced Damper is mounted to the fuel inlet of each Detroit® Air Swept Distributor Spout and serves a multitude of important roles as part of the fuel feed system.

Reduces the velocity of fuel entering the spout

The internal damper blade reduces fuel velocity maximizing the effectiveness of the distributor's high pressure air nozzles.

Evens the flow of fuel across the width of the distributor

The internal hinged damper blade disperses the fuel across the width of the distributor for an even flow.

Stops fire from travelling up the fuel chute during furnace upsets

If the pressure in the furnace goes positive, the damper blade will instantly swing shut and be held by the positive pressure. This effectively seals off the upstream fuel feed equipment, preventing fuel supply fires.

Minimizes tramp air infiltration when chutes are empty

With no fuel flowing, the damper will remain in the normally closed position thus mitigating air entrance through the distributor.

Each Detroit® Balanced Damper assembly is fabricated from 3/16" abrasion resistant steel and is provided with counterweighted dampers, pillow block bearings and hinged access panels. The counterweighted damper arms may be installed in the upper position (as shown) or in the lower position if space is limited.



Rotary Air Dampers

Rotary Air Dampers layer the fuel for even combustion.

The Rotary Air Damper enhances the action of the Detroit® Air Swept Distributor Spout. A continuously rotating damper blade causes the air pressure to pulsate as it flows through the spout. The difference between the maximum and minimum pressures is easily adjusted by the operator. By pulsating the air, the fuel is thrown with varying velocities and is spread somewhat from the back to the front of the grate. This is extremely effective at minimizing clumps of wet tangled biomass that would otherwise create CO excursions.



Features & Benefits:

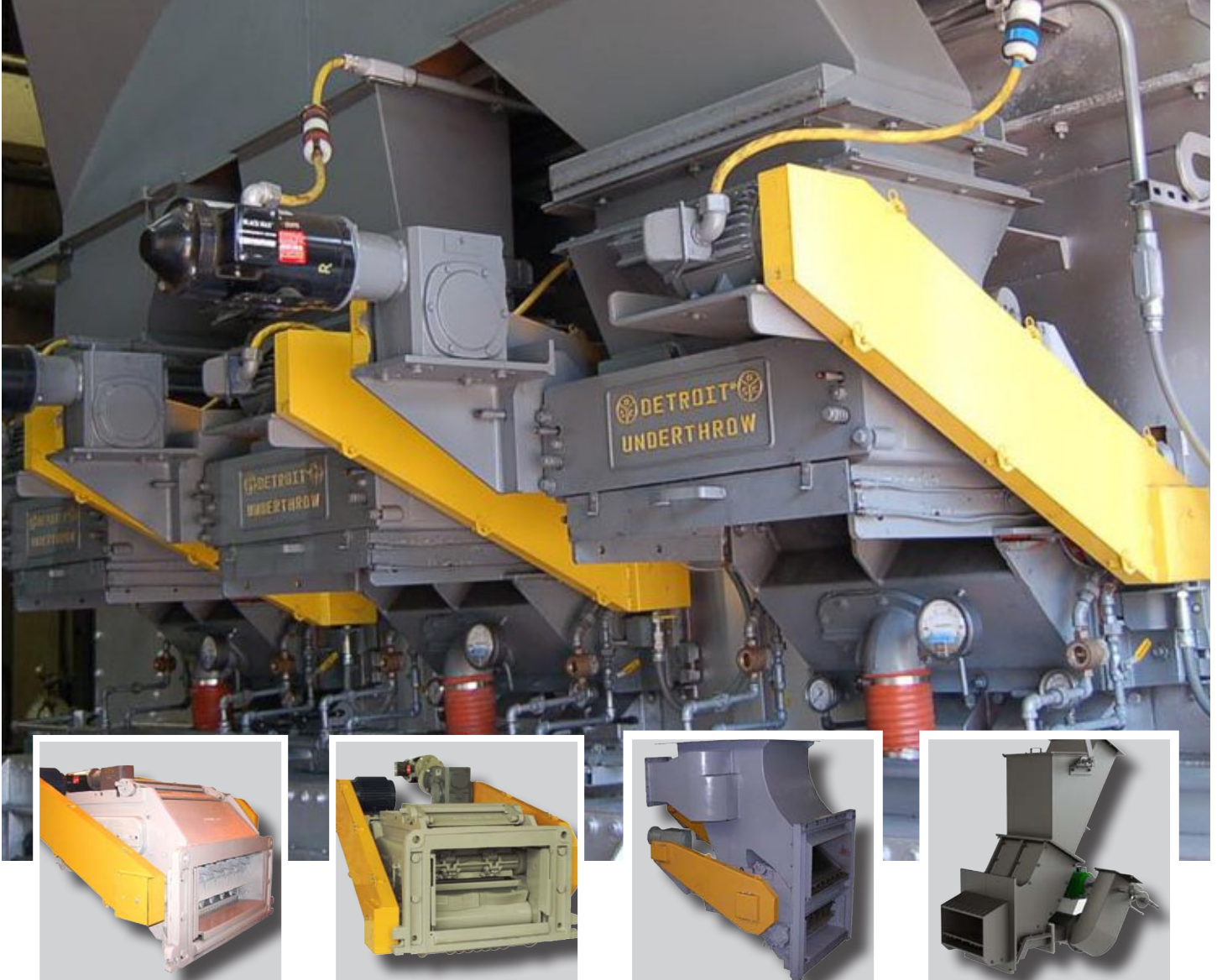
- Stainless Steel rotary damper blade
- Stainless Steel adjusting damper blade
- Supplied with greaseable or greaseless bearings
- Arrangements for either ambient air or hot flue gas
- Specifically designed for attachment to Detroit® Air Swept Distributor Spout
- Up to eight dampers driven through interconnecting shafting to a single drive



Fuel Feed Equipment // Detroit® RotoGrate® RotoGrate & Hydrograte Stokers

Fuel Feed Equipment //

Detroit® RotoGrate Stokers



Fuel Distributor Selection Guide

Detroit Stoker Company's portfolio of Fuel Distributors can handle nearly every type of solid fuel commonly (and not so commonly) burned in spreader stoker applications. Each distributor type handles a different range of fuels, with some overlap in capabilities. It can be challenging when selecting the Fuel Distributor that is ideal for your application, but Detroit Stoker Company Engineering and Sales is available to assist.

This guide shows some of the criteria Detroit Stoker Company uses to select a fuel distributor:

Detroit® Underthrow Fuel Distributor

- Fuel:
 - Coal: maximum 75% fines under ¼", top size under 1¼" but over ¾"
 - Biomass: ½" to 1½" solid pieces up to 20% of fuel mix
- Furnace depth up to 22 feet
- VFD (Variable Frequency Drive) controlled rotor and conveyor
- Manual trajectory adjustment

Detroit® Ultrafeed Coal Distributor

- Fuel:
 - Coal: maximum 40% fines under ¼", top size under 1½" but over ¾"
 - Biomass: 1" to 1¼" solid chunks up to 20% of fuel mix
- Furnace depth less than 18 feet
- VFD controlled rotor and conveyor
- Manual trajectory adjustment
- Adjustable conveyor position

Detroit® Air Swept Distributor Spout

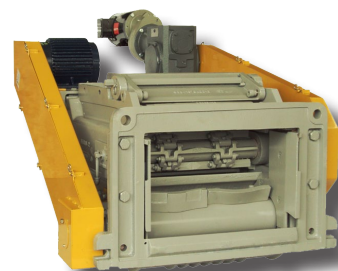
- Fuel:
 - Biomass: stringy plant material, bark, bagasse, etc., Solid pieces can be mixed with bulky fuels
- Furnace depth up to 30 feet
- Manual trajectory adjustment
- Available accessories:
 - VFD driven Rotary Air Damper: pulses the distribution air for a smooth fuel bed
 - Balanced Damper: gravity activated damper prevents fire from reaching fuel feed equipment, regulates fuel flow into distributor

Detroit® Combination Fuel Feeder

- Fuel:
 - Biomass (Air Swept Distributor Spout): stringy plant material, bark, bagasse, etc., composite pieces, i.e. briquettes, pellets, cubes, etc.
 - Coal (Underthrow): maximum 65% fines under ¼", top size between 1¼" and ¾"
- Furnace depth up to 22 feet
- Accessories for the Air Swept Distributor Spout
 - VFD driven Rotary Air Damper: pulses the distribution air for a smooth fuel bed
 - Balanced Damper: gravity activated damper prevents fire from reaching fuel feed equipment, regulates fuel flow into distributor



Underthrow Fuel Distributor



Ultrafeed Coal Distributor



Air Swept Distributor Spout



Combination Fuel Feeder

Detroit® Underthrow Fuel Distributor

Handles varying coal quality.

The Detroit® Underthrow Fuel Distributor is a fuel metering and distributing device that feeds fuel into the combustion chamber. The fuel is metered by a VFD (Variable Frequency Drive) driven chain-type conveyor to follow load demands. A uniquely designed rotor discharges the fuel with an underhand style motion. This motion allows each piece of coal to be in contact with the blades for an extended period of time, giving the coal a horizontal trajectory. A row of pneumatic nozzles below and behind the rotor provides consistent and even distribution to the back third of the grate. Coal fines are distributed easily with the Underthrow whereas they are found to be problematic with other distributor designs. Combustion efficiency is improved and the carbon content of the ash is reduced because of the highly effective fuel distribution.

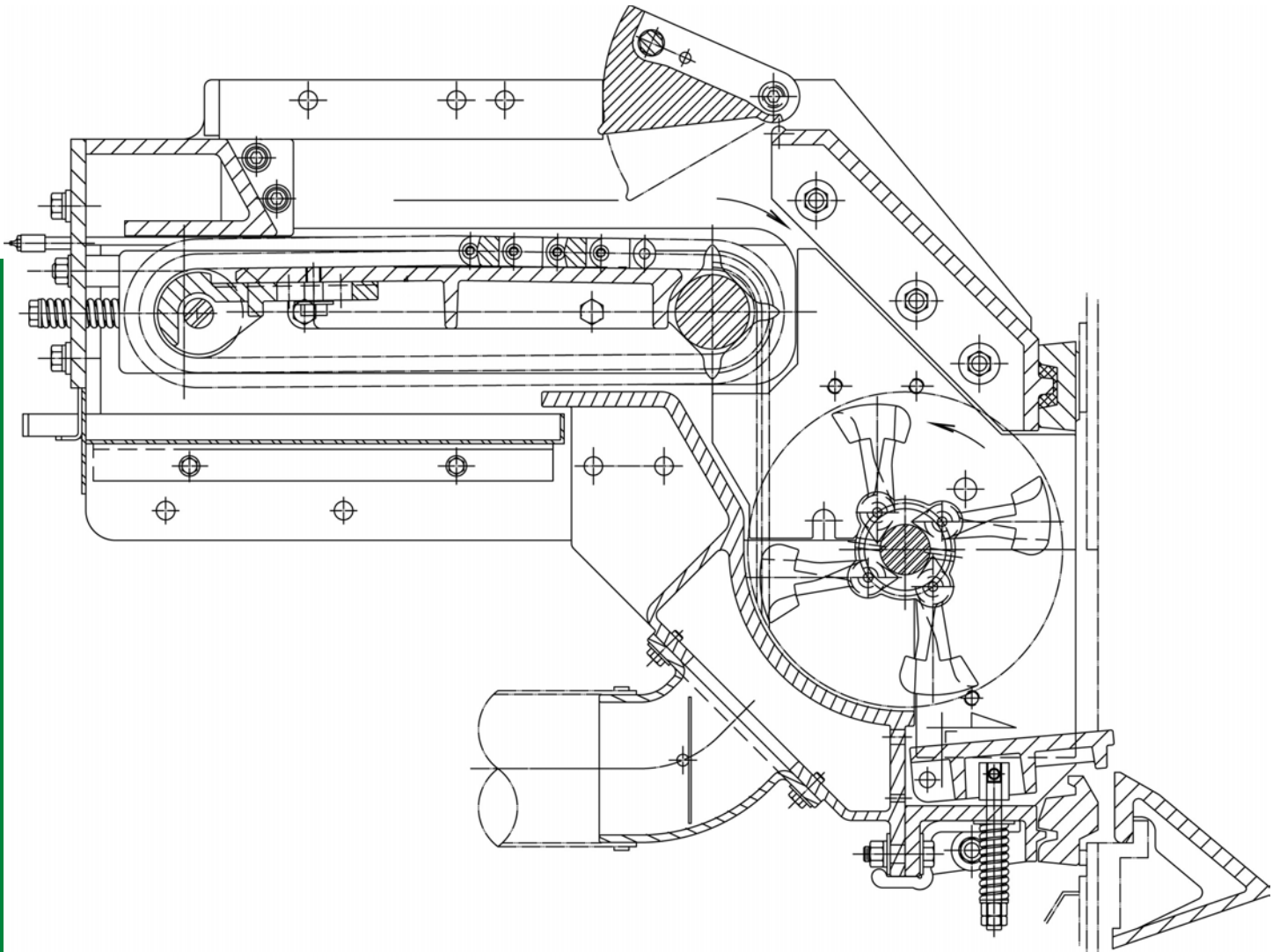


Features & Benefits:

- Water cooled rotor bearings
- Pivoting rotor blades mitigate jams
- Heavy duty VFD driven motors provide adjustment for varying fuel conditions
- Adjustable air damper for distribution air with port for pressure gauge
- Adjustable fuel gate for setting maximum fuel feed and to regulate coal feed into rotor
- A continuous chain conveyor assembly is protected from direct radiant heat exposure
 - Less deterioration of parts from heat, reduced need for replacement parts
- Internal components are removable in two (2) main assemblies without having to remove the distributor from the stoker front
 - The chain conveyor assembly pulls out from behind the distributor backplate, the rotor assembly drops out after unbolting the rotor housing air box
- Multiple rotor assembly blade configurations available to match distribution to furnace
- Ideal for distributing fuels with up to 65% less than ¼" and inconsistent moisture
- Can handle low quality, less expensive fuels
- Distributes fuels more consistently and evenly than other distributors
- Horizontal trajectory decreases suspension firing, reduces loss of ignition
- Reduces NOx emissions by introducing the fuel lower in the burning zone of the furnace
- Fewer moving parts to maintain than other distributors
- Flue gas recirculation can be utilized as distribution media to reduce excess air introduced into furnace and help reduce NOx
- Fits existing Detroit Stoker Company feeder openings without front wall modifications

Detroit® Underthrow Fuel Distributor

Sectional Side View

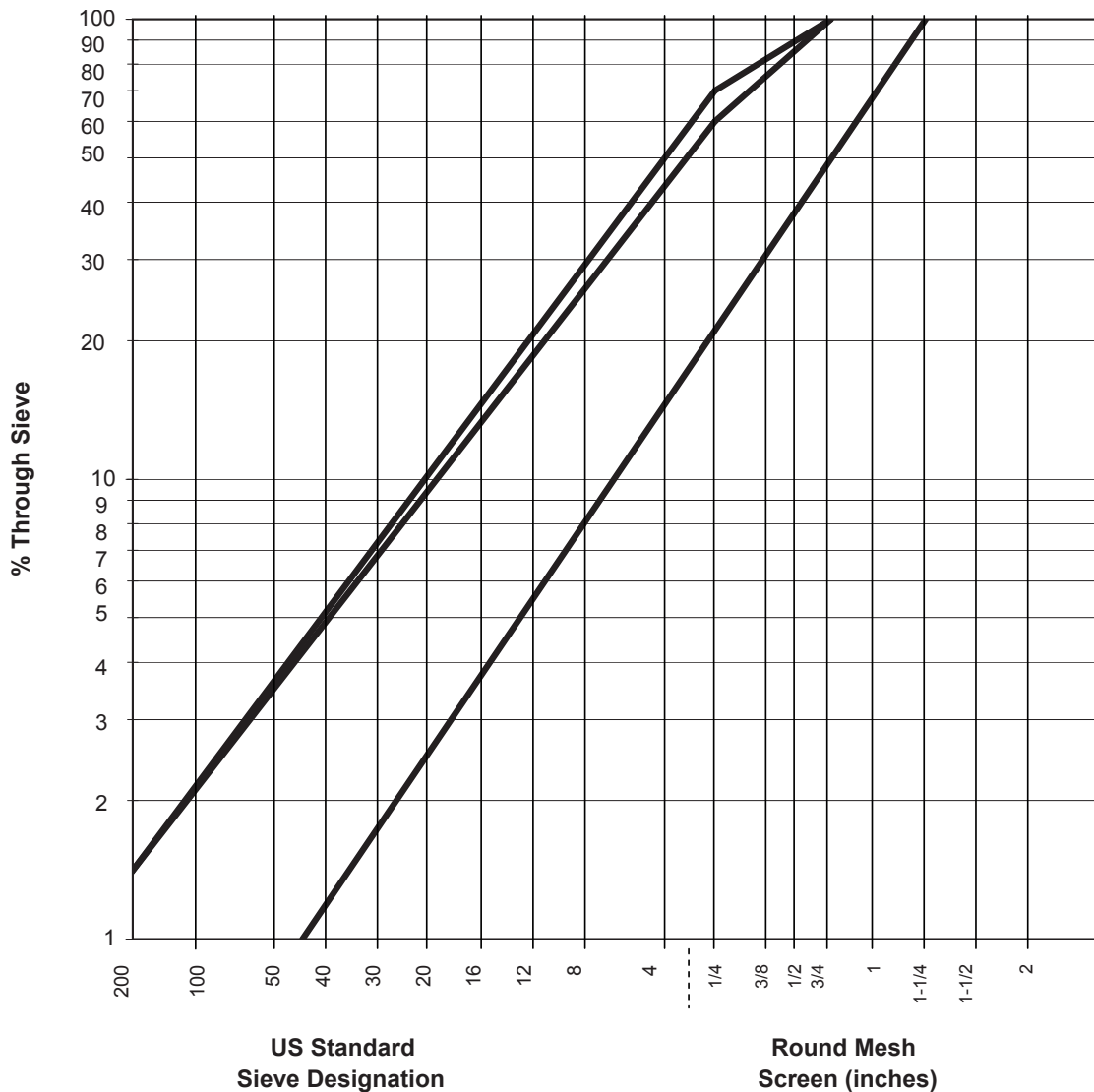


Fuel Feed Equipment // Detroit® RotoGrate Stokers

Detroit® Underthrow Fuel Distributor

Detroit® Underthrow Distributor - Coal Sizing - Recommended Limits

Fuel is to be delivered across the stoker hopper without size segregation. Acceptable sizing is indicated by the grey shaded area. All coal to pass through 1-1/4" mesh screen size. If sizing falls in shaded area please consult DSC Sales/Engineering.



Coal sizing is very important for a spreader stoker. Coal that is too coarse will have only a small amount burn in suspension and the boiler will not be able to change loads quickly. If the coal has too many fines there will be excessive suspension burning and the atmosphere within the boiler can become unstable. Additionally, excessive fines in the coal make it challenging to distribute the fuel to the rear of the grate.

Fuel Feed Equipment // Detroit® RotoGrate Stokers

Detroit® Ultrafeed Coal Distributor

Proven rugged performance.

The Detroit® Ultrafeed Coal Distributor, like the Detroit® Underthrow Fuel Distributor, is a combination coal feeding and distributing device. It introduces coal continuously into a combustion chamber at variable rates to follow load demands. The Detroit® Ultrafeed excels with fuels of consistently large size less than 40% under 1/4" on Detroit® RotoGrate Stokers of moderate length. The fuel is metered onto the overthrow style rotor by the same rugged VFD (Variable Frequency Drive) driven chain-type conveyor found on the Detroit® Underthrow. The rotor drum assembly is equipped with cast rotor blades of specially designed shapes to distribute the coal into the combustion chamber for optimum combustion. A VFD driven motor allows the rotor speed to be varied so the coal is always thrown to the rear of the grate.

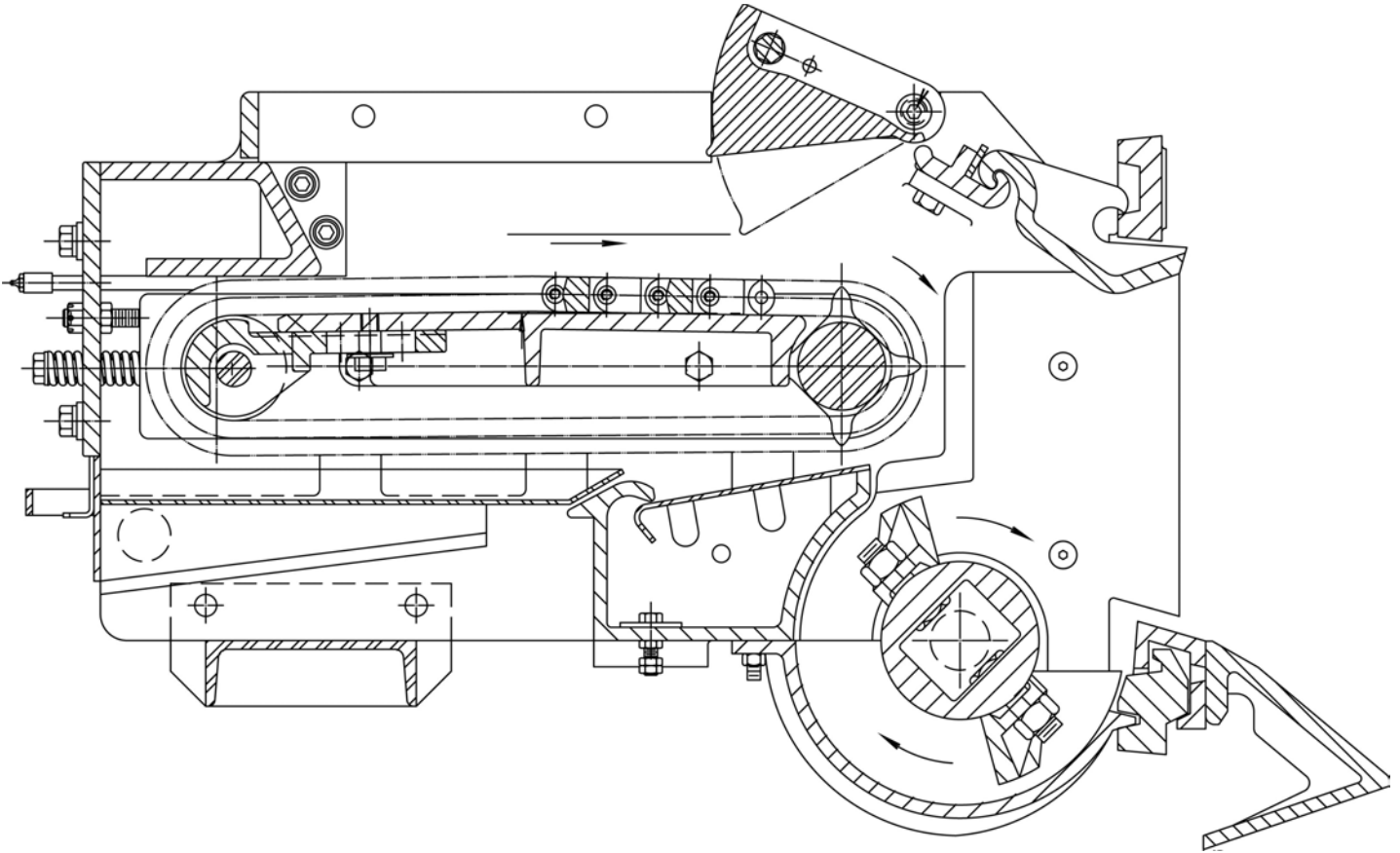


Features & Benefits:

- Water cooled bearings
- Specialized rotor blades for optimum distribution
- Large throat for oversized fuel particles and tramp material
- Heavy duty VFD driven motors to provide adjustment for varying fuel conditions
- Adjustable fuel gate for setting maximum fuel feed and to regulate coal feed into rotor
- Adjustable conveyor position for fuel trajectory and distribution manipulation
- Internal parts removable in two main assemblies (rotor drum assembly and conveyor carriage assembly) without removing the distributor from the stoker front plate
- Ideal for distributing fuels inconsistent in size and moisture content
- Distributes fuels more consistently and evenly than other feeders
- Fewer moving parts to maintain than other feeders
- Reduces the need for replacement parts
- Fits existing Detroit Stoker Company feeder openings without front wall modifications

Detroit® Ultrafeed Coal Distributor

Sectional Side View

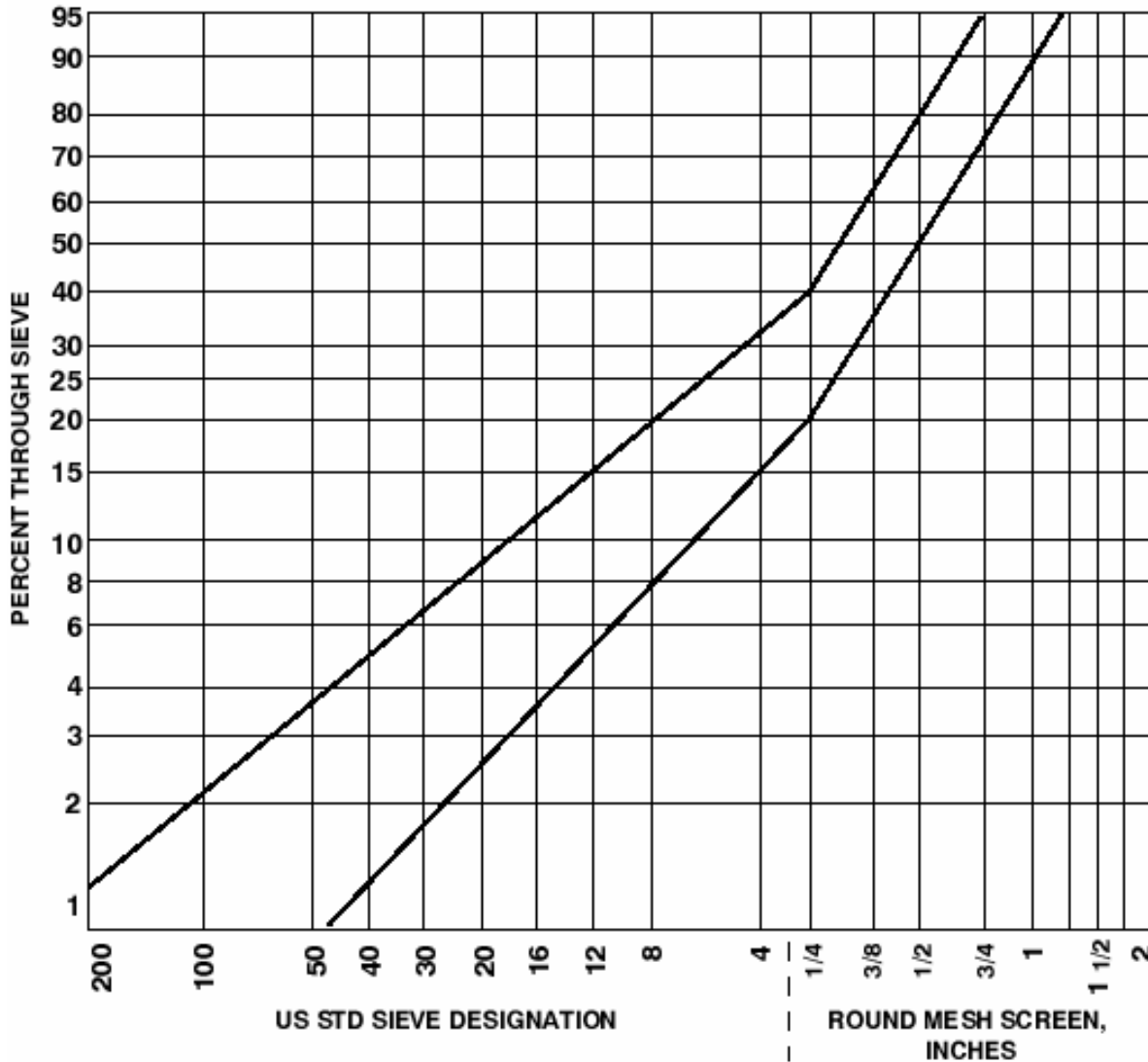


Fuel Feed Equipment // Detroit® RotoGrate Stokers

Detroit® Ultrafeed Coal Distributor

Detroit® Ultrafeed Distributor Coal Sizing:

Fuel to be delivered across stoker hopper without size segregation. Acceptable sizing falls between the black lines. All coal to pass through 1-1/2" mesh screen size.



