Lo - NOx Burners
Boilers – Heat Exchangers

Division of McNish Corporation

FGR (Flue Gas Recirculation) Low NOx Burner for Digester Gas and Natural Gas/Propane

The **Lo - NOx Burner Boiler Heat Exchanger** by ***Walker Process Equipment*** has stringent adherence to Air Quality Standards.

For more information contact your local Walker Process Representative.

- **Typical NOx emission outputs are:**
- **Natural gas 25 ppm. * Digester gas 25 ppm.**
- **Low particulate emissions. Low nitrous oxide.**
- **ASME CSD-1 Controls and Safety Devices are standard.**
- **Automatic Blend-In *or* Automatic Switch-Over**
- **Existing WPE Heat X Type B and Type EB burner retrofits available.**
- **Fifty years of experience in burners, boilers, and concentric tube in tube exchangers.**
- **Combustion efficiency services available for existing installations.**

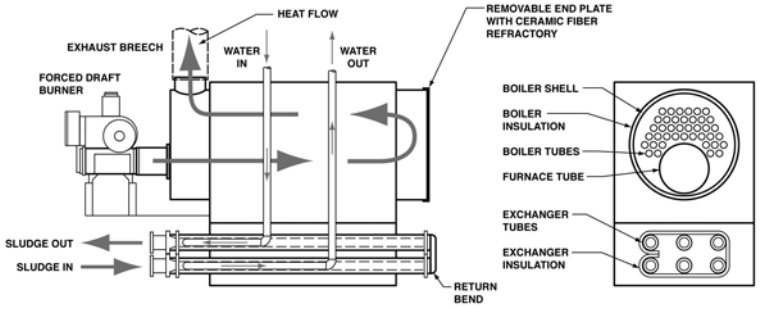
Burner Types:

There are two types of burners that are used to fire sludge heating boilers: induced draft and forced draft. Walker Process selected the forced draft burner many years ago as the preferred burner type due to the many design advantages that it offers:

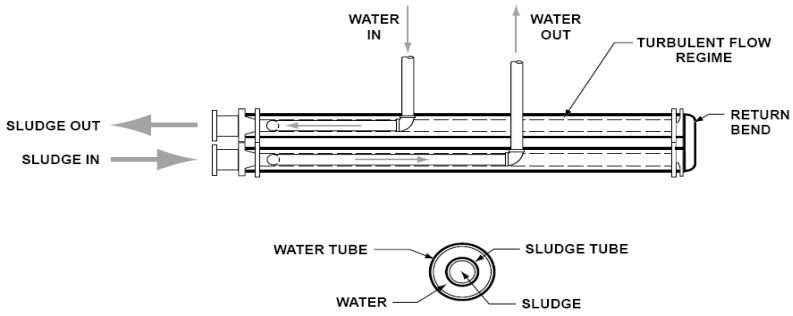
1. **Combustion Control**
   Mounted upstream of the furnace, the force draft fan is in contact with only cool ambient air of constant density. The uniformity of the intake air ensures accurate control of the air-fuel mixture. Contrary to this scheme, an induced draft fan is mounted on top of the exhaust breaching. As such, the fan is in contact with the hot combustion gases that vary in density depending on stack temperatures that result in less reliable control.

2. **Maintenance Requirements**
   Blower reliability and longevity is another area where the forced draft fan is favored. Again, since the forced draft fan sees only cool, clean air, it is less prone to maintenance problems than an induced draft fan. Also, because the forced draft fan is directly coupled to the blower, there are no V-belts to adjust or replace.

3. **Energy Savings – Electricity savings can be realized with a forced draft fan because of its smaller horsepower requirements.**



DRYBACK-FORCED DRAFT BURNER



Tube-In-Tube Exchanger with Counter flow Circulation

With the counter flow tube-in-tube piping arrangement, the mean temperature differential between the two fluids is maximized, which results in the most efficient transfer of heat from the water to the sludge. The high turbulence of the flow in a tube-in-tube exchanger further improves the transfer characteristics by reducing the film coefficients between the fluids and the exchanger tubes. Further enhancement of heat transfer characteristics is obtained in the tube-in-tube arrangement by providing rifling in the sludge return bends, insuring turbulent flow and scouring action.

The NOx numbers when firing digester gas will be very similar to the natural gas NOx numbers for both standard burners and the low NOx (IFGR) burners. The digester gas NOx numbers maybe a point or two higher for both standard and Low NOx (IFGR) burners. NOx emissions at 3.0% 02 will vary based on the percent of fuel bound nitrogen and boiler configurations.

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