Coal sizing is very important for a spreader stoker. Coal that is too coarse will have only a small amount burn in suspension and the boiler will not be able to change loads quickly. If the coal has too many fines there will be excessive suspension burning and the atmosphere within the boiler can become unstable. Additionally, excessive fines in the coal make it challenging to distribute the fuel to the rear of the grate.

Detroit® Combination Fuel Distributor

Add biomass to your fuel portfolio.

Fuel flexibility can be achieved with the Detroit® Combination Fuel Distributor. A truly unique design combines the proven performance of the Detroit® Underthrow Coal Distributor for coal firing and the Detroit® Air Swept Distributor Spout for the flexibility of firing biomass. This combination allows two, unblended fuels to be fired simultaneously. Established coal plants can add biomass firing by replacing all or several coal distributors on a boiler with Detroit® Combination Fuel Distributors. If the biomass fuel becomes scarce, coal can continue to be fired until the biomass becomes available. By having the option of burning coal or biomass, the risk of shutting down because of fuel shortages is eliminated.

The Detroit® Air Swept Distributor Spout portion of the Detroit® Combination Fuel Distributor is highly versatile and capable of distributing fuels having odd sizes such as stringy bark and fuels exhibiting lower bulk densities. With no moving parts, the distributor is ideal for firing wood and waste where tramp material (rock, metal, wire, etc.) would cause a mechanical type distributor to stall or plug. An integral Rotary Air Damper enhances even fuel distribution by depositing fuel from front to back as the damper passes through the closed and open positions. Introduction of the fuel into the furnace at the lowest possible height above the grate gives extra time for burnout of fly carbon and thus increases boiler efficiency.

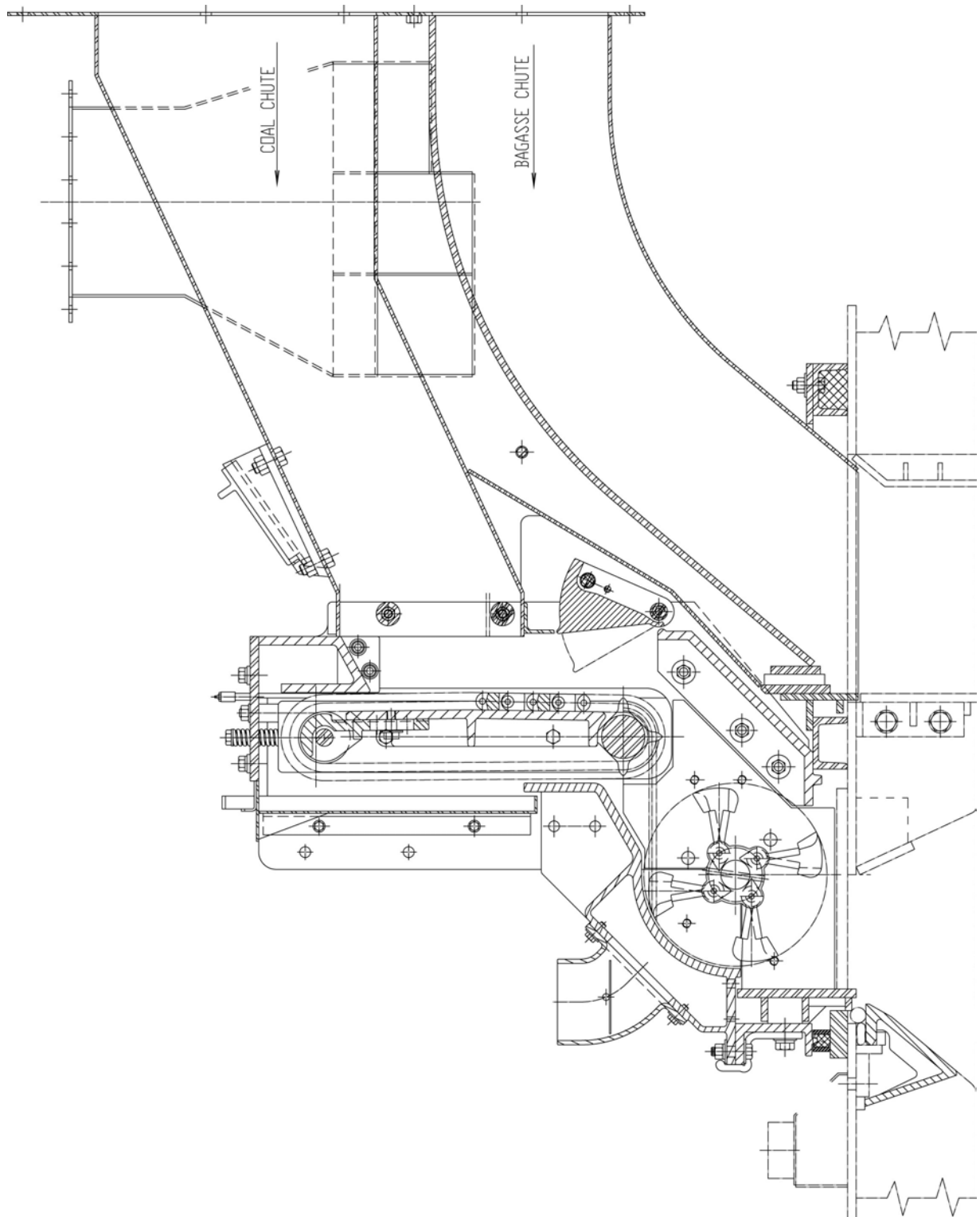


Features & Benefits:

- Same reliable equipment features of the Underthrow including:
 - Water cooled bearings
 - Pivoting rotor blades to mitigate jams
 - Heavy duty VFD (Variable Frequency Drive) driven motors to provide adjustment for varying fuel conditions
 - Adjustable air damper for distribution air with port for pressure gauge
 - Adjustable fuel gate for setting maximum fuel feed and to regulate coal feed into rotor
- Rotary Air Damper to create a uniform fuel bed of biomass
- Allows a controllable percentage of biomass into fuel regimen
- Can handle low quality, less expensive coals and biomass
- Sustained coal fire allows burning a wide variety of biomass
- Eliminates risk of shut down because of biomass fuel shortages
- Uses parts common to other Detroit Stoker Company equipment

Detroit® Combination Fuel Distributor

Sectional Side View



Fuel Feed Equipment // Detroit® RotoGrate Stokers

Control Panels for Fuel Distributors

Detroit Stoker Company can design and build a control panel specific to your operational needs. They are available as an addition to any equipment purchased from Detroit Stoker Company. We can match any preferred electronic equipment manufacturer and custom program the equipment to suit your particular application. VFD (Variable Frequency Drive) panels for fuel distributors and stoker grate drives and PLC (Programmable Logic Control) panels for system integration are available.

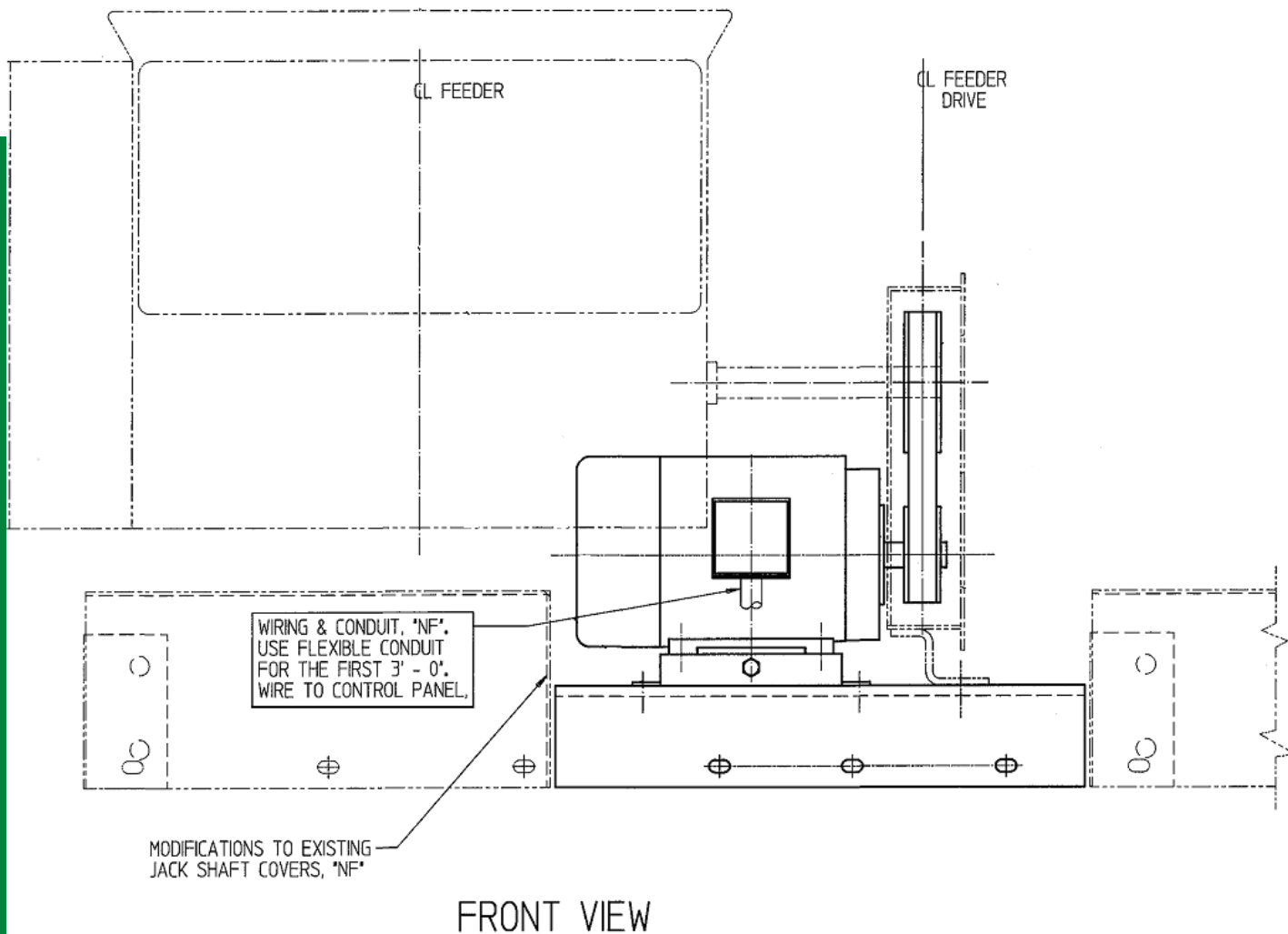


Fuel Feed Equipment // Detroit® RotoGrate Stokers

Individual Feeder Drives

Individual feeder drives allow you to eliminate your line shaft maintenance.

On the previously common reciprocating fuel distributors, Detroit Stoker Company used a line shaft along the width of the stoker flat arch to provide mechanical power. These line shafts have a series of U-joints and clutches and can require a lot of maintenance and replacement parts. With today's VFD (Variable Frequency Drives) and inverter duty motors, Detroit Stoker Company can offer extremely reliable individual feeder drives that require very little maintenance.



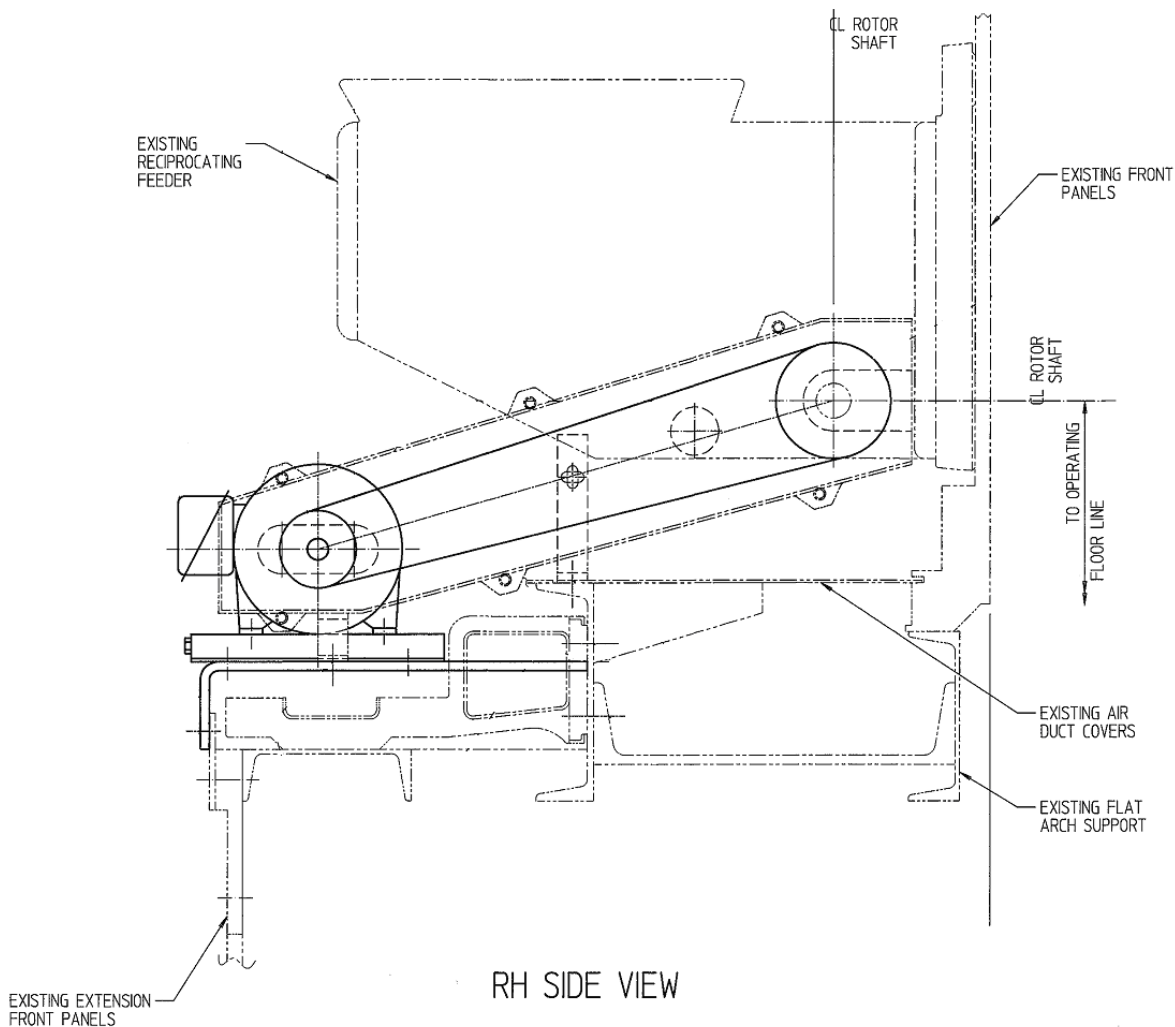
We furnish the material to replace the line shaft with modern VFD motor arrangements. There is one individually controlled 1 HP motor drive arrangement per coal feeder. Each motor is controlled through a VFD so the speed can be adjusted for the proper distribution of coal. With our extensive records of Detroit Stoker Company installations, we can tailor this upgrade to blend seamlessly into the stoker front.

Fuel Feed Equipment // Detroit® RotoGrate Stokers

Individual Feeder Drives

Features & Benefits:

- Driven pulley and bushing
- Drive pulley and bushing
- Timing belt
- 1 HP motor
- Drive guard
- Adjustable motor base
- Drive mounting bracket
- Drive control package consisting of AC VFD's for each distributor mounted in a common NEMA 12 enclosure complete with disconnect, all pre-wired to a panel terminal strip.
- Precise control of each feeder drive
- Eliminates line shaft maintenance
- Individual feeder shut down for maintenance



Tachometer & Zero Speed Switches

Instant information for easy decisions.

The addition of Detroit® Tachometer & Zero Speed Switch Arrangements offers the ability to continuously monitor the operation of your feeders' rotor shafts. The tachometer accurately monitors the rotor RPM's so adjustments can be made with confidence according to changes in fuel quality (i.e. moisture, sizing, etc.). The zero speed switch function enables trip alarms and fuel feed shut off interlocks, should the rotor stall. Fuel piling and destructive fires can easily be avoided. Each tachometer controller is a microprocessor based, fully enclosed, panel mounted device that is factory programmed for each specific application's operating range and is custom built for Detroit Stoker Company applications.

The LED readout displays real-time RPM at the control panel and also has the capability of sending a 4-20 mA scaled output signal as well as multiple relay contact outputs which can be tied into the fuel distributor controls and also to the DCS system for safety and control interlocks.

Each tachometer arrangement includes the panel mounted tachometer controller, a magnetic disk, sensing head with 6' cable, terminal strip box, mounting brackets and necessary fasteners. The tachometer controller can be shipped loose for field installation in an existing control panel or can be factory mounted and wired in a NEMA 12 enclosure.

Features & Benefits:

- LED readout with real time RPM display
- 4-20mA scaled output signal and multiple relay contacts
 - Allow connection to DCS and distributor controls
- Magnetic sensing head
- Brackets specific to Detroit Stoker Company distributors
- Effective monitoring of rotor speed and performance
- Protects motor by cutting power when rotor stops
- Visible biasing ensures even fuel distribution



Coal Distributor Feed Gates

Safely isolate individual distributors for maintenance.

Coal Distributor Feed Gates are designed specifically for installation above Detroit Stoker Company coal distributors. This location allows enough room between the coal distributor and the chute above. The gate allows the individual coal distributor to be emptied of coal while the other feeders continue to stoke the fire. The gate also serves as a safety isolation gate during maintenance outages. Gates are available for either automatic or manual operation. The manual gate is blow driven into the gate housing with a large hammer. The automatic gate is operated by a pneumatic cylinder.



Features & Benefits:

- Greaseable rollers for reduced wear
- Corrosion resistant material options
- Pneumatic cylinders with attached solenoid valves
- Direct fit to existing or new equipment

Non-Segregating Conical Distributors

Ensure even distribution across fuel beds.

Segregation of coal particles in a fuel supply system causes the largest chunks of coal to flow to the outside fuel feeders while the fines congregate to the center. The fines obstruct the air flow through the center portion of the grate, creating excessive CO. The larger chunks along the sides offer little resistance to the air flow and the flame temperatures increase in these areas, creating excessive NOx. Non-Segregating Conical Distributors have been proven to evenly distribute coal to each feeder. Non-segregated coal ensures each fuel feeder is feeding the same quantity and quality of material allowing for an even fuel bed with consistent heat release preventing the formation of excessive NOx and CO.

Detroit Stoker Company Non-Segregating Conical Distributors are provided for new installations and as replacements for existing equipment. They can be fabricated to match any existing fuel distributor type and are available with standard carbon steel construction or stainless steel construction for corrosive fuels and environments.



Features & Benefits:

- Construction specific to your fuel and needs
- Eliminates segregation of fuel size
- Ensures even distribution across entire fuel bed
- Scientific design based on research and proven through years of use
- One conical distributor can serve up to 5 feeders
- Fabricated of corrosion and abrasion resistant materials

Grate Drive Equipment //

Detroit® Hydrograte Stokers



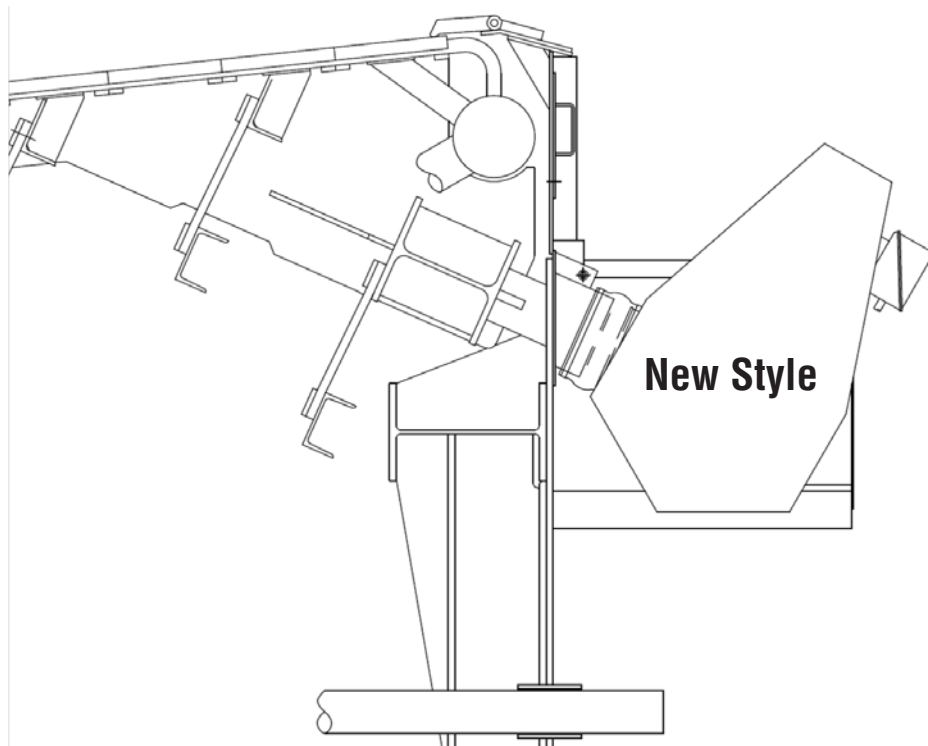
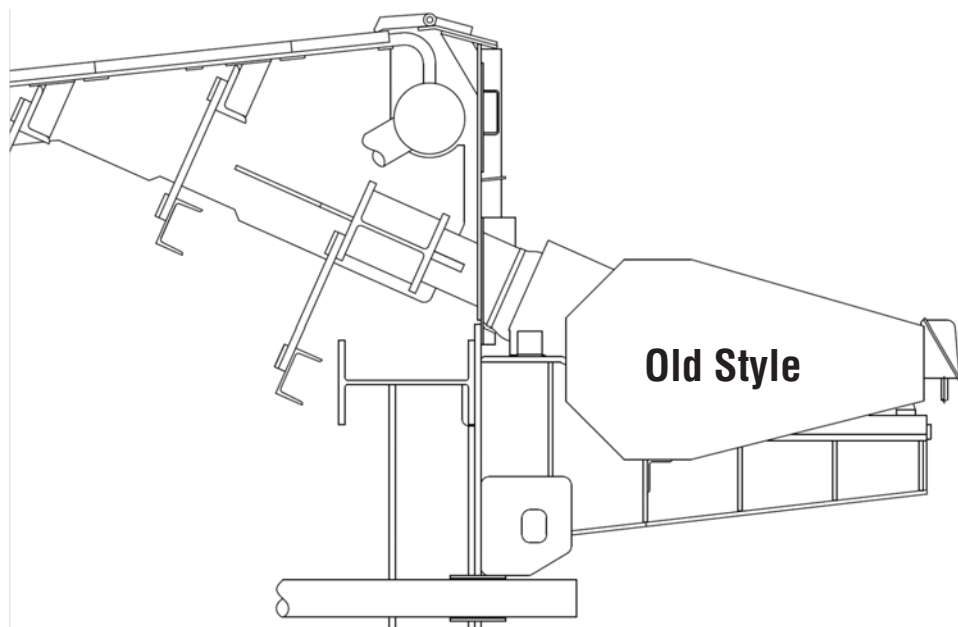
Old Style Grate Drive Replacement

Upgrade to the new style grate drive.

Upgrading to the new style grate drive from an existing old style grate drive has its benefits. Upgrading will save space as well as transfer vibration better. The new style grate drive has a smaller footprint as compared to the old style grate drive. The old style drives extended over 4 ½ feet off the back of the stoker. With the new style drive almost 2 feet can be recovered, which can allow for ease of access when maintaining the stoker. The upgrade to the new drive will allow better transfer of vibration to the vibrating grate and not to the stationary frame.

Features & Benefits:

- Smaller footprint
- Better vibration transfer to vibrating grate through improved bearing design



Drive Arm Seal

Protect your drive arm with our three piece system.

The removable drive arm seal with stuffing box consists of three components; an expanded metal shroud, a fabric seal and a stuffing box arrangement.

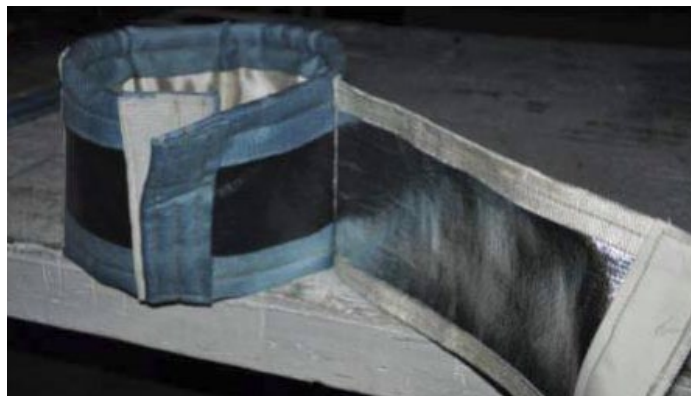
The outermost part of the assembly is an expanded metal shroud installed around and above the other drive components. This installation ensures ambient airflow to keep the drive arm seal cool. The shroud maintains a barrier that ensures the seal arrangement is protected and that there is space for ambient air to cool the fabric seal.

The fabric seal is the next component of the arrangement. It consists of a composite fabric seal made with hook and loop closure strips to facilitate installation. This fabric seal is rated for operating temperatures between 800°F and 1000°F.

The final component of the seal is a stuffing box arrangement. The arrangement allows temperature resistant material to be located within the sleeve plate to maintain a minimal clearance around the drive arm. It is held in place by metal retainer plates screwed to tabs on the sleeve plate. The stuffing protects the fabric seal from hot embers that might damage the fabric seal from the inside, while the shroud protects the fabric seal from external damages.

Features & Benefits:

- Three piece system for ultimate protection
- Configuration of arrangement allows fabric seal to be cooled with ambient air
- Easy installation of fabric seal with hook and loop closure
- Shroud and stuffing help to preserve the fabric seal





Grate Drive Equipment // Detroit® Hydrograte Stokers



Grate Drive Equipment //

Detroit® RotoGrate Stokers



Detroit® Planetary Grate Drive Arrangement

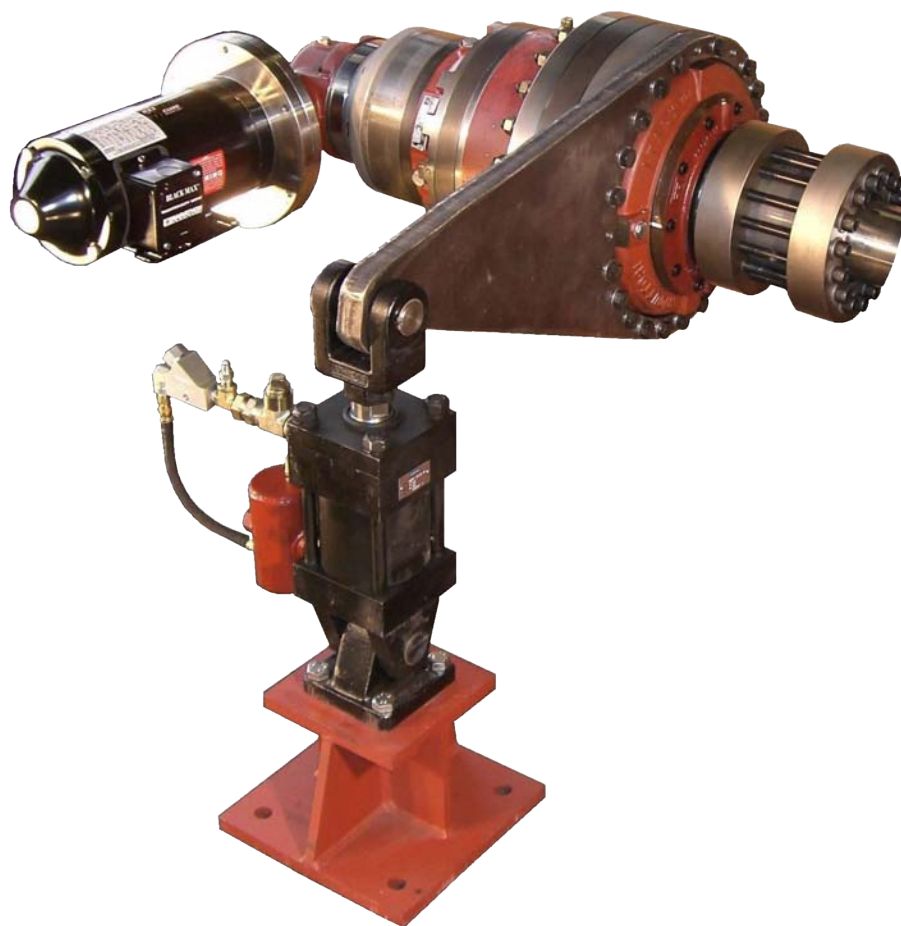
Powerful, precise and continuous drive.

The Detroit® Planetary Grate Drive Arrangement is a planetary gear reducer which allows a 1 HP motor to drive the stoker with up to 500,000 in-lbs of torque. The arrangement utilizes a passive hydraulic cylinder to monitor the torque being applied to the stoker shaft. A set of redundant pressure switches allows the operator to set the maximum allowable torque so the motor is de-energized before damage occurs to the stoker. A VFD (Variable Frequency Drive) controlled motor permits grate speed turndowns of up to 10:1, giving great flexibility to the grate system.

This arrangement has been successfully retrofitted on Detroit® RotoGrate Stokers and many other travelling grates including: C-E, B&W, Zurn, Riley and others. Detroit Stoker Company Engineering can determine grate compatibility and clearance requirements.

Features & Benefits:

- Smooth, continuous operation
- 10:1 grate speed turndown capability
- 1 HP motor, C-face mounted, TEFC
- Torque monitoring
- Electric and mechanical protection from over-torque grate damage



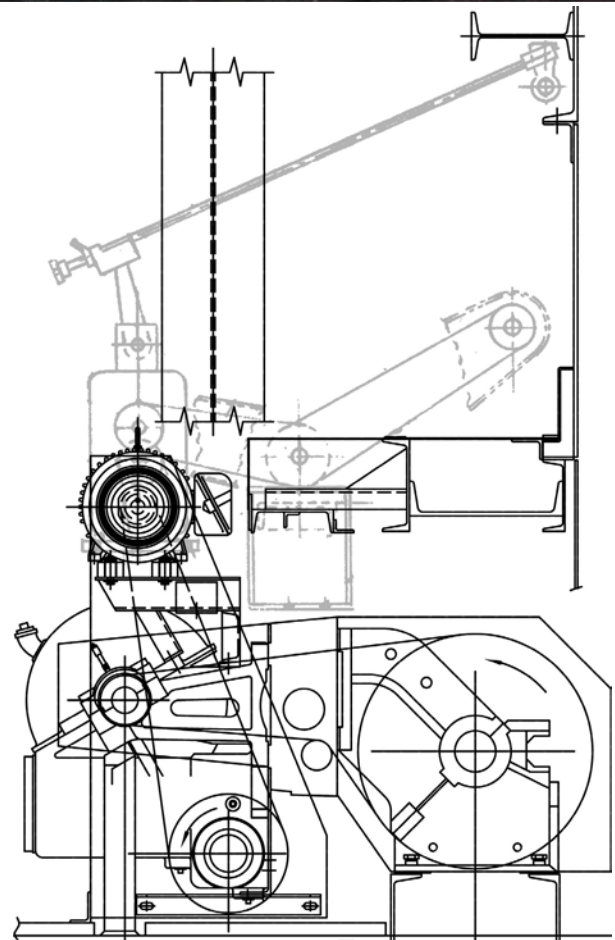
Detroit® RotoGrate Drive PIV Replacement

Modernize and increase flexibility!

Many Detroit® RotoGrate Stokers are driven by mechanical grate drives composed of a large worm gear box, roller chain sprockets and a variable speed device called a PIV (Positive Infinitely Variable) which allows turn downs up to 4 to 1. The mechanical PIV's were preferred until electronic VFD's (Variable Frequency Drives) evolved into the capable, reliable units used today. Replacing the PIV with a VFD driven motor and gearbox generally gives more flexibility in grate speed turn down, especially when paired with the available three speed gearbox. Also a VFD readily connects to any combustion control system for ease of control and safety interlocks.

Features & Benefits:

- State of the art VFD drive
- Custom engineered reduction for specific application
- Can connect to combustion control system for automated adjustment and operation
- Provides a greater range of grate speeds



The grey lines show the equipment on an old PIV arrangement. The black lines show the updated arrangement with VFD driven motor.

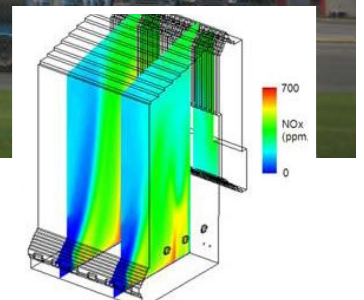
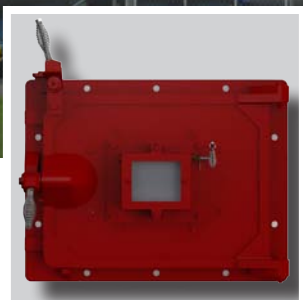


Grate Drive Equipment // Detroit® RotoGrate Stokers



Grate Components //

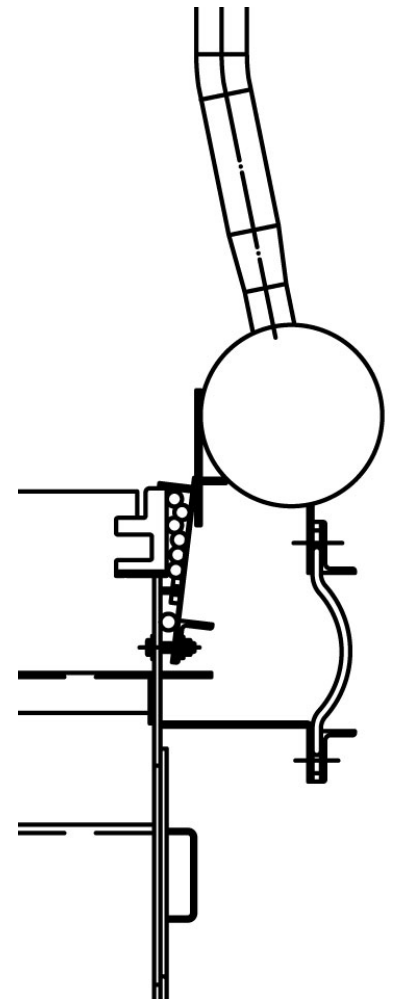
Detroit® RotoGrate & Hydrograte Stokers



Boiler to Stoker Fabric Air Seals

The fabric of efficient combustion.

The expansion joint between a top supported boiler and a bottom supported Detroit® Stoker must take the heat of combustion, prevent tramp air from entering the furnace and take up the growth of the boiler. To accomplish all these, Detroit Stoker Company offers a highly engineered composite fabric made of layers of Stainless Steel mesh, mineral wool, a gas barrier and coated fire-resistant cloth. Many satisfied customers have replaced their original sheet metal accordion style seals with these Boiler to Stoker Fabric Air Seals which are rated at 1100°F. The fabric air seal is clamped into place for easy installation and maintenance.



Features & Benefits:

- One piece construction eliminates tramp air infiltration
- Multi-layered composite fabric rated at 1100°F
- Easy installation with angle iron clamps
- Can be spliced for emergency repairs
- Continuous one piece seal along both sides and around rear corners

Rear Wall Inner Air Seal Pillow

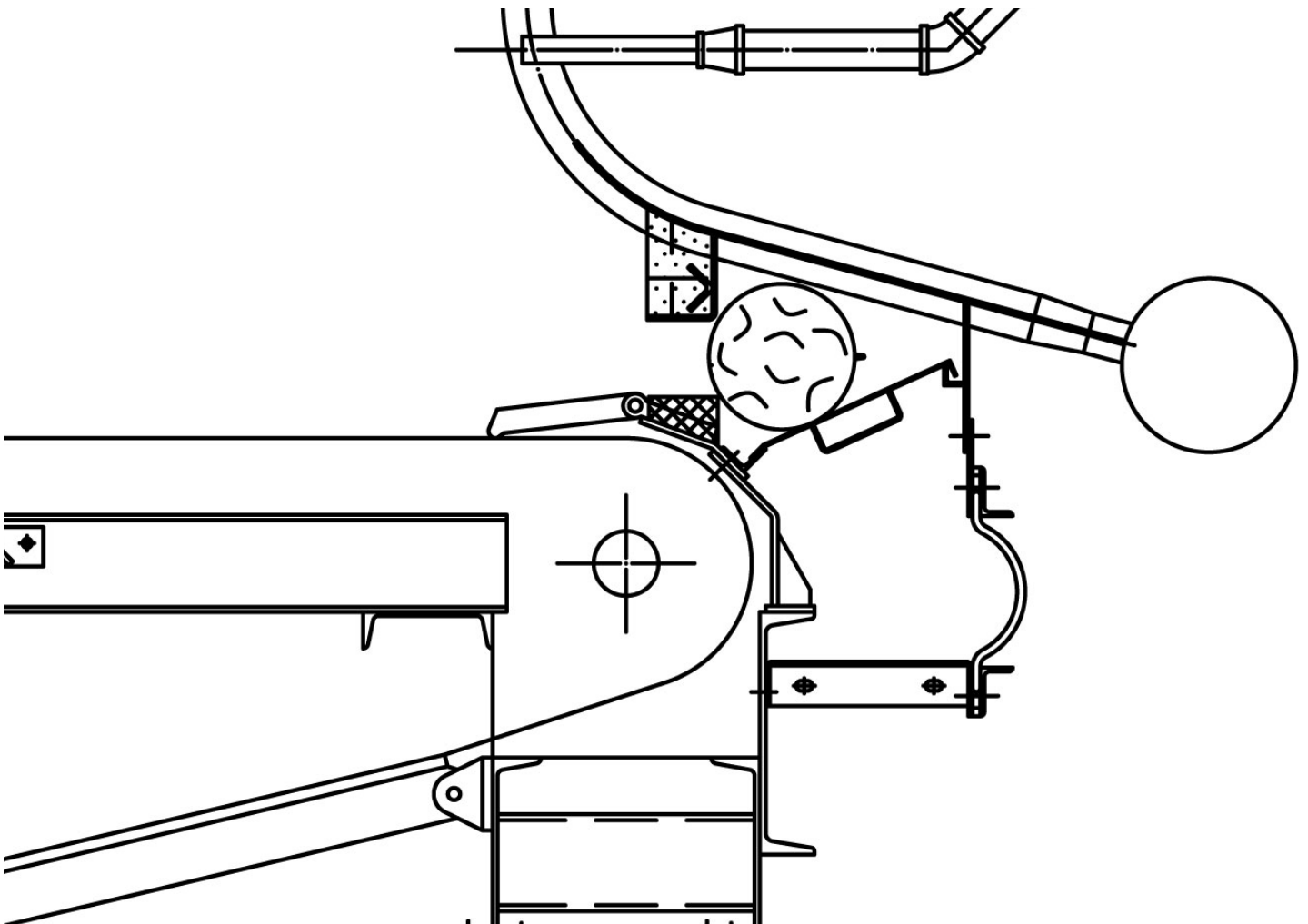
Seal the rear wall with a custom engineered air seal pillow.

The modern rear wall air seal design consists of a multi-layered cloth pillow. The cloth material is a combination of Stainless Steel mesh, woven fiberglass cloth and a high temperature insulating wool. The custom engineered pillow is held in place by a refractory laden angle. The angle is then clamped to the rear wall boiler tubes.

The fabric air seal pillow stretches the width of the boiler preventing air infiltration. The pillow also helps to prevent equipment wear at the rear of the boiler. The air seal pillow arrangement is custom engineered for top supported boiler applications.

Features & Benefits:

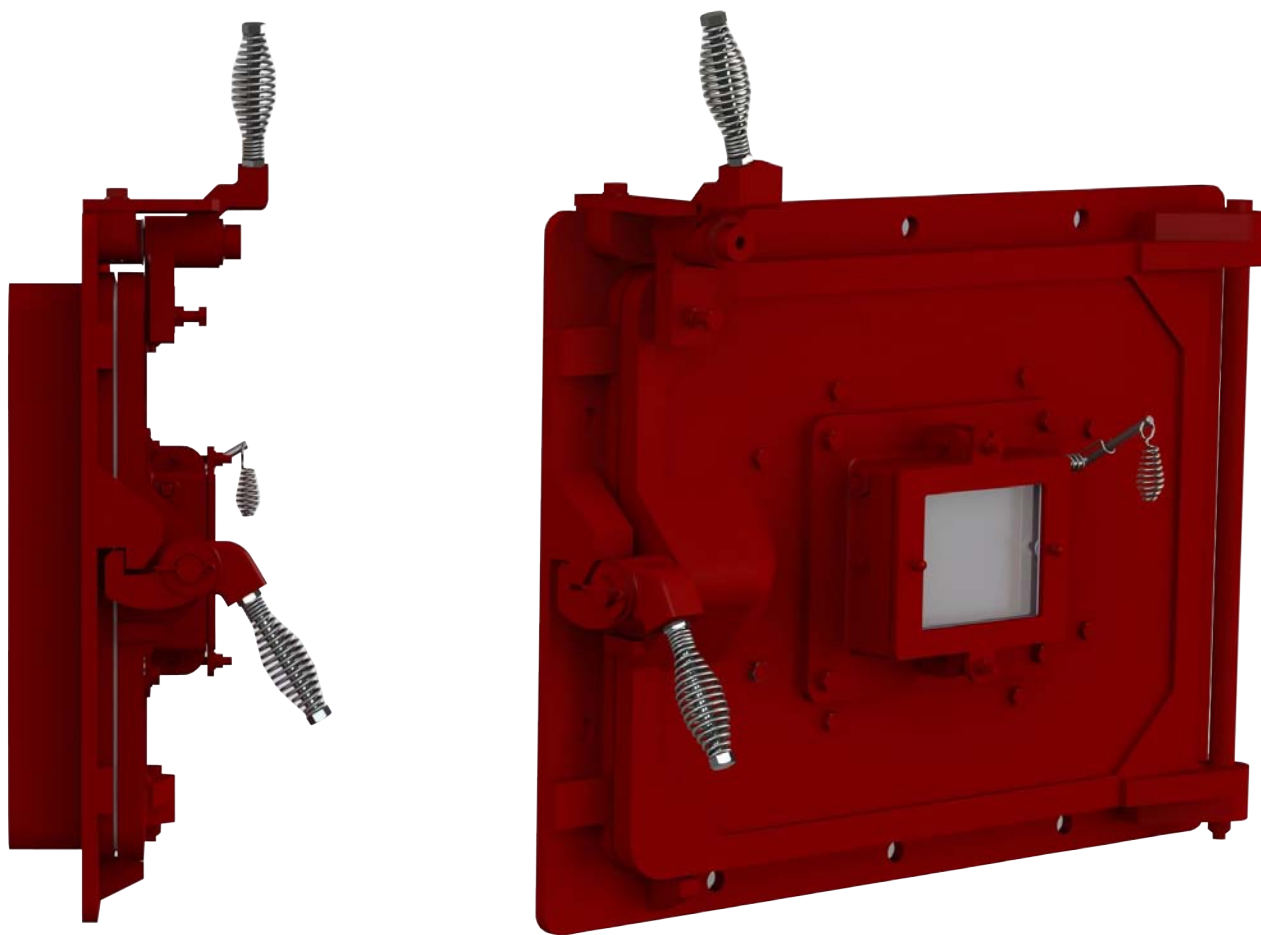
- Uses a combination of materials for strength and insulation
- Held in place by angle with refractory for more insulation properties
- Prevents air infiltration into the boiler
- Custom engineered for top supported boilers



Stoker Fire Doors

The door to effective operation and maintenance.

These fire doors are constructed of cast iron with a refractory lining on the fire side. The solid cast frame incorporates a continuous hinge pin and door support to prevent the door from sagging. A secondary safety latch, ensures that the door will remain closed should the furnace pressurize. Two sizes are available to allow ease of access in and out of the stoker during maintenance outages. The observation port is completely sealed and is furnished with high temperature safety glass.



Features & Benefits:

- Solid Cast Iron frame
- Continuous, one piece hinge pin
- Two latches provide positive closure
- Sealed observation door with safety glass
- Two sizes to accommodate all maintenance needs
- European Compliant version is available
- Seal ring insures tighter seal when door is closed eliminating tramp air

Grate Thermocouple Arrangement

Burn the fuel, not the grates.

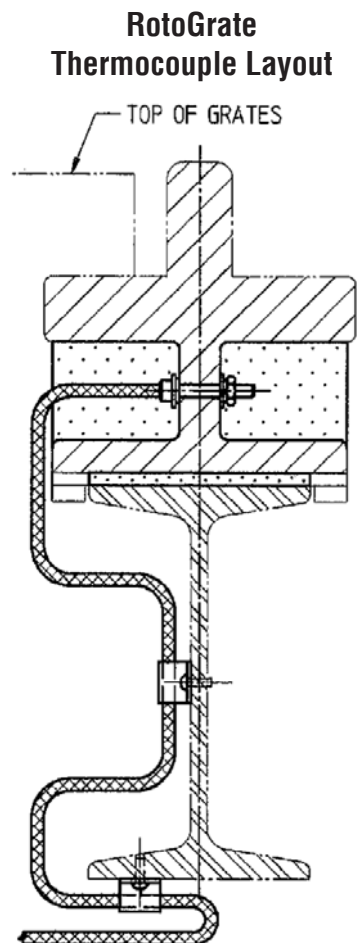
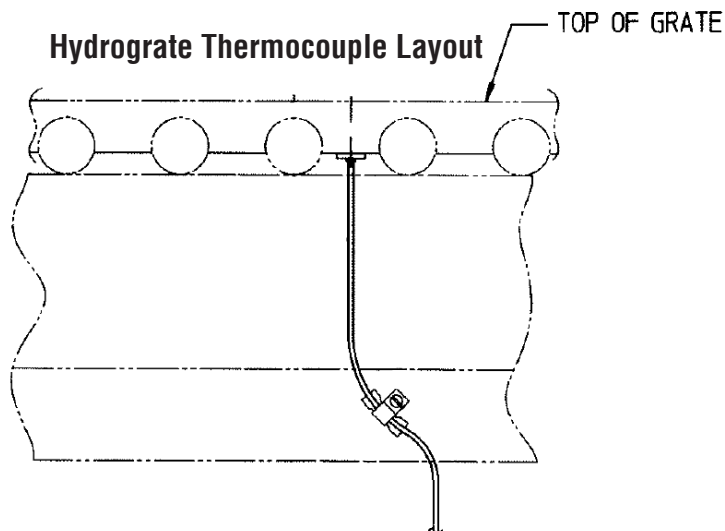
Thermocouples provide an extremely effective means to monitor temperatures of grate components while in operation. Changing ash bed conditions, co-firing/startup with burners and combustion air adjustments can be monitored and adjusted with confidence. Operators can avoid high temperature excursions and subsequent damage to grate components by being able to directly see the temperature of the grate. Thermocouples allow the use of data recording devices which can trend historical grate temperatures. The thermocouples can also be wired directly to a combustion control system for data recording.

Detroit Stoker Company thermocouples are rated for temperatures up to 2000°F. Each thermocouple is mounted to the underside of the grate, as shown in the sketches below. Once mounted they are then covered with refractory so the grate temperature is measured, not the combustion air temperature.

The quantity and location of each thermocouple is dependent upon the fuels and grate dimensions. Detroit Stoker Company Engineering determines the proper locations specific to each stoker. As part of the arrangement, Detroit Stoker Company also supplies all necessary fasteners and hardware, a NEMA 4 junction box and a mounting bracket for the junction box. The junction box is field mounted on the outside of the existing side support steel.

Features & Benefits:

- Direct information about grate temperatures
- Avoid costly heat damage
- See affects of air and fuel adjustments
- Monitor grate temps when firing a gas burner above
- Rated to 2000°F



Extension Front Arrangement & Flat Arch Refractory Pans

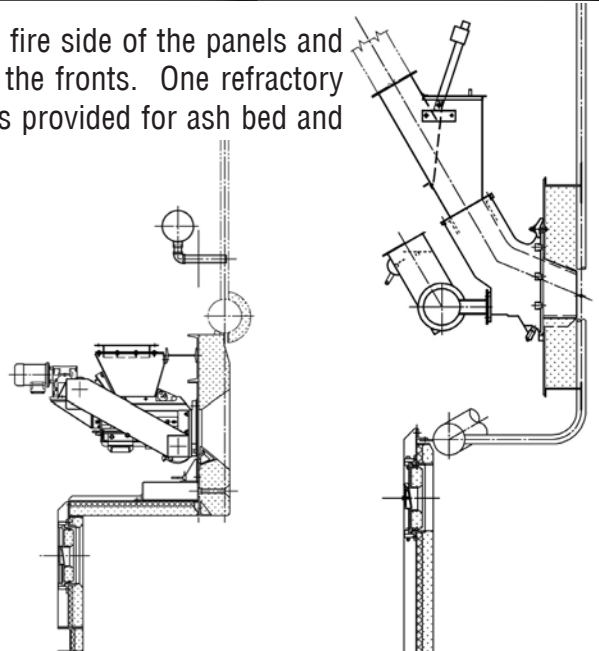
Keep tramp air out and dangerous sparks in with Detroit® Extension Fronts.

Stoker extension fronts take abuse from hot clinkers, ash piles and accidental fires. This extreme service often leaves its mark with warped fronts that leak tramp air into the furnace and let dust and sparks out. Extension fronts are often difficult to remove and reinstall for maintenance activities. New Detroit Stoker Company Extension Front Arrangements are constructed from heavy ¼" A36 Steel with a heavy column between each bay/module. A combination of insulating board and castable refractory are installed on the fire side of the panels and columns. This keeps the heat in the furnace and the paint on the fronts. One refractory insulated Stoker Fire Door for each bay/module of the stoker is provided for ash bed and maintenance access.



Features & Benefits:

- Straight metal with no air leaks
- Can be fitted to all Detroit® RotoGrate, Hydrograte & VCG Stokers or any other stoker
- Easily removed and reinstalled for maintenance
- Heavy ¼" A36 Steel construction
- Double insulated to keep the heat in the furnace



Insulate yourself from unnecessary heat damage with Detroit® Flat Arch Refractory Pans.

The refractory underneath the stoker flat arch reflects the heat from the fire back at the grate to ensure complete combustion of any residual carbon. Flat Arch Refractory Pans also insulate the flat arch from damaging and dangerous heat keeping the area safe for operators to perform their daily routines.

Features & Benefits:

- Constructed from ¼" Steel
- All welded construction
- Integral expansion slots for long refractory life
- Easy replacement

Sand Classifiers

Don't let the carbon go up the stack!

Sand Classifiers are used on wood fired stokers to separate the burnable char from the ash and sand. The classifiers separate the BTU-rich char for reinjection while the abrasive ash and sand are discarded to the ash system. Removal of the sand and ash reduces the wear on the reinjection nozzles and the boiler tube surfaces. Sand Classifiers are most often mounted below the dust collector hopper.

Inside the Sand Classifier, a drum made of Stainless Steel mesh is mounted at a slight angle. The ash from the boiler hopper is fed into the top end of the drum while the drum is rotated on an axle. The mounting angle causes the material to flow toward the discharge end of the drum. Since the burnable carbon is larger than the non-burnable ash and sand, it continues out the discharge end of the drum. The ash and sand fall through the mesh into a hopper and then empty into an ash conveyance system. The larger char particles collected at the discharge end of the drum are reinjected into the boiler.

Two sizes of Sand Classifiers are available, 18" and 27". Detroit Stoker Company Engineering and Sales determine the appropriate size and number of classifiers required based on the amount of fuel being fed into the boiler. Several different mesh sizes are also available and are dependent upon different fuel types and operating conditions.

Features & Benefits:

- Stainless Steel Mesh
- Variety of available mesh sizes
- Custom tailored to fit in available space
- Two sizes of drum diameter
- Inlet complete with bypass to sand hopper
- Designed to empty sand and ash into existing ash system



Overfire [Secondary] Air Control Systems

Turbulence is critical for efficient combustion.

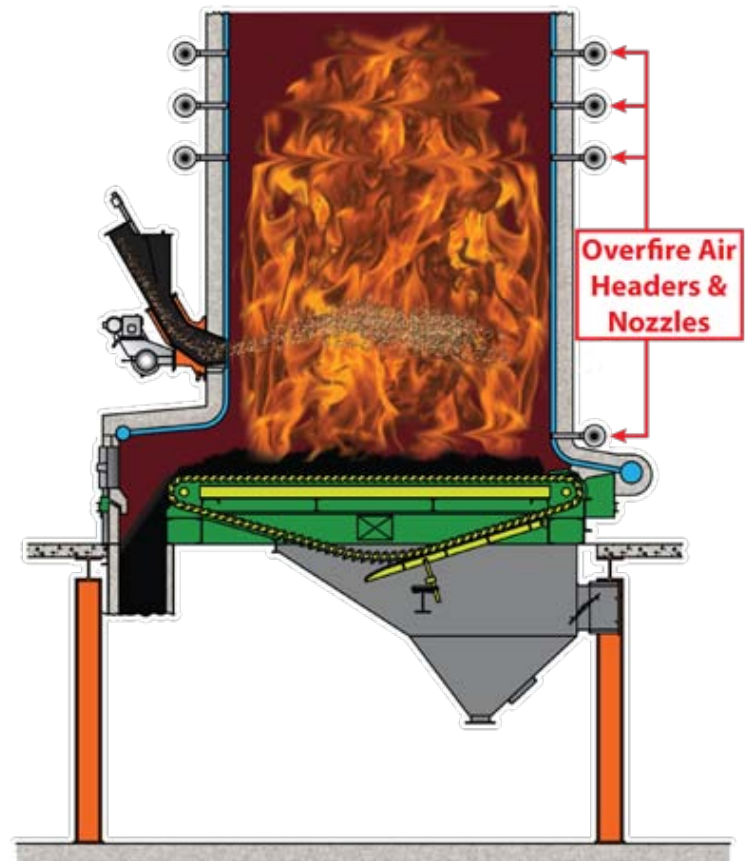
Detroit Stoker Company has been designing Overfire Air (OFA) Control Systems to complement Detroit® Stokers since 1898. Due to changes in emission considerations, OFA has increased from the original design of 10-12% up to as much as 50% (dependent upon fuel). Overfire Air was originally designed to just control particulate. OFA Control Systems now reliably rein in emissions, all while increasing overall combustion efficiency. OFA provides the needed turbulence for the mixing of volatiles with air for combustion.

Detroit Stoker Company's design of the Overfire Air Control System utilizes the proven configuration of front and rear furnace wall penetrations with each row of nozzles independently adjustable. Elevations of the nozzle rows and nozzle sizing are determined by Detroit Stoker Company Engineering and based on fuel characteristics such as sizing and moisture, input and particular firing conditions. Multiple levels of nozzles are typical. Nozzle diameter increasing with elevation allows the greatest flexibility for obtaining the best operating conditions for different loads. At boiler full load conditions the highest level of nozzles are most effective for emissions reduction due to increased flame height and furnace temperatures. At lower loads the lower level of nozzles becomes the most effective as the flame height and furnace temperatures decrease.

Features & Benefits:

- Fully ported Stainless Steel nozzles for maximum discharge efficiency
- Specifically tailored according to fuel, load, and operating conditions
- Front and rear wall preferred (side wall locations if site conditions demand)
- Multiple rows on front and rear walls, individually adjustable
- Control emissions

For emission predictions or guarantees before the installation of an Overfire Air Control System, Detroit Stoker Company can offer an Engineering Study and CFD Modeling to review the current operating data, fuel analysis, and expected emission target values. This would include data collection and recommendations through a summary report of findings. Contact Detroit Stoker Company Engineering for more information.



Flue Gas Recirculation [FGR] Systems

Lower NOx emissions without costly chemicals.

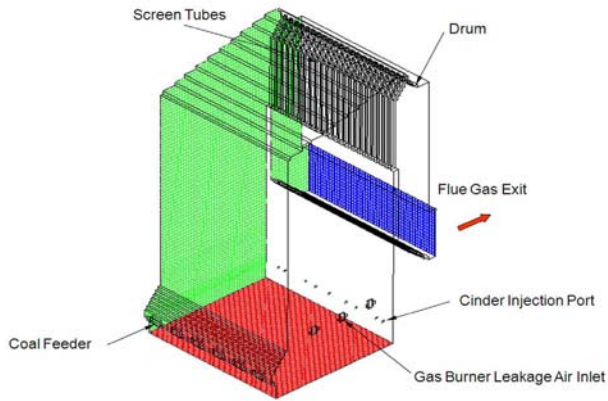
Flue Gas Recirculation for NOx control includes gas recirculation into the furnace with the Undergrate/Primary Air, Overfire/Secondary Air or both. The combustion air is mixed with 10-30% of the flue gas and is re-circulated. The inert gases (water vapor, carbon dioxide and nitrogen) make up the flue gas and take heat away from the combustion process and lower flame temperatures. The lower flame temperature and less oxygen inhibit the formation of thermal NOx.

In order to make any emission predictions or guarantees by modifying the existing Overfire/Secondary Air Control Systems, Detroit Stoker Company would need to review the current operating data, fuel analyses and expected emission target values. This could be done through an Engineering Study, which would include data collection and recommendations through a summary report of findings. The process to predict the performance after the addition of FGR can also be aided by a CFD (Computation Fluid Dynamics) process.

Features & Benefits:

- Significantly reduce NOx emissions
- Requires no chemicals or fuel alteration

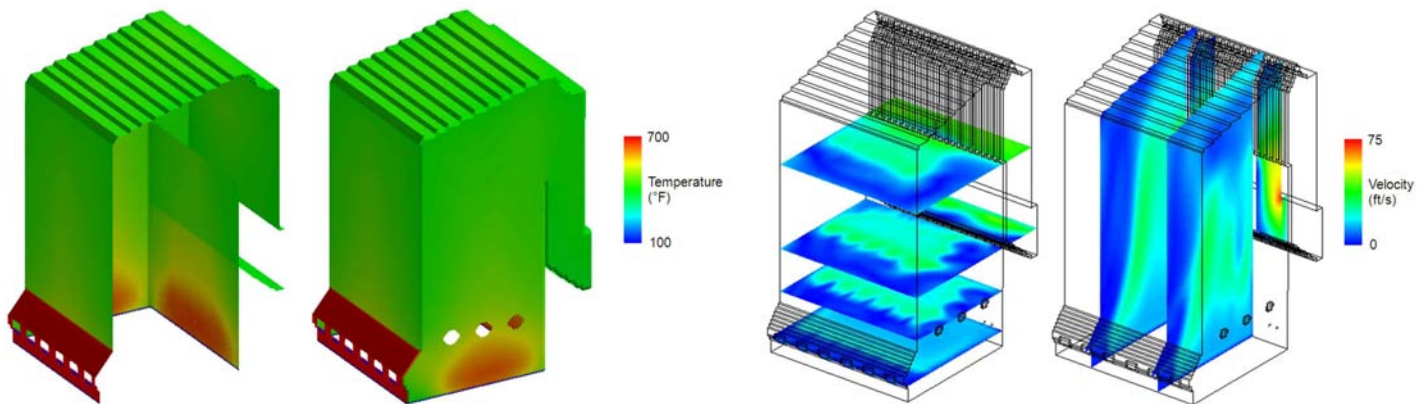
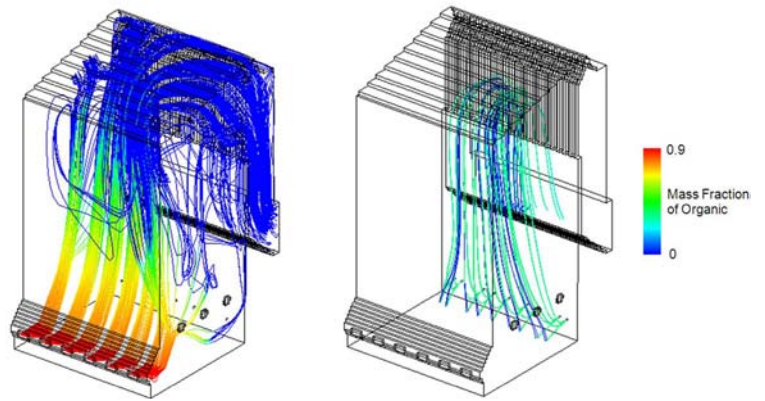
Computational Fluid Dynamics [CFD] Model



Detroit Stoker Company creates computer models of clients' industrial furnaces as part of Detroit Stoker Company engineering process design to improve system performance and reduce emissions. A technique known as Computational Fluid Dynamics Modeling is used to estimate flue gas properties within a unit and to assist in determining the design and operation of Undergrate/Primary and Overfire/Secondary Air systems to help characterize proper emission controls and performance improvements. Once constructed, the computer model can be modified to estimate the effects of changes in design and operating conditions.

In a typical project:

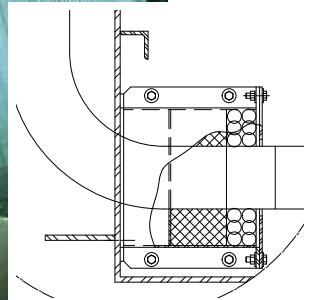
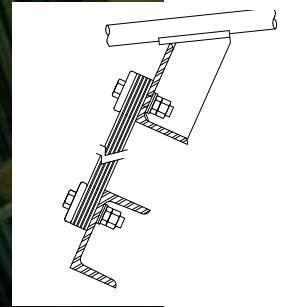
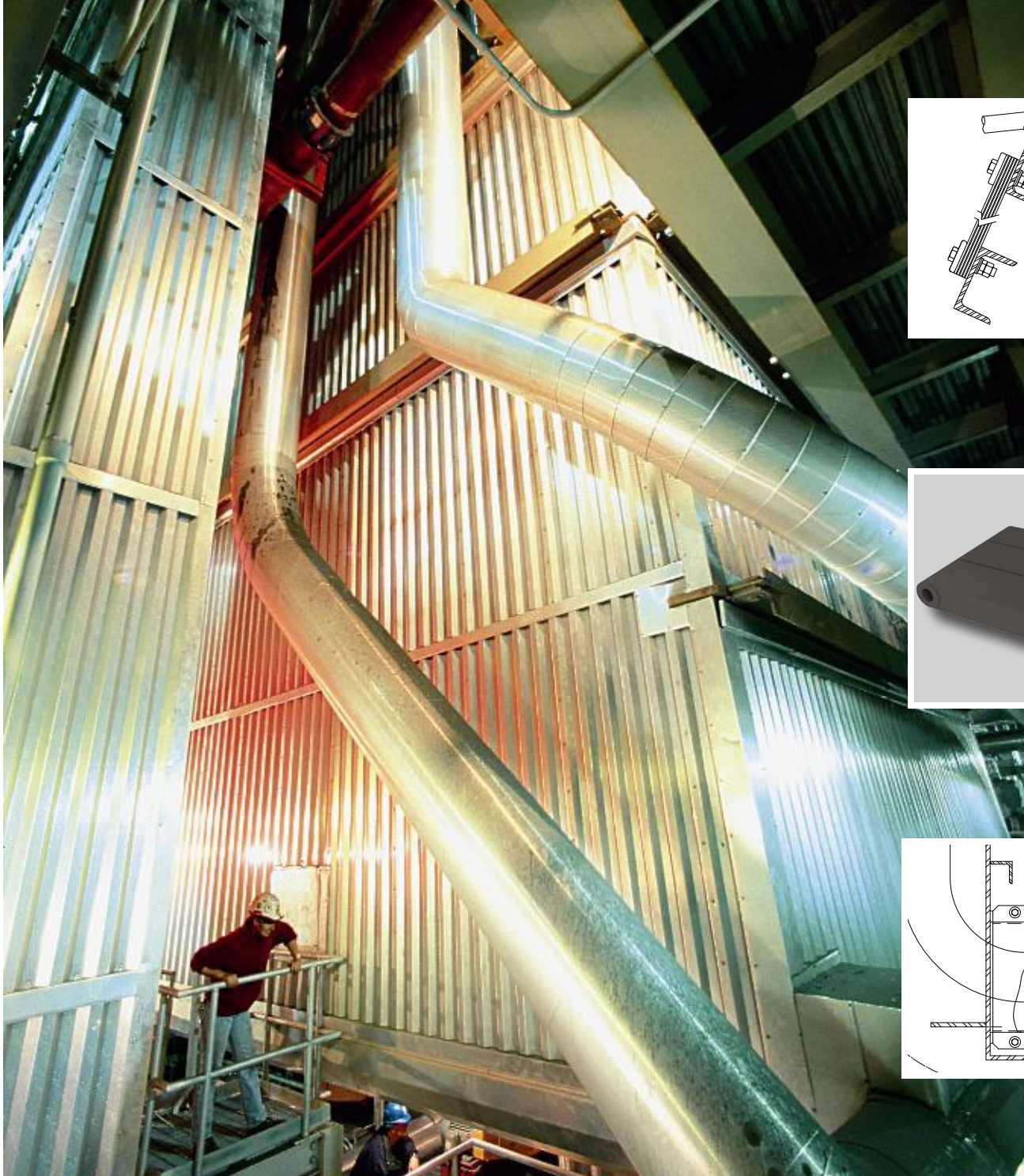
- Client's unit is first modeled without design changes or operating changes
- Baseline temperature, flow behavior, and flue gas conditions are determined
- Model simulating new Overfire/Secondary Air injection is performed
- Overfire/Secondary and Undergrate/Primary Air configurations are adjusted to optimize flow behavior and flue gas conditions
- Changes to baseline emission results are compared
- Boiler dimensions, operations data & mass and energy input and output data are supplied by client for evaluation



Grate Components // Detroit® RotoGrate & Hydrograte Stokers

Grate Components //

Detroit® Hydrograte Stokers



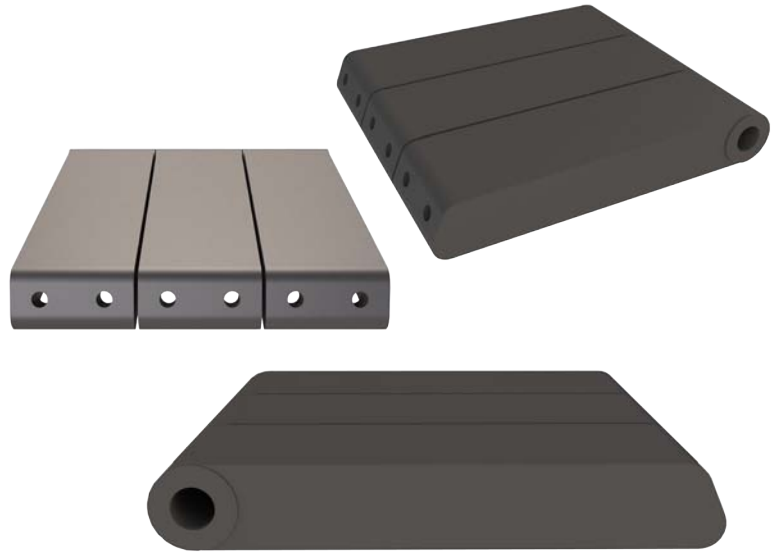
Detroit® Hydrograte Rear Tuyeres

Positively attached design gives positive results.

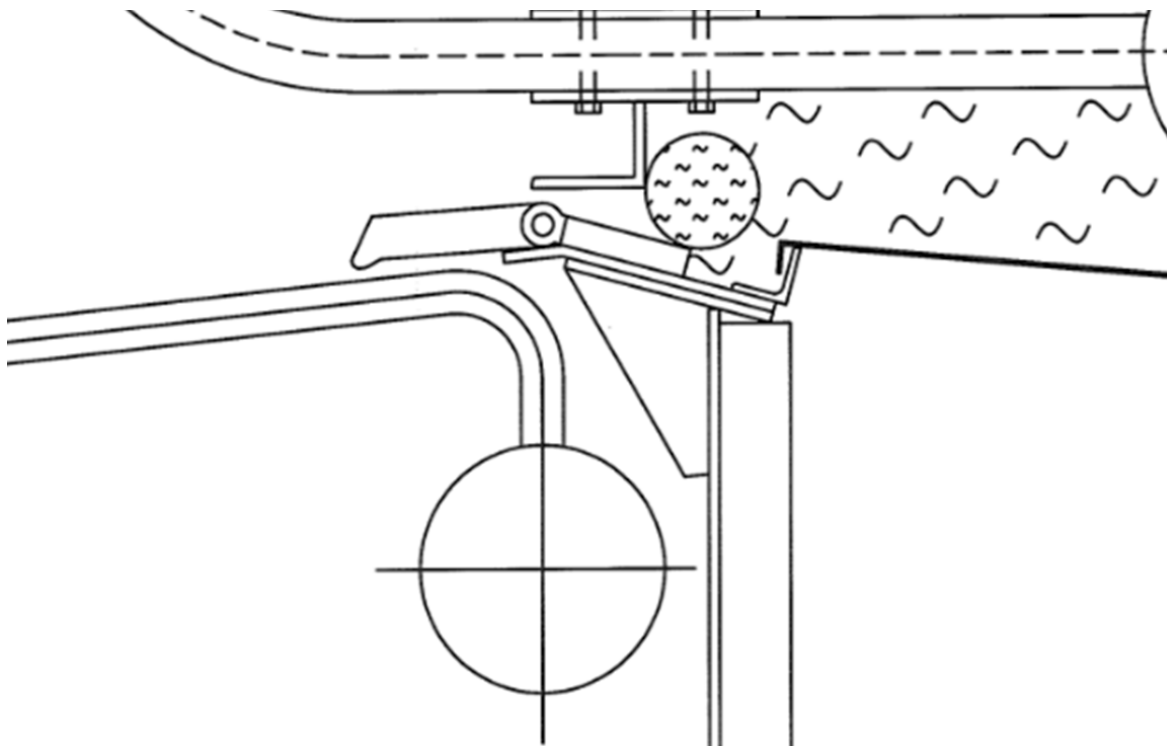
The Detroit® Hydrograte Rear Tuyeres keep fuel and debris from lodging at the rear of the vibrating grate and allow controlled amounts of combustion air through for cooling. Cast Ductile Iron and Stainless Steel options are available to fit any operation. The hinged design utilizes fabricated supports and Stainless Steel hinge pins for easy installation, consistent operation, and no more lost tuyeres!

Features & Benefits:

- Positively attached hinged design
- Heat Resistant Ductile Iron or Stainless Steel tuyere material available
- Prolonged operation ensured by Stainless Steel hinge pin
- Hinged tuyeres float with the grate bars
- Eliminates lost tuyeres



The new arrangement is shown on the following sketch:



Cast Stainless Steel Inner Seals

No contact means no wear and no jams.

The figure shown below illustrates Detroit Stoker Company's Cast Inner Seal Arrangement. This arrangement is standard on all new air cooled grates being built. We have adapted the design and developed patterns to install this arrangement on existing water cooled grates.

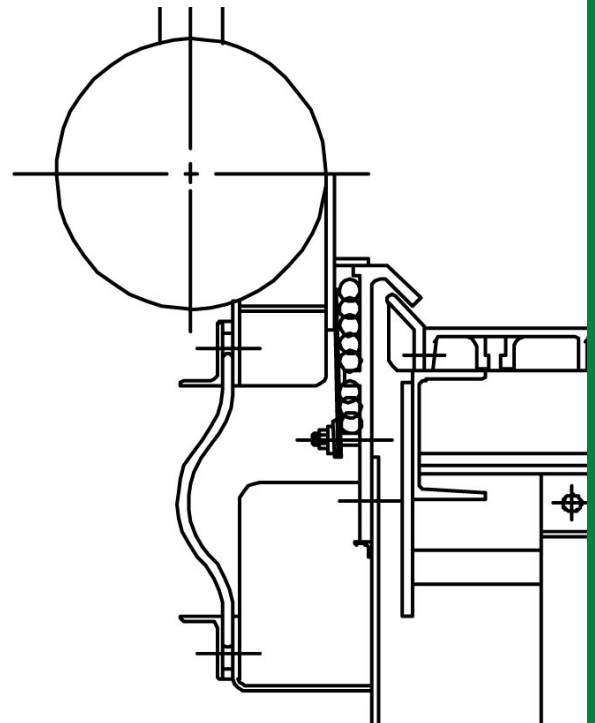
The new arrangement begins with an inner side seal casting that bolts to the vibrating frame as well as an overlapping side seal casting that bolts to the stationary frame. Both castings are ASTM A297, Grade HH, Type 2 Stainless Steel. This material is ideally suited for applications requiring both heat and abrasion resistance. Stainless Steel sheeting is next attached to the side seal casting. This sheeting can flex with the boiler/stoker expansion completing the inner seal arrangement.

Braided ceramic rope is then used to pack the area between the existing header weldments and the new side castings. Detroit Stoker Company provides the Stainless Steel flat bar to be field welded to the tops of the castings to hold the rope packing firmly in place. The existing stoker to boiler fabric seal can also be reused with this arrangement.

Since the castings are not in contact as the grate vibrates they do not experience the wear observed on the older seal design which utilized 'T'-bars. In addition, because the air seal is being made above the grate surface and at an inclined angle, this seal design is much less susceptible to being jammed and not allowing tramp materials through the seal. This has been found to be of great value at installations where numerous rocks are entrained in the fuel supply.

Features & Benefits:

- New better design
- Stainless Steel, heat and abrasion resistant castings
- Can reuse existing stoker to boiler fabric seal
- Less susceptible to jams since air seal is above the grate surface



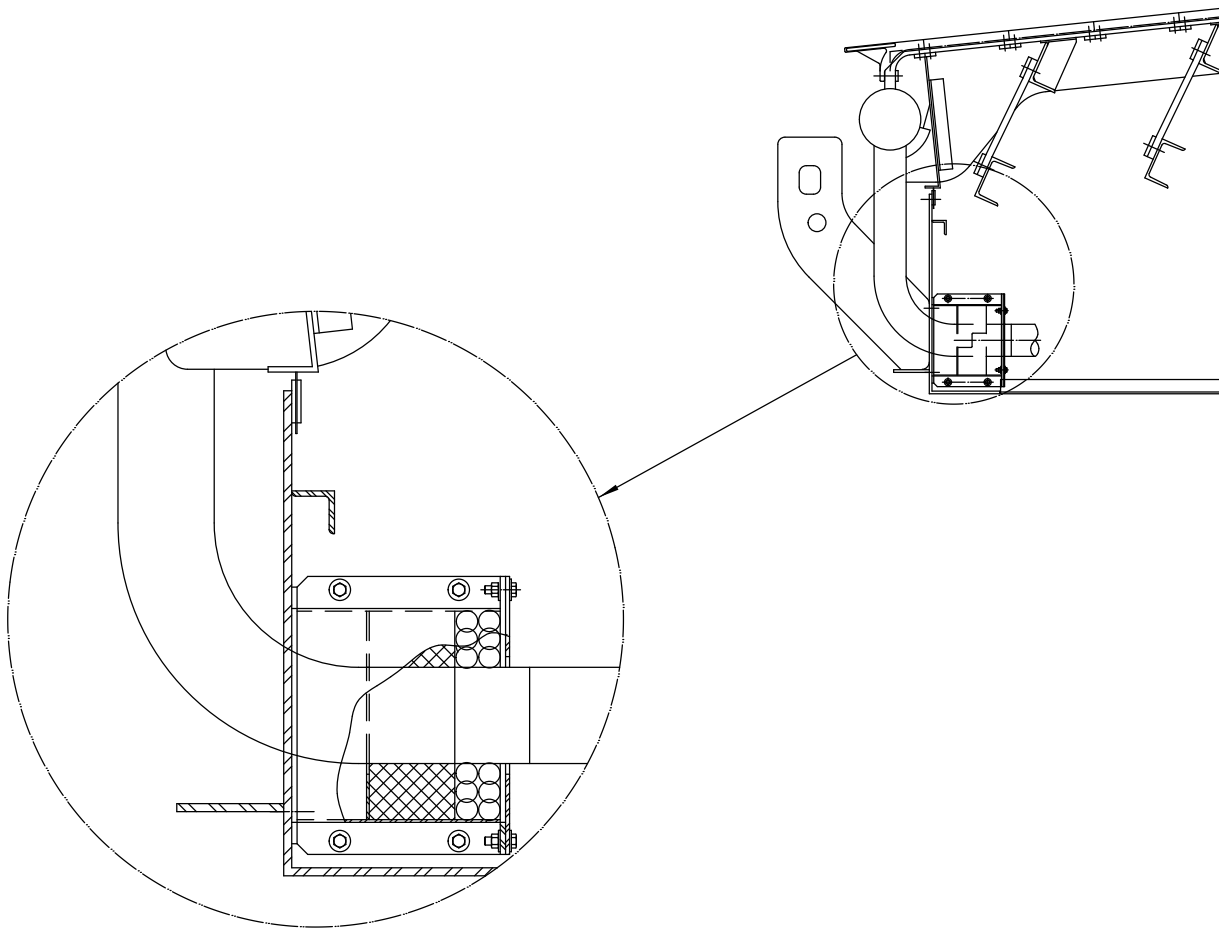
Feedwater Tube Seal

Keep tramp air out of the undergrate with a Feedwater Tube Seal.

The Feedwater Tube Seal prevents tramp air from entering the undergrate. This tube seal is a three part system and is comprised of:

- A fabricated ASTM A36 carbon steel enclosure assembly
- Fiberglass rope
- Multi-fabric stuffing

The Carbon Steel enclosure assembly comes in two halves for easy installation over the feedwater tube. Inside the Carbon Steel enclosure, for added protection and insulation, fiberglass rope and multi-fabric stuffing is applied.



Features & Benefits:

- Two piece assembly allows for easy installation over feedwater tube
- Three piece system works together for ultimate sealing and protection
- Keeps tramp air out of the undergrate

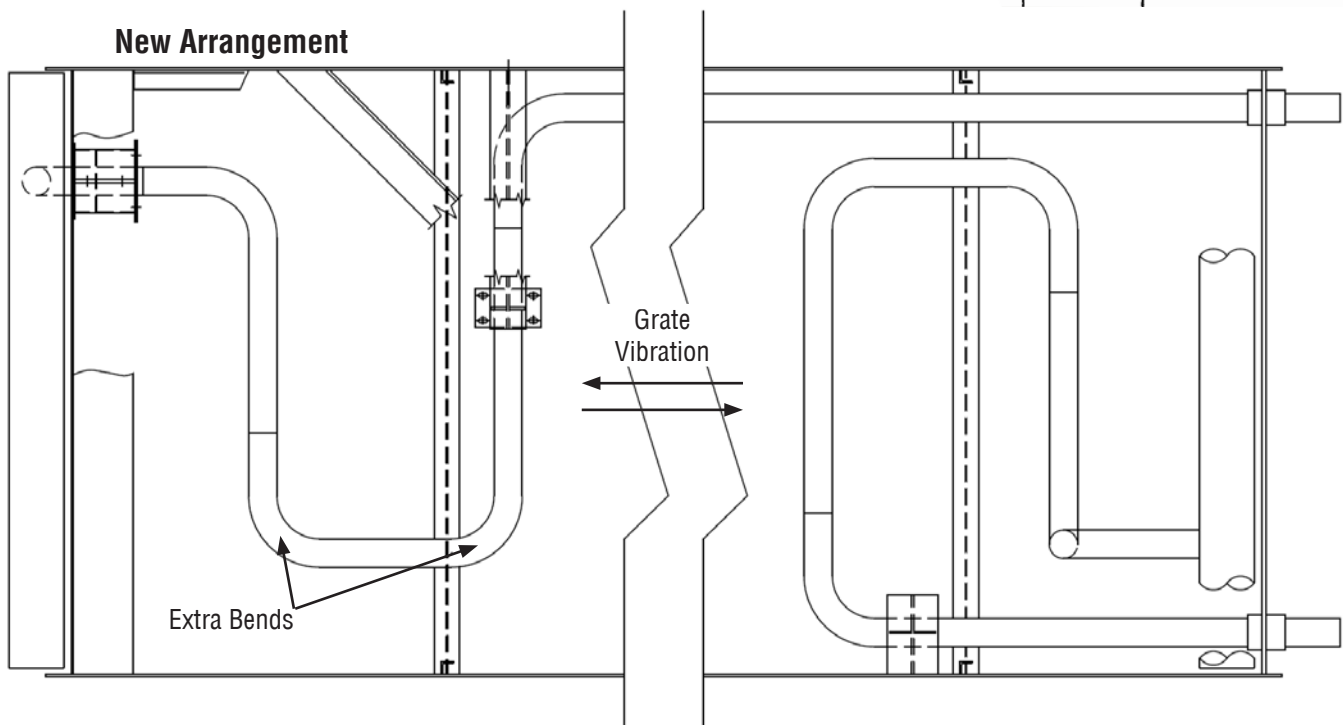
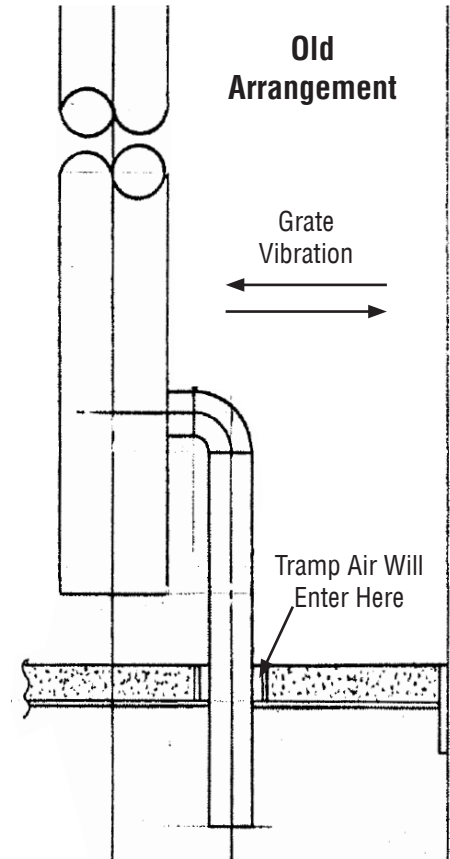
Internal Feedwater Tubing Vibration Arrangement

Upgrade and gain the safety benefits from the Internal Feedwater Tubing Vibration Arrangement.

The Feedwater Tubing Vibration Arrangement allows for better sealing and stops vibration transfer. Without the Feedwater Tubing Vibration Arrangement the inlet and outlet pipes for the header enter and exit perpendicular to the direction of vibration. To allow free movement of the inlet and outlet pipes, the hole around the inlet and outlet pipes must be a bit larger than the tubes themselves. This gap around the tubes allows tramp air to enter the undergrate, which is undesirable. With the Feedwater Tubing Vibration Arrangement the pipes enter and exit in the direction of the vibration. This allows for better sealing as close tolerances can be observed and tube seals can be added. In the tubing arrangement extra bends are added to the feedwater tubes so unwanted vibration is not transferred. This tubing is internal of the stoker stationary frame for added safety.

Features & Benefits:

- Pipes enter and exit in the direction of vibration
- Extra bends in feedwater pipe won't allow unwanted vibration transfer
- Better sealing capabilities with pipes entering and exiting in the direction of vibration
- Internal design for added safety



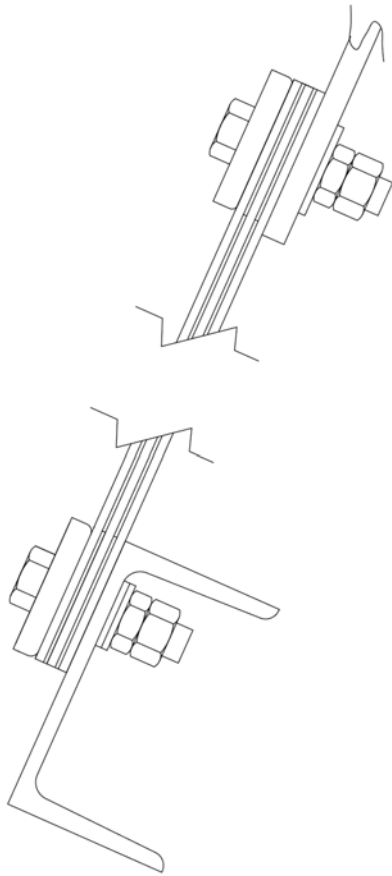
Flex Strap Upgrade

Go from three flex straps to five flex straps.

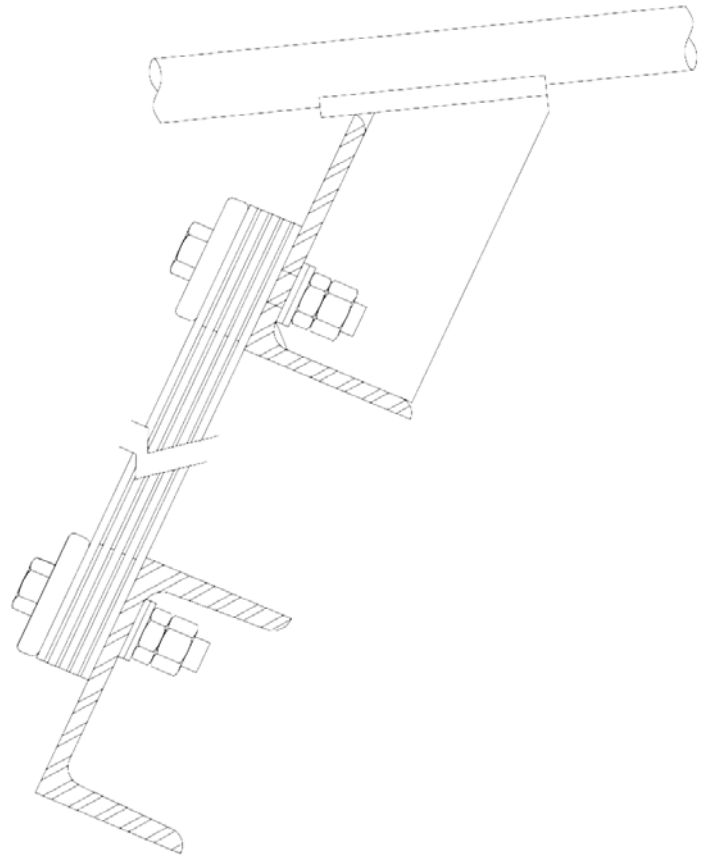
Upgrade from the three flex strap configuration to the five flex strap configuration. The previous configuration consisted of three 3/16" thick annealed Stainless Steel straps. The upgraded configuration consists of five 1/8" annealed Stainless Steel straps. The annealed Stainless Steel straps are perfect for undergrate air temperatures of 300°F and greater, allowing for a higher temperature tolerance. For undergrate air temperatures below 300°F heat treated and tempered hot rolled steel straps are available. Upgrading from three to five straps means less fatigue on the straps which equals a longer life.

Features & Benefits:

- Stainless Steel allowing for higher undergrate air temperatures
- Hot Rolled Steel allowing for lower undergrate air temperatures
- 3 straps to 5 straps allowing for less fatigue and longer strap life



Previous Three Strap Configuration



New Five Strap Configuration

Grid Tube Beef Up & Grid Tube Attachment

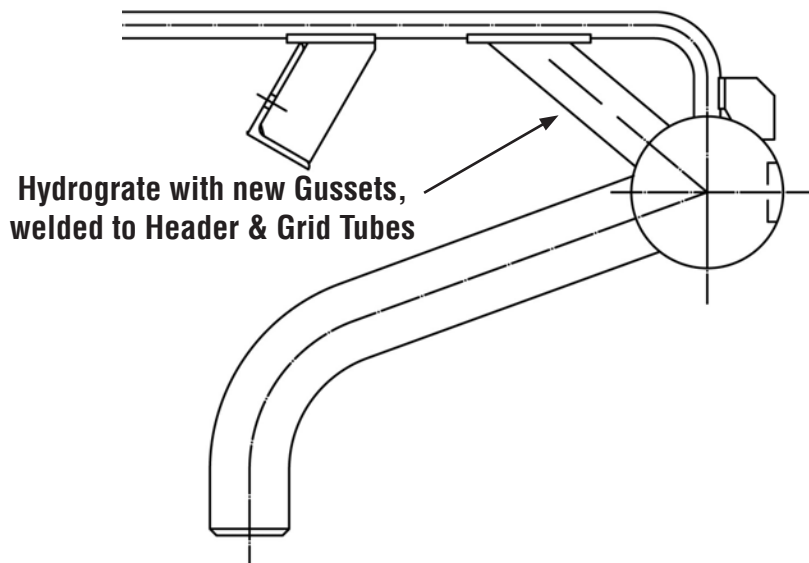
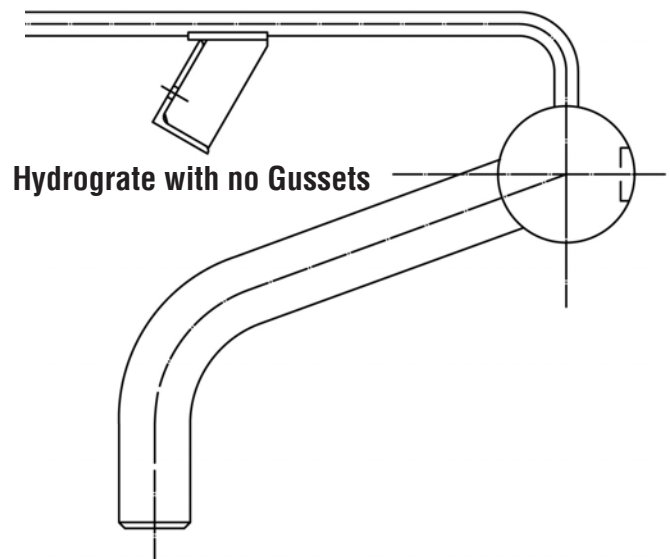
Beef up your grid tubes with grid tube gussets.

The Grid Tube Beef Up & Grid Tube Attachment consists of additions to the rear header area of a Detroit® Hydrograte Stoker. The addition consists of installing gussets from the rear header to the grid tubes. The gusset is made up of a stiffener and a saddle. With these gussets installed the rear headers will now have additional support via the grid tubes and the new stiffeners.

The stiffeners and saddles are made of 3/8" thick A36 carbon steel plate. After the gussets are installed the rear headers are stress relieved with a heat treat process.

Features & Benefits:

- Adds additional support to the headers
- Constructed of A36 carbon steel





Grate Components // Detroit® Hydrograte Stokers



Grate Components //

Detroit® RotoGrate Stokers

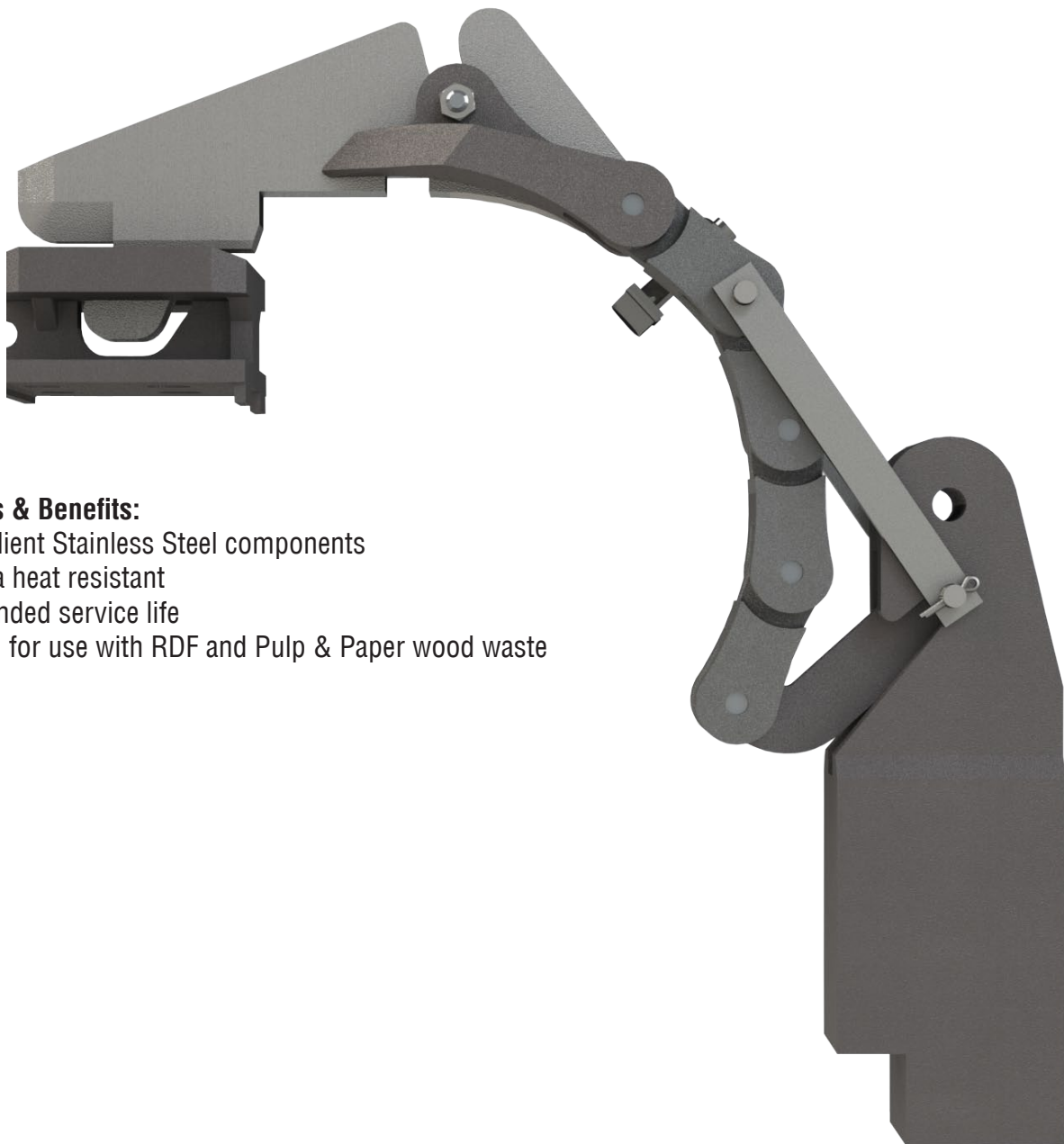


Stainless Steel Grate Guides

If you can't take the heat, switch to Stainless Steel.

Grate Guides protect the Detroit® RotoGrate Stoker's front end components by keeping the grate bars closed as they pass around the grate shaft. Keeping the grate bars closed halts excessive amounts of tramp air from passing through. Stainless Steel Grate Guides resist damage from hot clinkers, large piles of fuel and have a substantially longer service life. All this adds to the efficient long term operation of your Detroit® RotoGrate Stoker.

The Stainless Steel components on the Grate Guides include the Grate Guide retainer and all the fasteners.



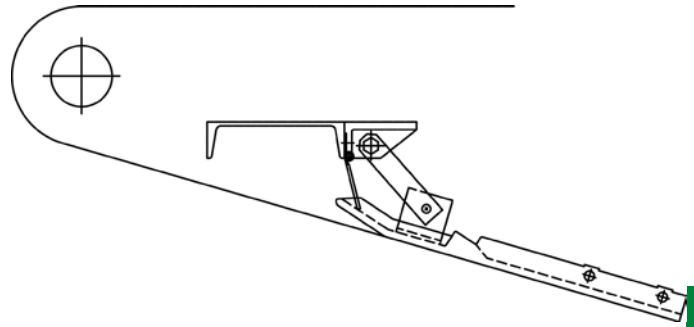
Features & Benefits:

- Resilient Stainless Steel components
- Extra heat resistant
- Extended service life
- Ideal for use with RDF and Pulp & Paper wood waste

Lower Front Air Seals

Simple, heavy and effective.

The Lower Front Air Seals on a Detroit® RotoGrate Stoker are another line of defense against air leaking around the front grate shaft of the stoker. Upper and Lower Front Air Seals allow the ash to cool before passing over the front of the grate. The new style Lower Front Air Seals are constructed of heavy Cast Iron which eliminates the need for counterweights. They are easy to install and provide flawless service when installed correctly. The spring loaded side seals of the old design have been replaced with a one piece fabrication that bolts rigidly to the Cast Iron of the air seal. These side seals keep the air from passing between the bays of grate bars.



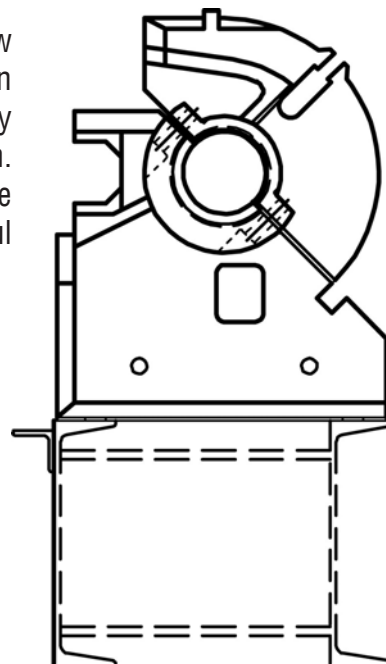
Features & Benefits:

- Modular Cast Iron construction
- Heavy integral weight keeps pressure on the grate bars
- Increased thickness for wear ability
- Avoids use of counterweight
- Fabricated side seals eliminate troublesome springs

Heavy Duty Front Bearing Support Channels

Solid construction protected by refractory.

These Heavy Duty Front Bearing Support Channels are the standard for new Detroit® RotoGrate Stokers installations. This design is based on the suggestion of a Detroit Stoker Company Field Service Consultant. After installation, refractory is installed on the ash side of the beam to protect it from hot clinkers and ash. Warping and heat damage is nearly eliminated making the replacement of grate wear components a breeze. This modification has proven to be very successful and is available as a retrofit onto existing Detroit® RotoGrate Stokers.



Features & Benefits:

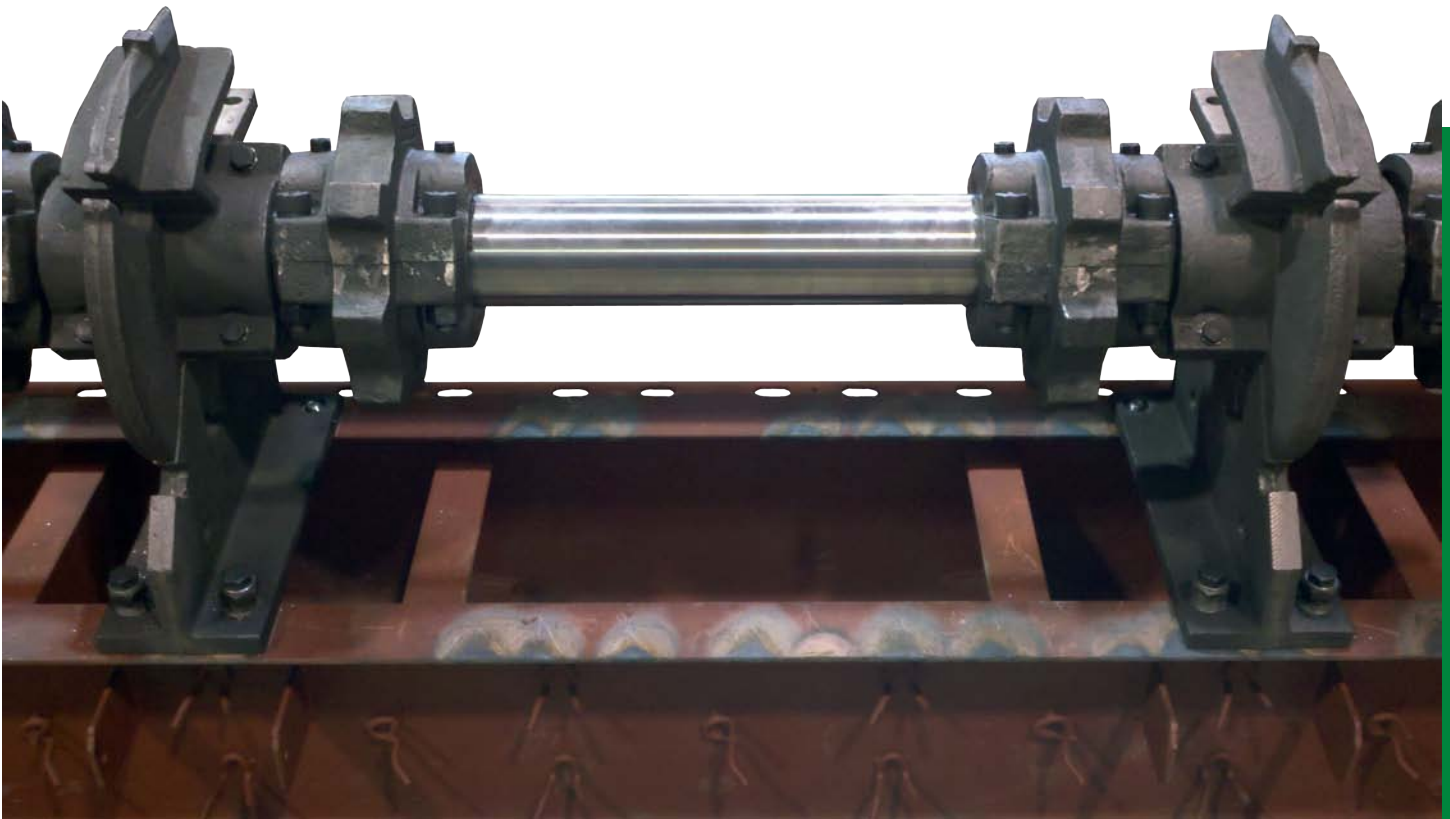
- Current standard for new Detroit® RotoGrate Stokers
- Refractory protects beam from heat damage
- Stiffeners keep beam square and speed grate shaft alignment
- Can be retrofitted to any Detroit® RotoGrate Stoker



Hardened Shafts & Bearings

Hard working stokers require hard shafts and bearings.

The Detroit® RotoGrate Stoker has fired a wide variety of fuels. Upgrades such as hardened shafts and bearings allow a wood or refuse fired stoker to last as long as the coolest running coal-fired stoker. Hardened shafts are available as induction hardened or for the toughest conditions, weld overlay that gets the bearing area surface up to 50 Rc. Hard bearings complement the hardened shaft and are available in alloys up to 40 Rc.



Grate Components // Detroit® RotoGrate Stokers

Features & Benefits:

- Decreased service interruptions for maintenance
- Increased operational life of shaft and bearings
- Bearing material is customized to specific fuel and conditions
- Various shaft options to meet exact needs

Carbon Bearings

Self lubrication and smooth operation.

Carbon bearings provide uninterrupted service for your Detroit® RotoGrate Stoker through their self-lubricating qualities. The graphite within these bearings provide the necessary lubrication so no grease is required. Without grease, maintenance costs decrease while service interruptions disappear. Unlike self-lubricating metal bearings with graphite plugs that provide lubrication at the expense of bearing surface area, our Carbon bearings provide continuous lubrication while supporting the shaft with the entire surface of the bearing. Detroit Stoker Company's Carbon bearings, in combination with our hardened shafts, provide performance fit for the toughest service.

Features & Benefits:

- Self-lubricating qualities
- No messy, troublesome grease required
- Continuous lubrication leading to lower maintenance costs

*Bearings are press fit and will require Rear Idler replacement.



Abrasion Resistant Top Support Rails

If the grate bars of the Detroit® RotoGrate Stoker are the lifeblood of the stoker, then the top support rails are the arteries.

The Top Support Rails must support the weight of the grate bars, the fuel, and the ash on the Detroit® RotoGrate Stoker while allowing the grate bars to travel freely. They are intended to wear with the grate bars for best operation and maintenance results. Detroit® RotoGrate Stokers that fire fuels with abrasive qualities (especially RDF, High Silica, etc.) or extra high temperature applications can benefit from Top Support Rails lined with special abrasion resistant material. These rails are machined to accept strips of the special abrasion resistant material along the wear areas. This option is complemented by the use of Stainless Steel grate bars. Customers in the Pulp and Paper and Waste to Energy sectors have benefitted greatly from these Top Support Rails.

Features & Benefits:

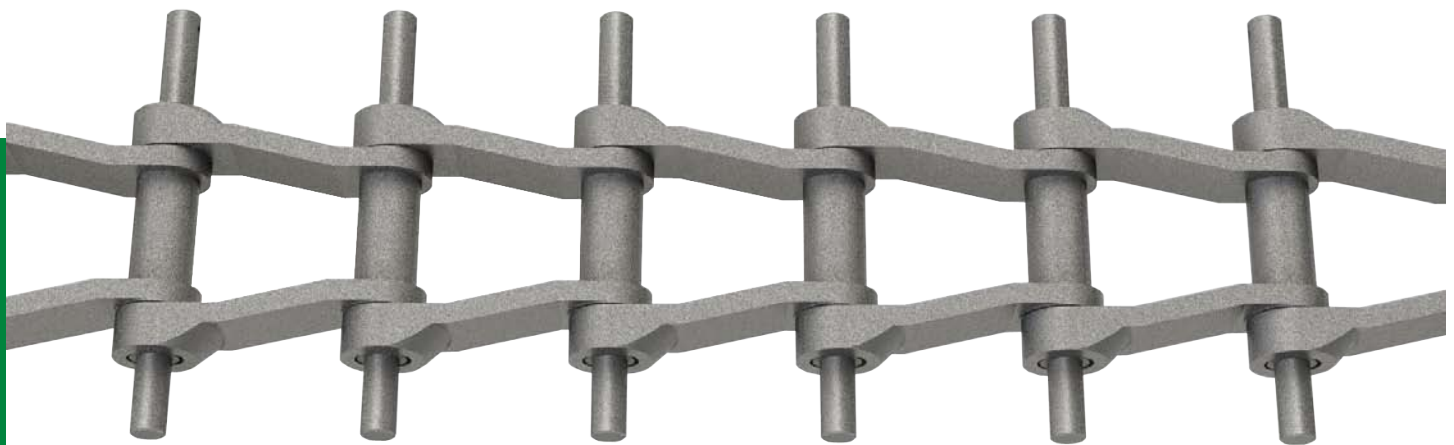
- Extra long life of Top Support Rails
- Resistant to abrasive fuels
- Extended service in high heat applications
- Abrasion resistant lined rails match the wear resistance of Stainless Steel grate bars



Detroit® High-Strength Grate Chains

Makes the Detroit® RotoGrate Stoker the STRONGEST link in your operation.

The Detroit® High-Strength Chain Link has been developed to exceed the demand for a chain with increased strength, resistance to thermal excursions and increased wear resistance. State of the art casting technology enables this link to incorporate all these great features and more! Constructed from a special heat-treated 4140 Steel Alloy, the links are held to exact strength and hardness properties. Pin wear is reduced and installation is facilitated by an integral pocket in each link that mates to the chain pin.



Features & Benefits:

- Specialized 4140 Steel Alloy, heat treated
- Superior to all Ductile Iron castings and forged links
- Resistant to temperature excursions
- Excellent wear resistance
- Limited stretch eliminates excessive chain sag
- Reversible for extended life
- Available with standard 5/8” or heavy duty 11/16” pin
- Performance at almost no additional cost

Property Comparison of Commonly Used Chain Links

Property	Pearlitic Ductile Iron	c1045 Forging	DSC High-Strength
Tensile Strength (psi)	80,000	82,000	188,000
Yield Strength (psi)	55,000	45,000	167,000
Elongation (%)	6	16	12
Hardness (BNH)	200-225	160-180	363-375

Grate Components // Detroit® RotoGrate Stokers

Detroit® Grate Bars

Detroit Stoker Company sets the bar on quality with Detroit® Grate Bars.

The innovative design of the Detroit® Grate Bar offers excellent performance both operationally and structurally. The unprecedented strength and durability in Detroit Stoker Company's grate bars translate directly to reduced maintenance and improved cost containment for your operation. Integral wear indicators allow you to get the most out of every bar!

Detroit Stoker Company's grate bars are available in three different materials:

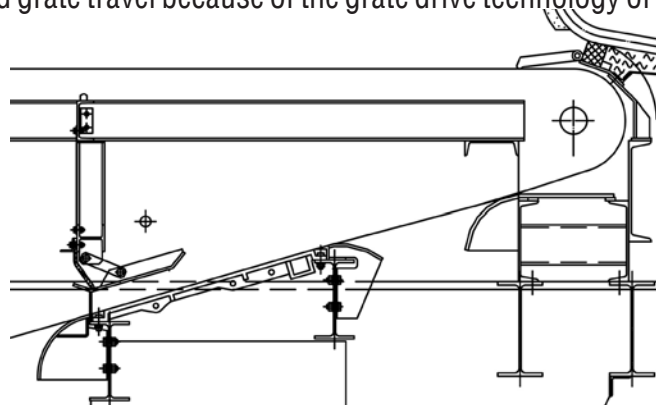
- Gray Iron – ASTM No. A319
 - Unsurpassed performance in coal fired applications
 - Continuous service up to 550°F
 - Can handle excursions up to 650°F
- Heat Resistant Ductile Iron – ASTM No. A536
 - Hi-Silicon Moly alloy
 - Excellent for low ash fuels or combinations of fuels
 - Continuous service up to 700°F
 - Can withstand excursions to 800°F
- HH Stainless Steel – ASTM No. A297
 - Severe duty bar for the most demanding conditions
 - Preferred for burning RDF and similar fuels
 - Continuous service up to 900°F
 - Tolerant of excursions to 1200°F

Detroit Stoker Company Sales & Engineering wants to assist you in selecting the best grate bar for your Detroit® RotoGrate Stoker! Contact us today!

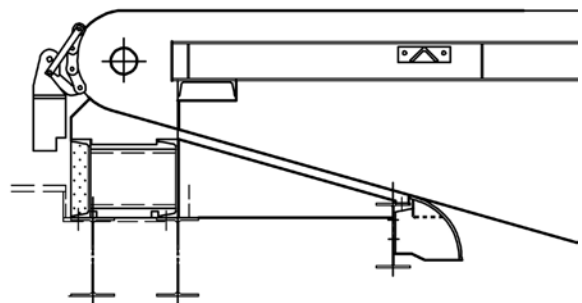
Detroit® RotoGrate Closure Plates

One jog backward can mean uninterrupted steam production forward.

The original Detroit® RotoGrate Stoker was limited to forward grate travel because of the grate drive technology of the day. Many customers wanted to jog the grate in reverse to free up occasional grate jams. With the introduction of the Detroit® Planetary Grate Drive, the reverse option became available and sought after. Since the grate was not originally intended to be operated in reverse, some design features inhibited reverse travel. The Closure Plates are necessary to close the grate bars to prevent snagging as they travel back down the rear slide rails. Similarly in the front, the grates are closed so they do not catch the bottoms of the lower front slide rails. With this addition, downtime has been significantly reduced in jam-prone operations. Closure Plates are for use only with the Detroit® Planetary Grate Drive and are not compatible with Detroit Stoker Company mechanical or hydraulic grate drives.



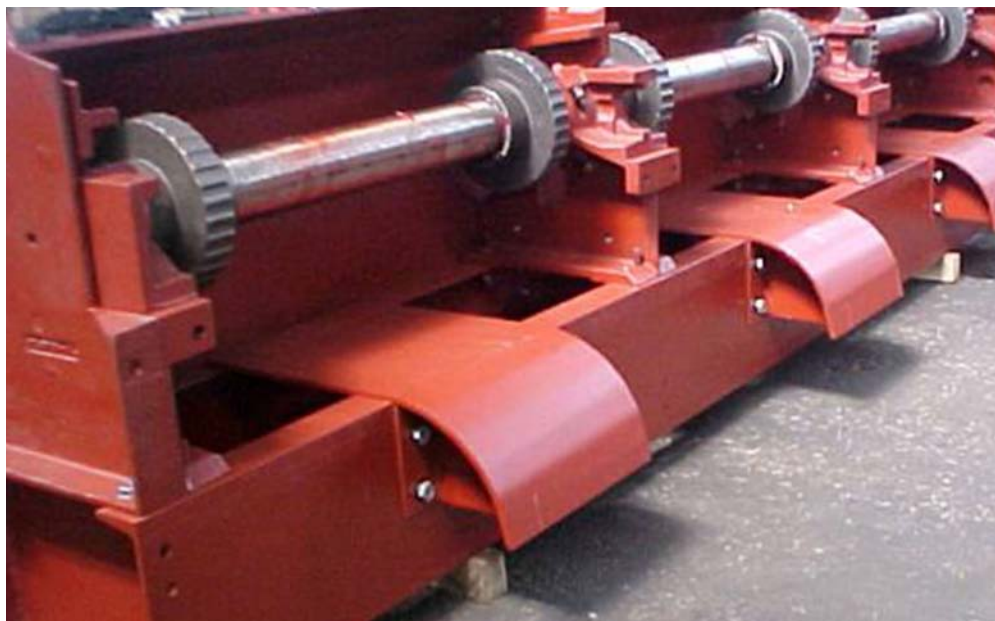
Sectional Side View of Closure Plates installed at the rear of a Detroit® RotoGrate Stoker.



Sectional Side View of Closure Plates installed at the front of a Detroit® RotoGrate Stoker.

Features & Benefits:

- Decreased service interruptions for maintenance
- Increased operational life of rear slide rails
- Extended service of the lower front slide rails
- Standard configurations simply bolt into place
- Installation can easily be added to regular maintenance schedules



Grate Components // Detroit® RotoGrate Stokers

Detroit® RotoGrate Stoker Rear Tuyeres

Positively attached design gives positive results.

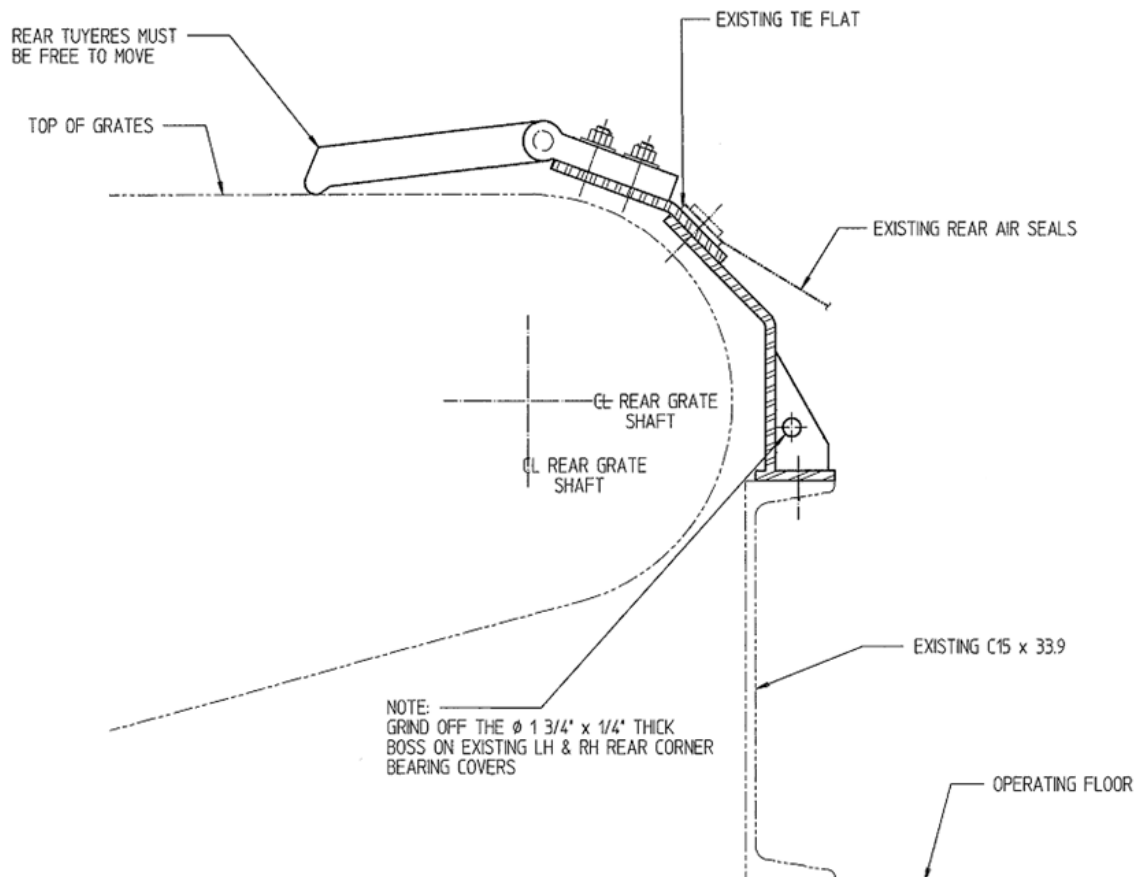
The Rear Tuyeres keep fuel and debris from lodging at the rear of the traveling grate and allow controlled amounts of combustion air through for cooling. Cast Ductile Iron and Stainless Steel options are available to fit any operation. The hinged design utilizes fabricated supports and stainless steel hinge pins for easy installation, consistent operation, and no more lost tuyeres!

Features & Benefits:

- Positively attached hinged design
- Heat Resistant Ductile Iron or Stainless Steel tuyere material available
- Prolonged operation ensured by Stainless Steel hinge pin
- Hinged tuyeres float with the grate bars
- Eliminates lost tuyeres
- Design allows for reverse jog of grates without popping tuyeres out



The new arrangement is shown on the following sketch:





Grate Components // Detroit® RotoGrate Stokers

Ash & Material Handling Systems //



Detroit® Vacpak Ash Receiving Equipment

The Detroit® VacPak combines separation and filtration in a single unit that occupies less space than conventional systems while using abrasion-resistant materials to minimize maintenance. Its ash receiver and separator remove heavy particles and fine, suspended particles are trapped by a filter which results in 99.9% separation efficiency.

Features & Benefits:

- Combines separation and filtration in a simple space saving unit
- Integrated design requires less maintenance and eliminates redundant ash discharge valves
- Operating efficiency of the mechanical blower is significantly greater than that of a steam exhauster
- Moisture condensing maintenance problems are virtually eliminated
- For quick installation it is supplied as a complete system, delivered with dust collector and blower units all pre-assembled
- Pulse jet type bags are easily replaced with side access doors or walk-in plenum
- System is rated to 20" Hg. vacuum
- Air locks are available on higher capacity units for continuous discharge of material
- Alternative filter media are available to meet a variety of operating conditions and temperatures
- Utilizes solid state control system logic



Detroit® Ultraflo Mixer

The Detroit® Ultraflo Mixer blends dry materials including ash and sludge as well as abrasive or granular materials with a kneading action that uniformly mixes them with water.

The Detroit® Ultraflo Mixer is Ideal for Mixing & Conditioning:

- Ash
- Sludge
- Dusty and abrasive materials
- Granular materials

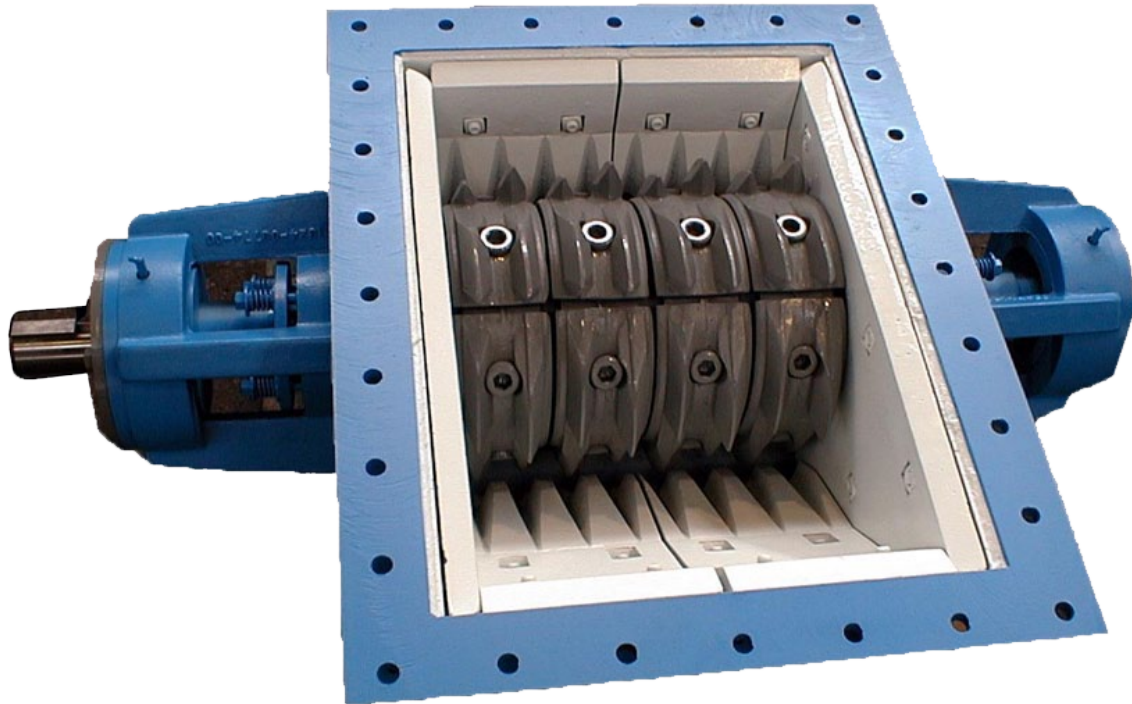


Features & Benefits:

- Complete mixing with controlled material flow and uniform wetting
- Totally-enclosed design allows for cleaner operation
- Dual-shaft paddle system
- Rugged construction with heavy-duty drive for reliable operations and low maintenance
- Stationary mixing trough - no noisy, rotating drum to leak and wear
- Positive conveyance and blending with minimal material build up on paddles
- Low-speed operation for minimal wear, low horsepower consumption
- Easy access for maintenance or removal of parts
- Paddles and/or mixing trough available with coatings and various construction materials
- Available in a range of sizes and models which can be designed to suit customer's specific requirements
- Consistent discharge of manageable material for process or disposal
- An easy retrofit for replacement of old drum-type conditioner/unloader or an existing mixer or pug mill
- Completely shop-assembled for simplified installation
- Optional accessory equipment, variations and specially-engineered adaptations are available

Detroit® Clinker Grinder

The Detroit® Clinker Grinder is built for hostile operating environments.



The Rugged Construction Consists of:

- Rigidly stiffened rolled steel housing
- Cast Ni-Hard lines the grinder enclosure, wear plates and grinder plates
- Grinder teeth are Ni-Hard cast and bolted for easy maintenance
- Crusher roll is supported by external flanged roller bearings
- Seals are designed to withstand continuous high temperature operation

While the grinder has been most often used in power plants to handle ash clinkers, it can also be used for a wide variety of other friable materials.

Detroit® Rotary Seal Feeders

Especially suited for abrasive and high temperature materials.

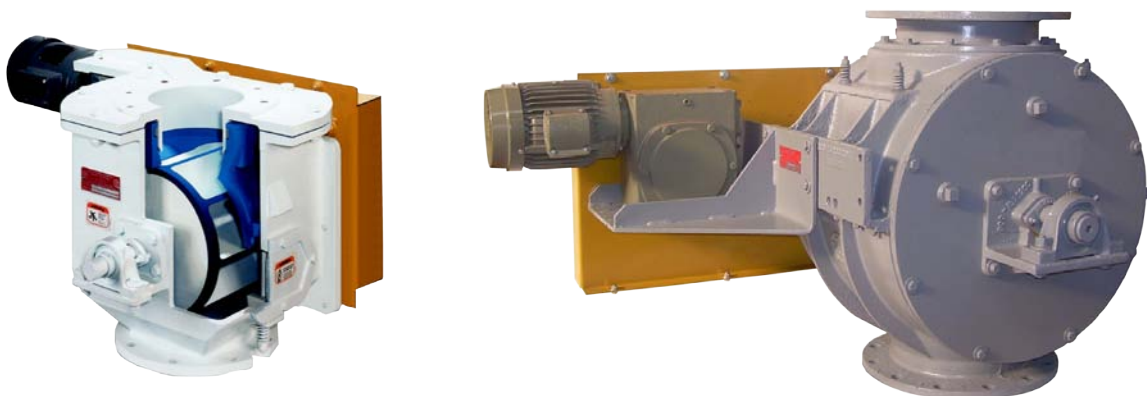
Features & Benefits:

- All cast iron construction
- Spring loaded tension bolts maintain a tight air seal in the rotor assembly
- Rotor has generous sized rotor pockets
- Removal of end cover plate permits access to rotor and rotor sealing assembly for easy maintenance
- Access openings are provided on the feeders for internal inspection
- Heavy-duty packing glands prevent gas or material leakage at the rotor shaft
- High-temperature packing
- Externally mounted, heavy-duty, self-aligning pillow block bearings
- Shear pin assembly located on the driven sprocket of the rotor shaft protects the drive mechanism against feeder jamming from foreign material
- A heavy metal guard with ready access to the drive
- Factory assembled, tested and shipped as a complete unit ready for installation
- Chain driven by a single reduction, right angle worm gear, totally enclosed, fan cooled motor



Detroit® Rotary Seal Feeders are normally installed in a vertical position. However, they may be installed at any angle up to 35 degrees from the vertical, provided they are orientated so that the rotor shaft remains in a horizontal plane. Please advise if the feeder is to be installed other than vertically.

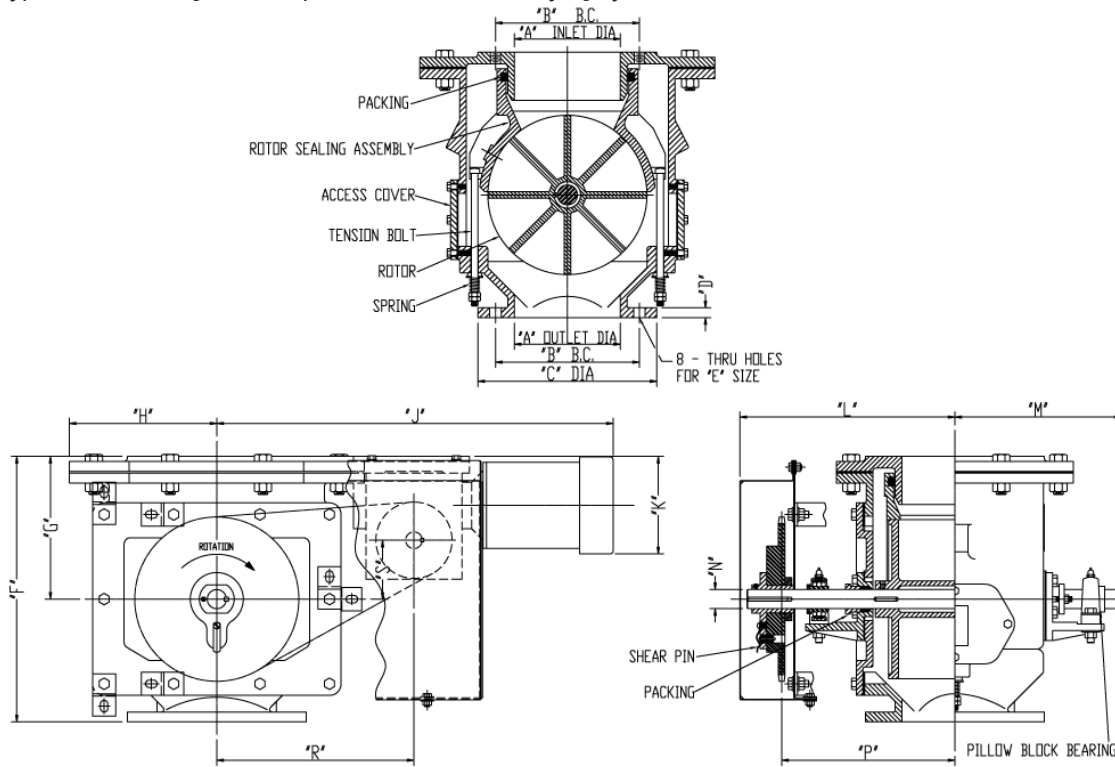
Sizes available from 6" through 14"



Detroit® Rotary Seal Feeders

Low Capacity - Detroit® 6", 8" and 10" Rotary Seal Feeders

Type A and Type AA for feeding to atmosphere or vacuum conveying system.



6", 8" & 10" Rotary Seal Feeder

Seal Feeder Size	Drive HP	Rotor Displacement Per Rev	Dimensional Data (All Dimensions In Inches)						
			"A"	"B"	"C"	"D"	"E"	"F"	"G"
6"	1/2	0.17 ft ³	6"	9 1/2"	11"	3/4"	3/4"	1'-5"	9 1/4"
	3/4								
8"	3/4	0.44 ft ³	8"	11 3/4"	1'-1 1/2"	3/4"	3/4"	1'-8"	10 3/4"
	1								
10"	1	0.66 ft ³	10"	1'-2 1/4"	1'-4"	7/8"	1"	2'-0"	11 3/4"
	1 1/2								
"H"	"J"	"K"	"L"	"M"	Ø "N"	"P"	"R"		
6"	9 1/2"	2'-4 1/2"	7 1/8"	1'-3 1/16"	11 3/8"	1 7/16"	11 3/4"	1'-1 1/2"	
8"	11 1/8"	2'-5 7/8"	7 1/8"	1'-4 1/4"	1'-9/16"	1 7/16"	1'-1 1/16"	1'-2 7/8"	
10"	11 1/4"	3'-23/32"	7 1/8"	1'-8 1/8"	1'-3 3/4"	1 15/16"	1'-6 1/8"	1'-9"	

Dimensions are the same for Type A and Type AA Feeders. The only difference is an 8-vane rotor for Type A and a 16-vane rotor for Type AA.

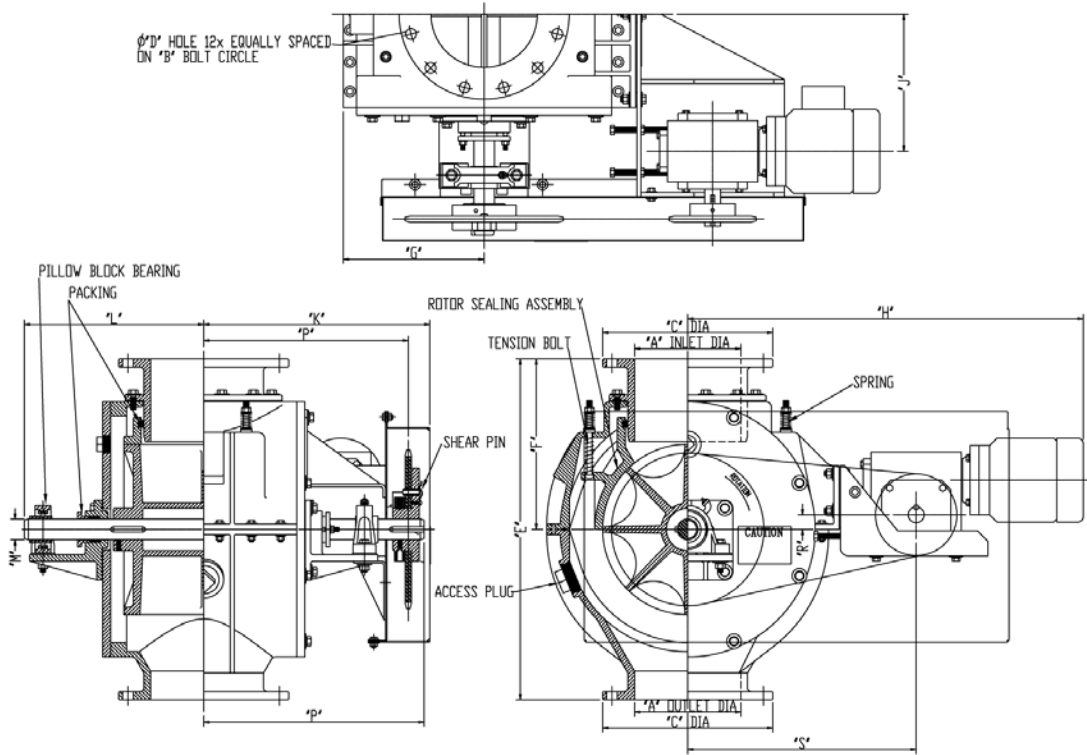
Rotor displacement is in cubic feet of material per revolution and is theoretical so an efficiency factor should be considered when establishing feeder requirements which will allow for the rotor pockets not completely filling as they pass the feeder inlet. This is a condition determined by rotor speed and to some degree, material size.

Ash & Material Handling // Detroit® Stokers

Detroit® Rotary Seal Feeders

High Capacity - Detroit® 10", 12" and 14" Rotary Seal Feeders

Type A and Type AA for feeding to atmosphere or vacuum conveying system.



10", 12" & 14" Rotary Seal Feeder

Seal Feeder Size	Drive HP	Rotor Displacement Per Rev	Dimensional Data (All Dimensions In Inches)						
			"A"	"B"	"C"	"D"	"E"	"F"	"G"
10"	1	1.0 ft ³	10"	1'-2 1/4"	1'-4"	1"	2'-8"	1'-4"	1'-1 1/4"
12"	1 1/2	1.5 ft ³	12"	1'-5"	1'-7"	1"	2'-10"	1'-5"	1'-2 3/4"
14"	2	2.25 ft ³	14"	1'-6 3/4"	1'-9"	1 1/8"	3'-1"	1'-6 1/2"	1'-3 7/8"
	"H"	"J"	"K"	"L"	"M"	"N"	"P"	"R"	"S"
10"	3'-1 1/8"	1'-0 7/8"	1'-9 1/4"	1'-4 7/8"	1 15/16"	1'-7 1/4"	1'-8 3/4"	1 3/8"	1'-9 1/2"
12"	3'-5 7/16"	1'-0 3/4"	1'-10 1/4"	1'-6"	2 3/16"	1'-8 1/4"	1'-9 3/4"	2 5/16"	2'-0"
14"	3'-6 7/16"	1'-1 3/4"	1'-11 1/4"	1'-7"	2 3/16"	1'-9 1/4"	1'-10 3/4"	2 5/16"	2'-1"

Dimensions are the same for Type A and Type AA Feeders. The only difference is an 8-vane rotor for Type A and a 16-vane rotor for Type AA.

Rotor displacement is in cubic feet of material per revolution and is theoretical so an efficiency factor should be considered when establishing feeder requirements which will allow for the rotor pockets not completely filling as they pass the feeder inlet. This is a condition determined by rotor speed and to some degree, material size.

Ash & Material Handling // Detroit® Stokers

Detroit® Double Flap Airlock

Maintaining the integrity of the seal.

The Detroit® Double Flap Airlock is an effective way to handle hot and abrasive materials which are fibrous and sticky. Detroit Stoker Company brings its extensive expertise in abrasive material handling to thousands of applications worldwide. The Detroit® Double Flap Airlock design provides the ultimate in long-term durability and reliability for any material handling need.

The Detroit® Double Flap Airlock can be installed on:

- CFB Boilers • Kilns • Storage Silos • Cooling Towers
- Dust Collectors • Gravity Feed Hoppers • Precipitators
- Classifiers • Pressure and Vacuum Conveyors
- Bulk Material Handling Systems

The flap valve provides even material flow across an air differential, similar to the rotary airlock. Even material flow is achieved by utilizing dual chambers that are timed to discharge alternately.

Valve Design Features:

- Constructed of high temperature and abrasion resistant materials for a rugged design
- Exclusive Detroit® wear resistant alloy seat and flap
- All cast body and internals – machined for consistency
- The valve's large removable access panel allows easy, in-place maintenance
- Full-throat design nearly eliminates material bridging in difficult applications
- The double flap design guarantees the seal is never broken during filling and emptying cycles

Industry Applications:

- Pollution Control
- Recycling
- Pulp & Paper
- Mining
- Incineration
- Bulk Powder Solids



Original Equipment Manufacturer //

Replacement Parts

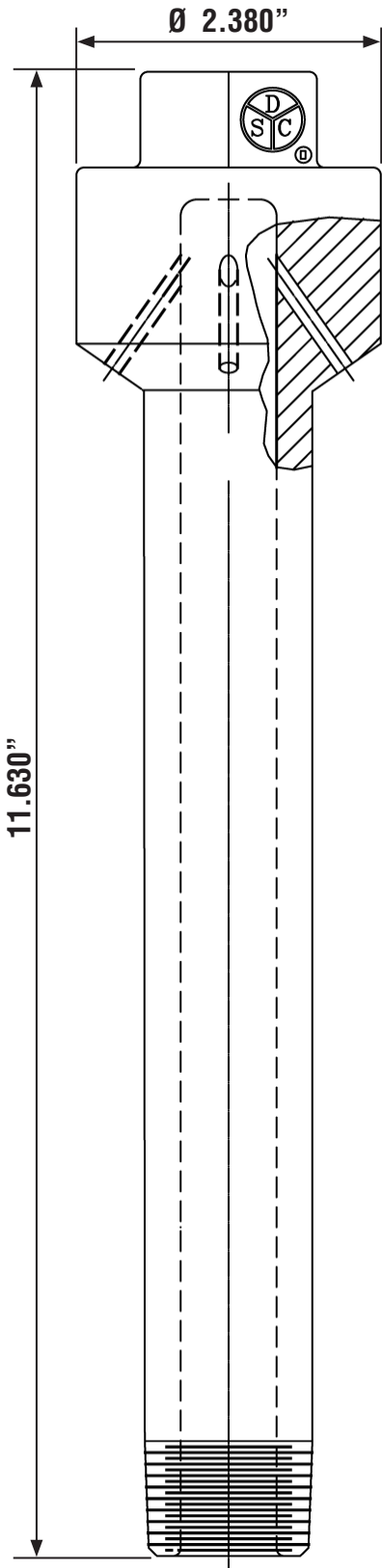


OEM Equipment including, but not limited to:

- Anthony Ross
- Asea Stal
- Babcock and Wilcox
- Combustion Engineering/Alstom
- Combustion Power Corporation
- Deutsche Babcock
- Distral
- Energy Products of Idaho (EPI)
- Factory Sales
- Fives Cail Works
- Foster Wheeler/Pyropower
- Gotaverken
- Hoffman Combustion Engineering
- John Thompson
- Kvaerner/Tampella/Metso
- Martin GMBH
- Redler
- Riley Stoker/Babcock Borsig
- Steinmueller
- Stock Equipment
- Takuma
- Thermal Energy
- Volund
- Von Roll
- Zurn/Aalborg/Indeck

2104TP-36-A

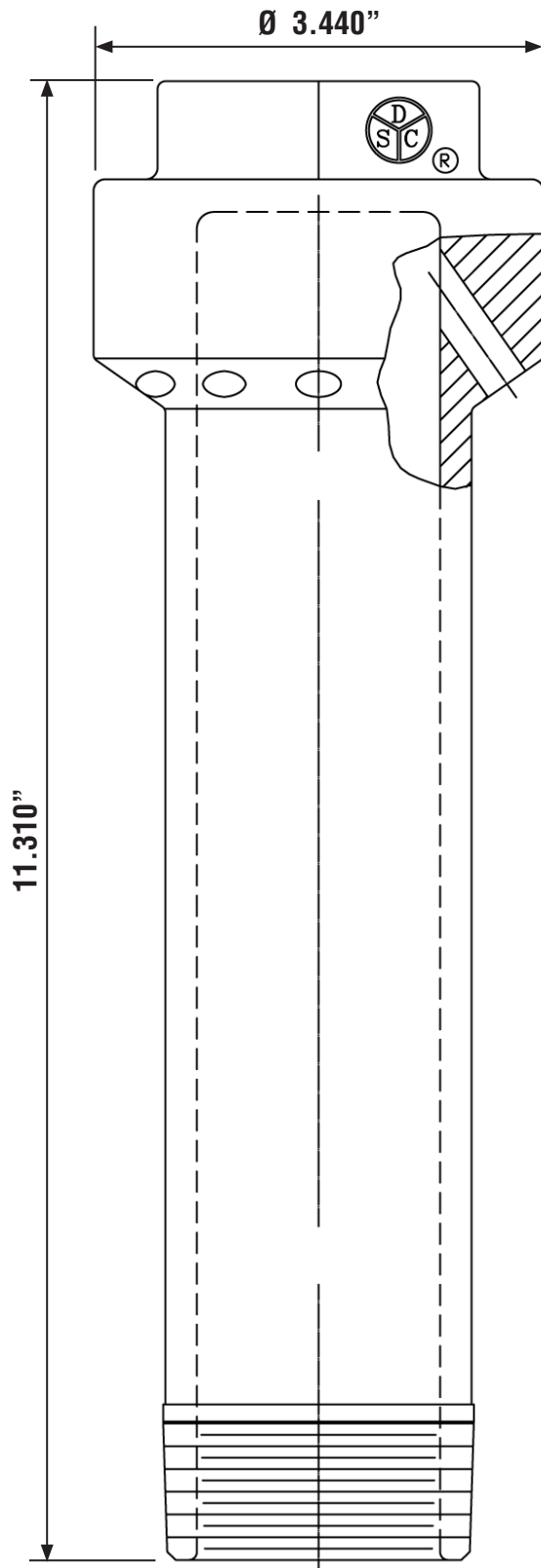
Material: ASTM A297 Grade HH



Nozzles & Tuyeres // Fluidized Bed Combustors

2104TP-205652

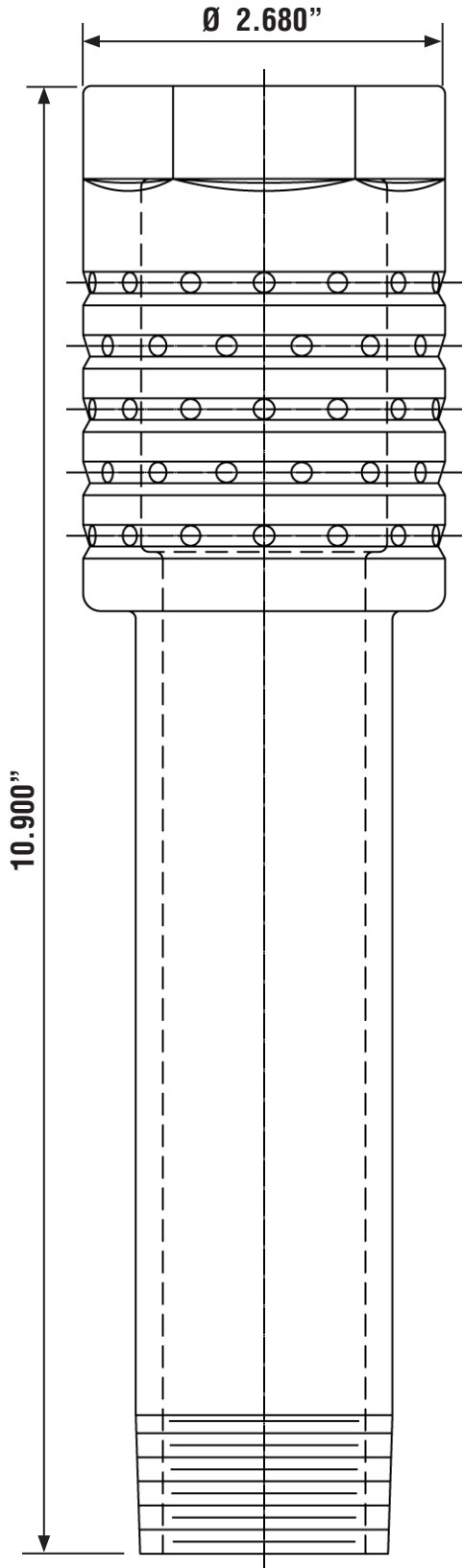
Material: ASTM A297 Grade HH



Nozzles & Tuyeres // Fluidized Bed Combustors

2104CE-0011100

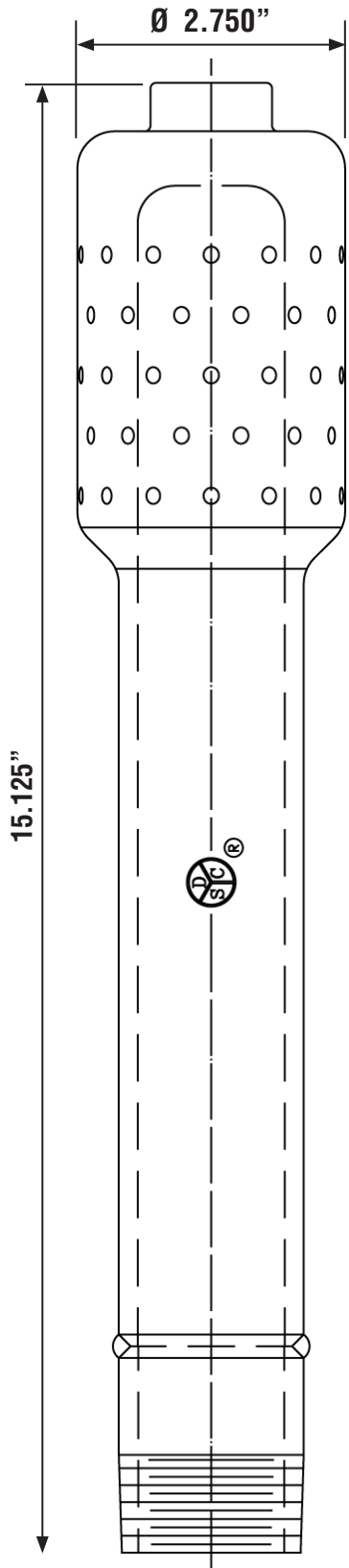
Material: ASTM A297 Grade HH



Nozzles & Tuyeres // Fluidized Bed Combustors

2104CE-1770-1

Material: ASTM A297 Grade HH

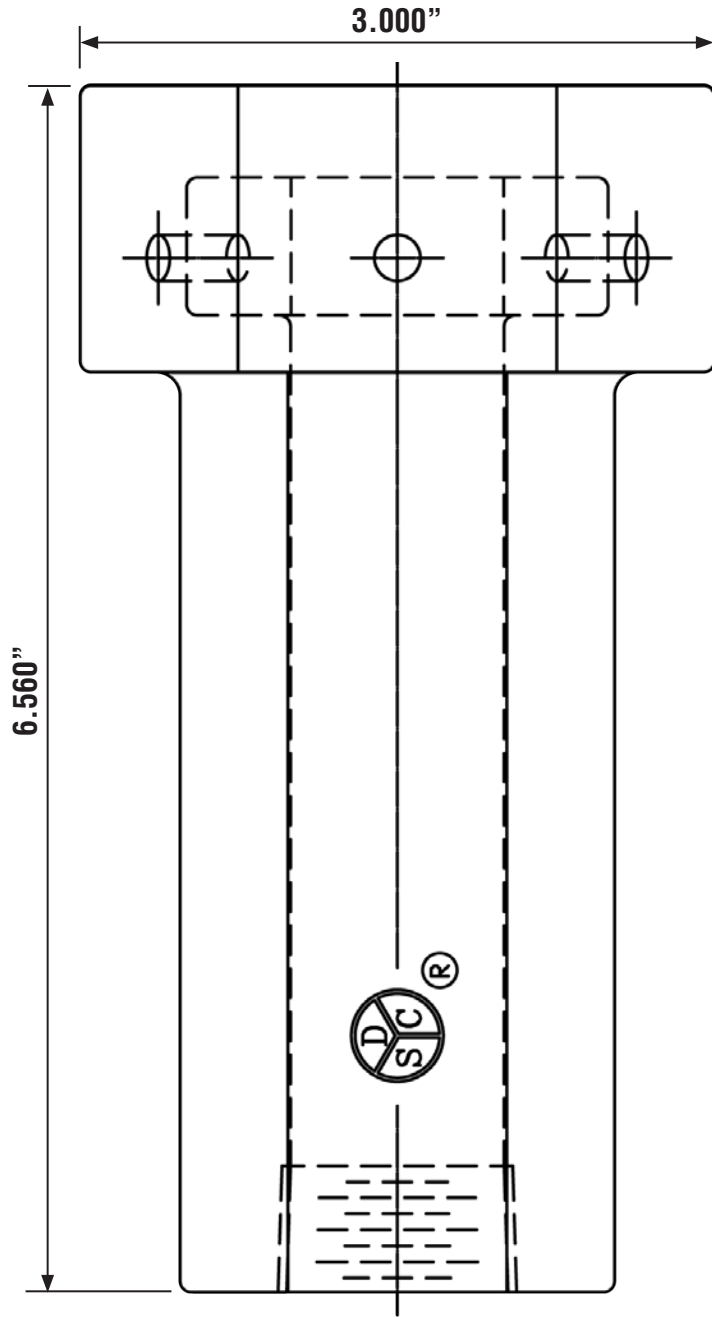


Nozzles & Tuyeres // Fluidized Bed Combustors

2104EP-2-101-A

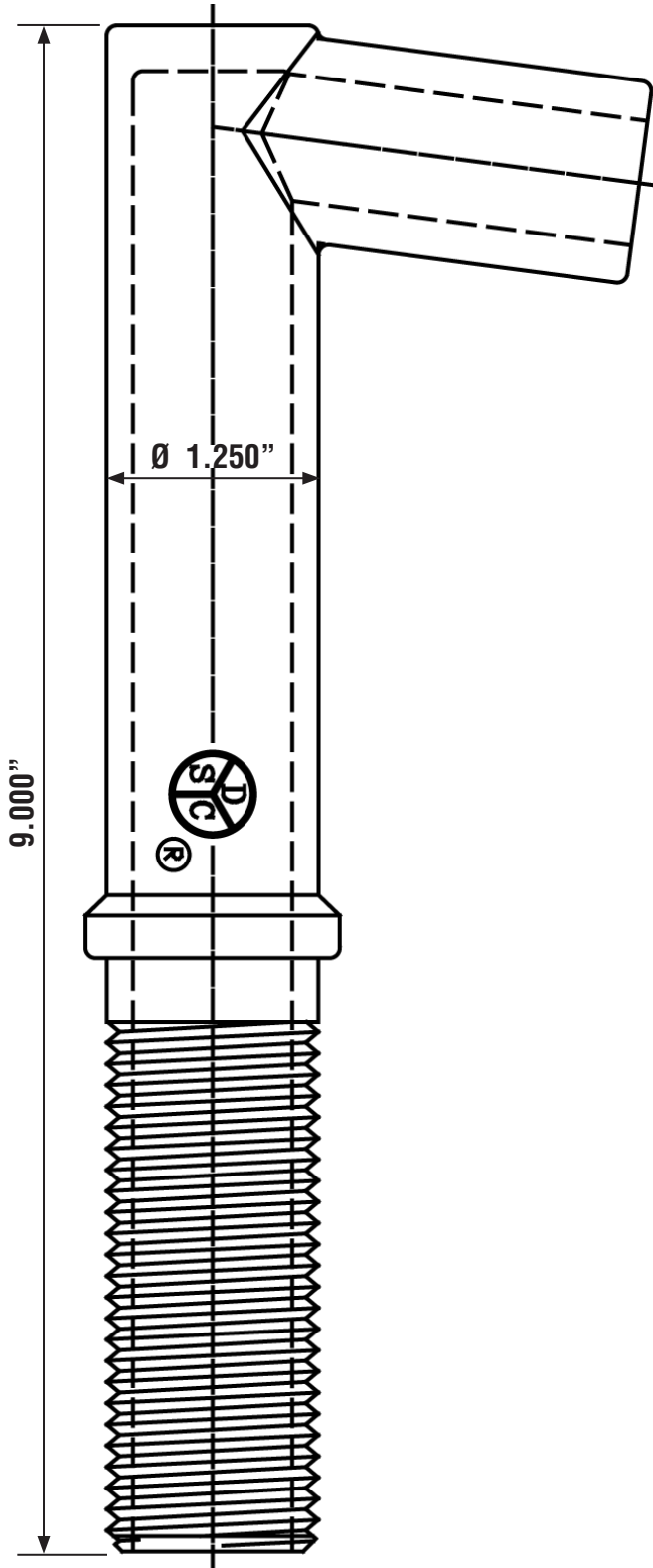
Material: ASTM A297 Grade HH

Nozzles & Tuyeres // Fluidized Bed Combustors



2104FW-917-MC

Material: ASTM A297 Grade HK

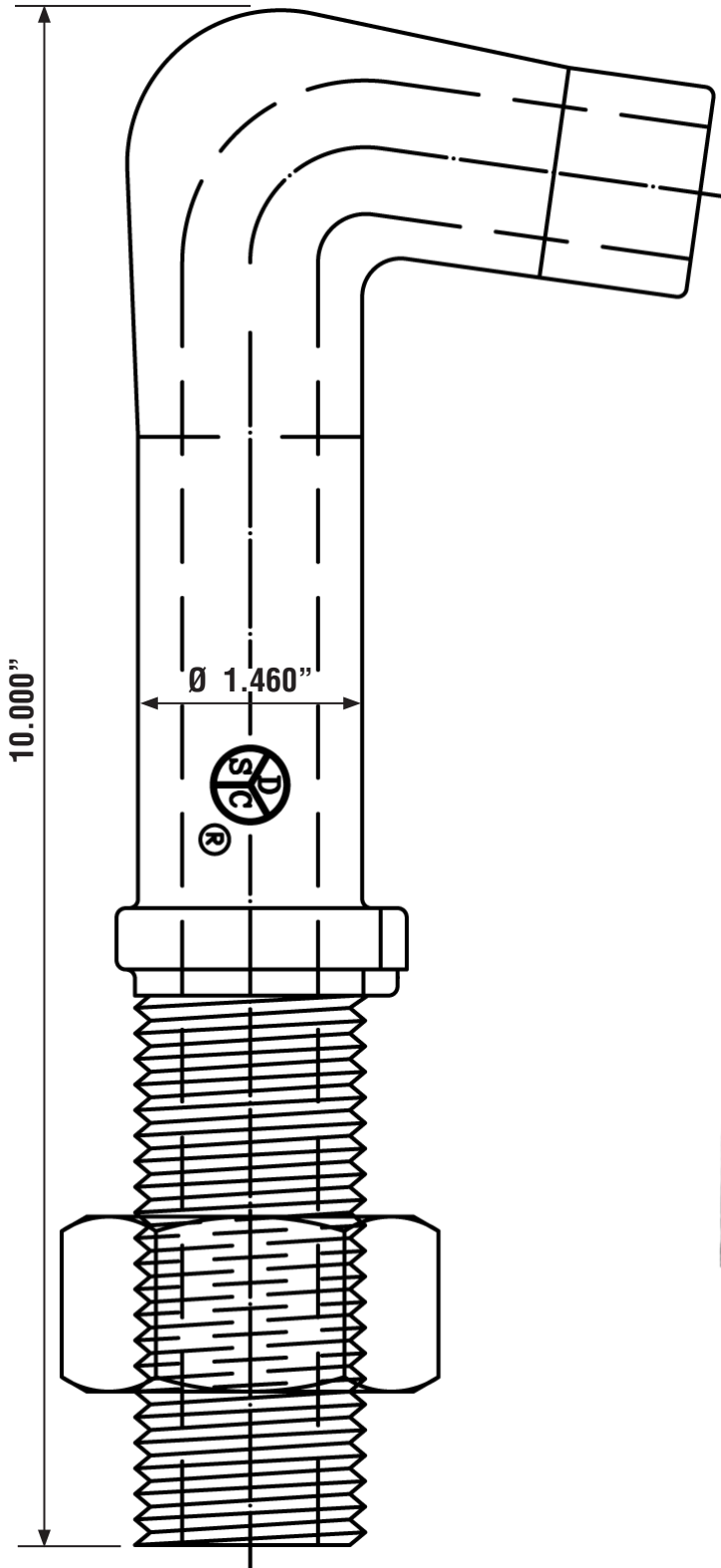


Nozzles & Tuyeres // Fluidized Bed Combustors

2104FW-917HD-3

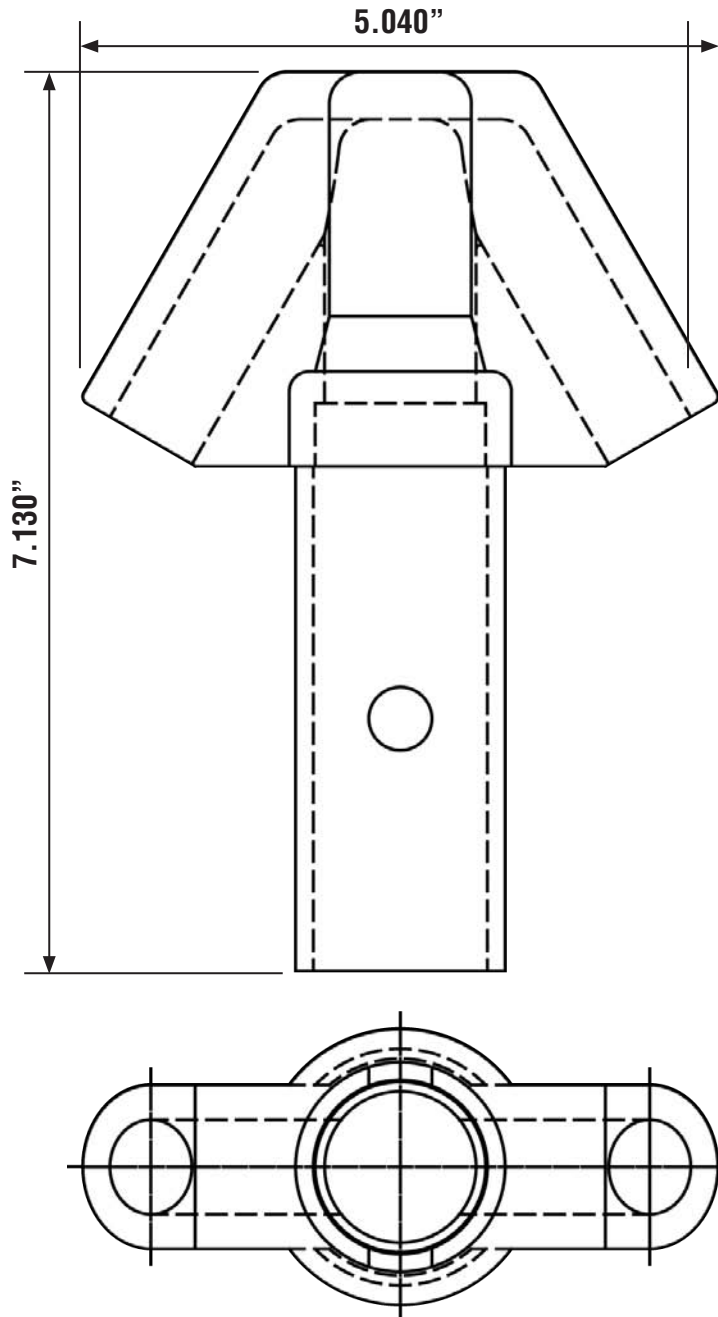
Material: ASTM A297 Grade HD

Nozzles & Tuyeres // Fluidized Bed Combustors



2104PP-60-10-80-CB

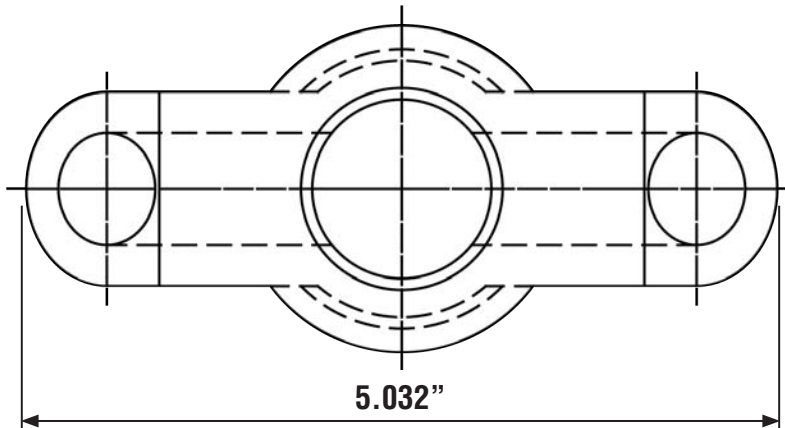
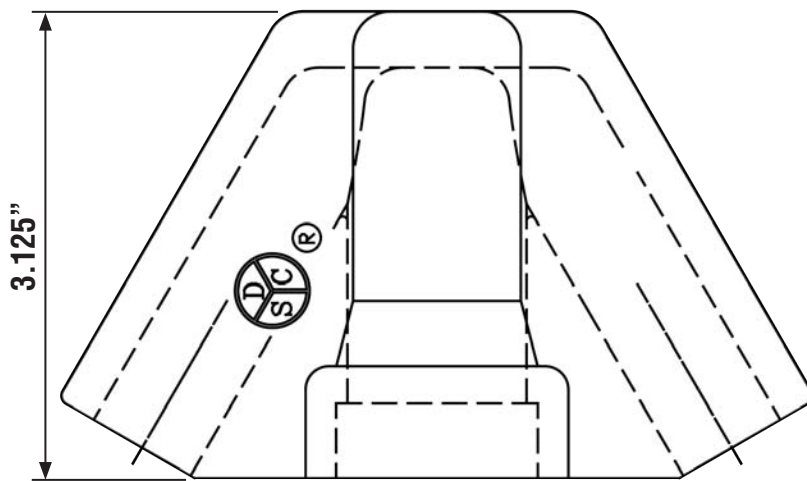
Material: ASTM A297 Grade HD or HK



Nozzles & Tuyeres // Fluidized Bed Combustors

2104PP-60-10-75

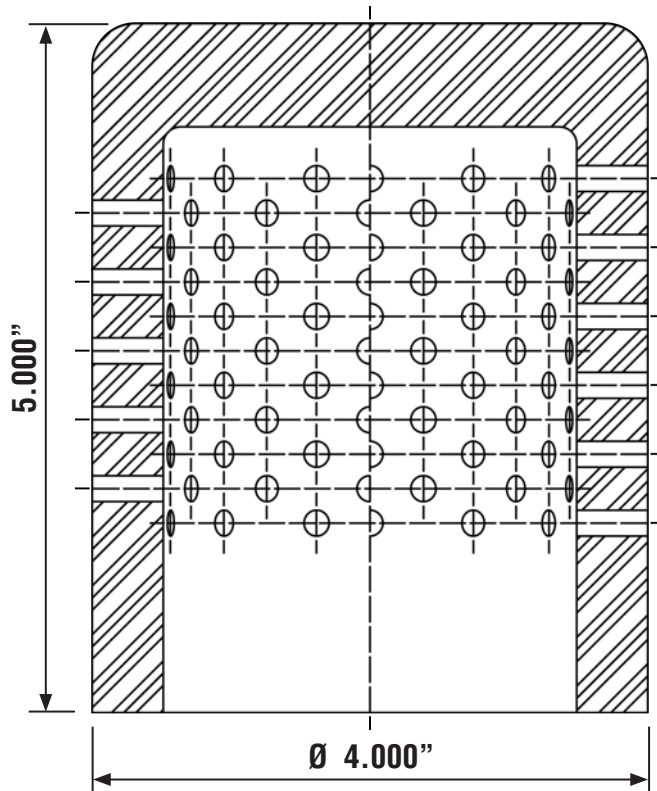
Material: ASTM A297 Grade HD or HK



Nozzles & Tuyeres // Fluidized Bed Combustors

2104RI-8YX05220

Material: ASTM A297 Grade HH

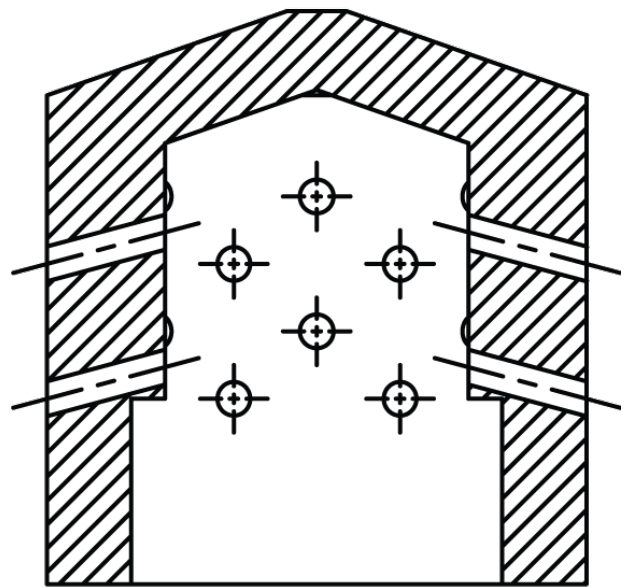
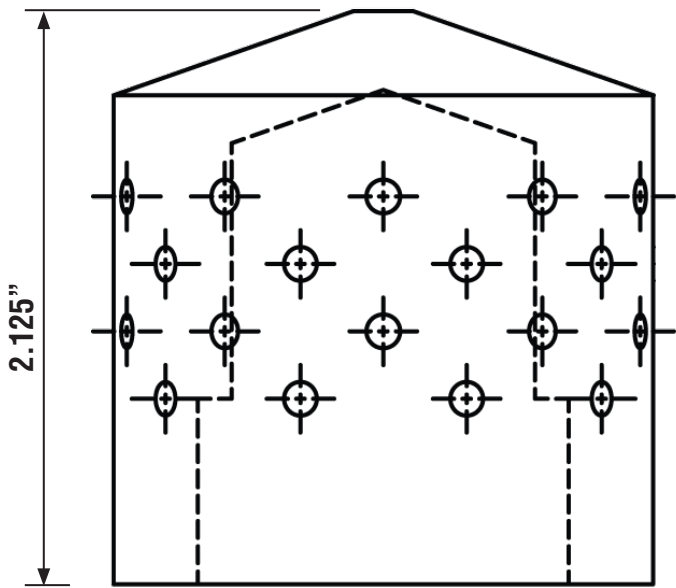
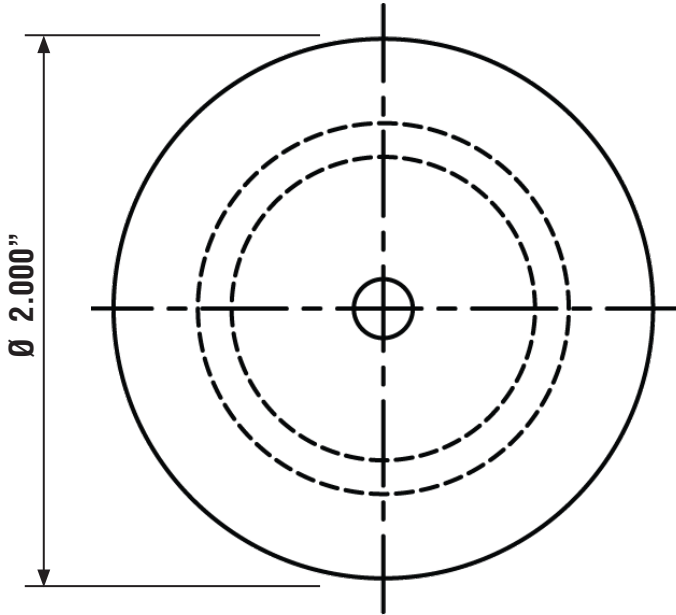


Nozzles & Tuyeres // Fluidized Bed Combustors

2104BW-1986-1

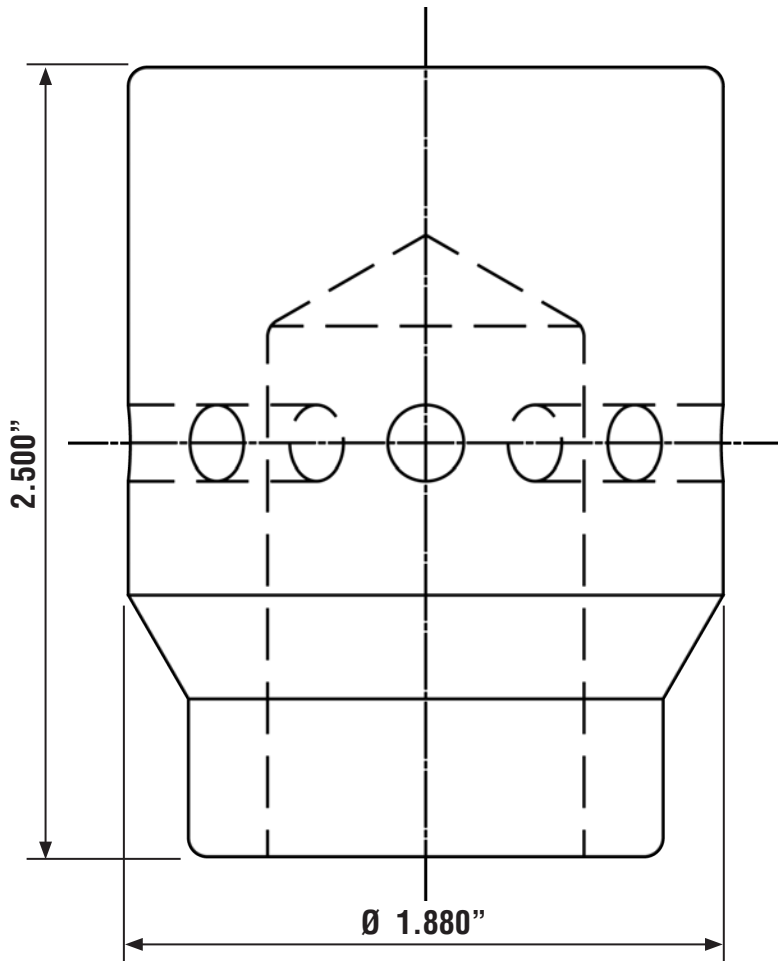
Material: ASTM A297 Grade HH

Nozzles & Tuyeres // Fluidized Bed Combustors



2104KV-953

Material: ASTM A297 Grade HD



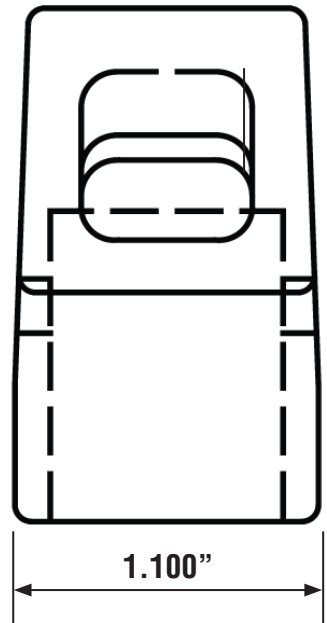
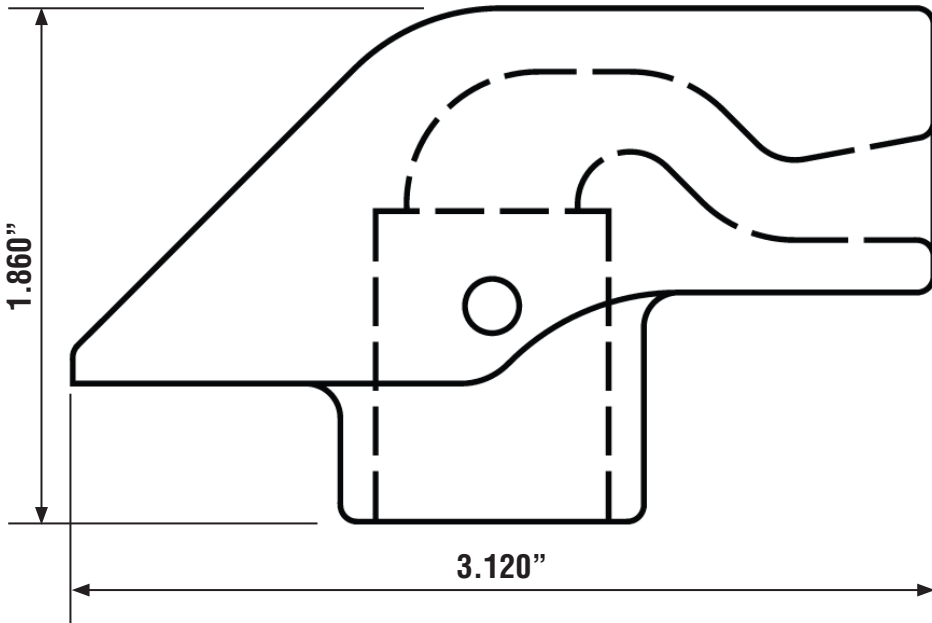
Nozzles & Tuyeres // Fluidized Bed Combustors

2104KV-BFB

Material: ASTM A297 Grade HK

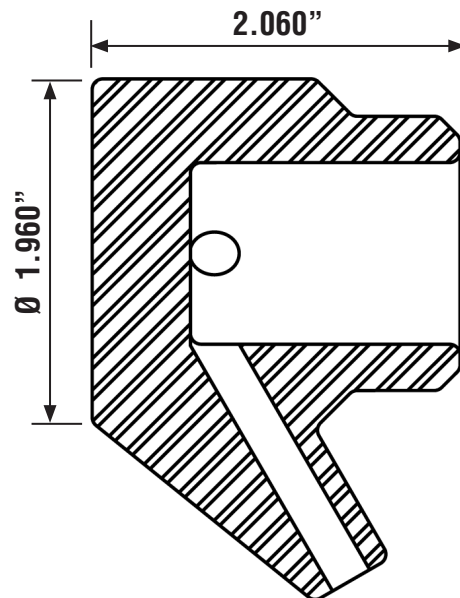
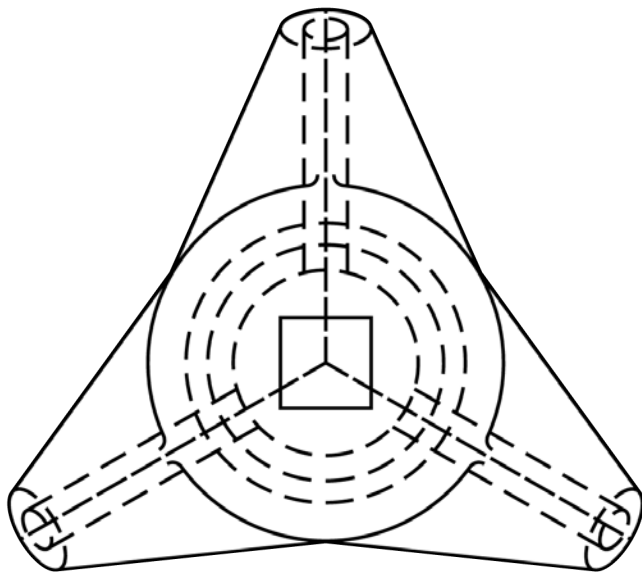


Nozzles & Tuyeres // Fluidized Bed Combustors



2104KV-00101006

Material: Alloy



Nozzles & Tuyeres // Fluidized Bed Combustors



Detroit Stoker Company // Customer Service Contacts

Call 1.800.STOKER4 (1.800.786.5374)

Director Renewal Sales & Rotary Seal Feeders

Matt Hoffman

Call 734.243.3575 or e-mail mhoffman@detroitstoker.com

Customer Service Representatives:

Laurie Vandavelde

(Assists Companies beginning with the letters A-F)

Call 734.243.3990 or e-mail lvandavelde@detroitstoker.com

Christy Horton - Manager of Renewal Sales

(Assists Companies beginning with the letters G-O)

Call 734.243.4033 or e-mail chorton@detroitstoker.com

Larry DeSloover

(Assists Companies beginning with the letters P-Z)

Call 734.243.2287 or e-mail ldesloover@detroitstoker.com

Ben Lagenderfer

Call 734.243.3531 or e-mail blagenderfer@detroitstoker.com

Jeff Randall

Call 734.243.4417 or e-mail jrandall@detroitstoker.com

Generic Parts Manager & GTS Reciprocating Grate Part Sales:

Mike Mussman

Call 734.243.5211 or e-mail mmussman@detroitstoker.com

Manager of Aftermarket Contracts, Including Additions and Betterments, Ash Systems Manager:

Doug Perkins

Call 734.243.2513 or e-mail dperkins@detroitstoker.com

Director of Burner Group:

Jim Feese

Call 717.689.3592 or e-mail jfeese@detroitstoker.com

Maintenance and Repair:

Gene Dulik

Call 734.693.2740 or e-mail gdulik@detroitstoker.com

Director of Contract Sales:

Tim Loviska

Call 734.243.3595 or e-mail tloviska@detroitstoker.com

New Stoker Sales:

Dave Jackson

Call 734.243.2883 or e-mail djackson@detroitstoker.com

Amy Malko

Call 734.243.4233 or e-mail amalko@detroitstoker.com

Service Manager:

Bob Custer

Call 734.243.3528 or e-mail bcuster@detroitstoker.com