REPORT: Provided by GES USA with collaboration of Madison Kipp - Melting aluminum alloy for die casting process business

INSTALLATION DATE: Fitch Fuel Catalyst with bypass system in place - 9/21/2022

MEASURING EQUIPMENT: Fox digital MAS flow meter, Bacharach PCA 400 4 gas analyzer with current calibration

FITCH MODEL: 4 qty, FHD2-6-2 NG fuel catalyst at 2 facilities. North plant and Sun Prairie plants

LOCATION: Sun Prairie plant operates 2 older aluminum melting furnaces
Average consumption at full power: 4400 SCFH of natural gas

- Furnace #1: Baseline stack temperature – 1379F, O2 - 7.6%, CO2 -7.5 PPM, CO - 7 PPM, Fuel flow recorded 4463 SCFH.

  Fuel Catalyst Engaged: O2 increased to 5%, CO increased to 13 PPM, Temperature increased to 1391F

  Fuel Catalyst Engaged: Fuel flow adjustments were made, reducing flow by 11%. O2 was 2.4%, CO2 10.4 PPM, CO 0%, Fuel flow recorded 3920 SCFH.

- Furnace #2 Baseline stack temperature - 1587F, O2 - 5%, CO2 - 9 PPM, CO - 2 PPM, Fuel flow recorded 4263 SCFH.

  Fuel Catalyst Engaged: stack temperature recorded at 1581F, O2 remained at 5%, CO2 remained at 9 PPM, CO decreased to 0. Fuel flow recorded 3758 SCFH

  After tuning and reducing fuel flow by 11.5%, stack temperature recorded at 1551, O2 reduced to 3.5%, CO2 had slight increase to 9.8 PPM, CO had slight increase to 1 PPM. Fuel flow recorded 3758 SCFH

  **On following day, MK maintenance advised me that this furnace #2 had some operational issues that needed diagnosing. Data to be set aside until this issue is resolved and new data can be collected

LOCATION: North Plant: 2 Schaefer Furnaces capacity 3500 pounds of aluminum per hour
Average consumption at full power is 6800 SCFH of natural gas

- Furnace #1: Baseline stack temperature – 1496F, O2 - 1.2%, CO2 - 11.1 PPM, CO – 1465 PPM,

- Fuel Catalyst Engaged: Stack temperature - 1505F, O2 - 0, CO2 - 11.8 PPM, CO off the chart 9900 PPM, recorded 6952 SCHF

  Tuned and reduced fuel flow by 10%, from 6952 SCFH to 6212 SCFH

  Stack temperature - 1571F, O2 - 1.8%, CO2 - 10.8 PPM, CO – 0 PPM. CO emission reduced by 100% down to zero. This significant reduction indicates the burner was previously operating extremely rich and discharging high amounts of poisonous CO.

- Furnace #2 : Baseline stack temperature - 1518 F, O2 - 0, CO2 -11.8 PPM, CO 1875 PPM.

Fuel Catalyst Engaged: Immediate emission testing record the CO increased to 3227. This is a clear indication of the higher energy output of the Fitch treated natural gas, documenting an overly rich condition.

Stack temperature recorded - 1495F, O2 .1%, CO2 11.7PPM, CO 3227PPM

After tuning and reducing fuel flow by 10% from 6868 SCFH to 6172 SCFH
Stack temperature recorded - 1458F, O2 - 2.4%, CO2 - 10.4PPM, CO - 0. CO reduced by 100% down to zero.

Calculated on the full power fuel consumption at 60% of a 24-hour day

CONCLUSION

- Furnace was able to maintain proper temperature and aluminum melt temperature
- There has been no reduction of aluminum melt rates or performance
- CO emission was reduced to -0- and energy was increased as a result of Fitch treated natural gas.
- CO2 emissions were reduced annually by appx. 3861 pounds based on 117 pounds of CO2 per MBTU burnt (mega British thermal units)
- Fuel consumption was reduced by an average of 10.33% ((3 furnaces – excluding the furnace with operational issues)
- The reduction of gas per year is 12,055,680 SCFH

****This report is provided with the approval of the Madison Kipp management. Any communication directly is not authorized. Any requests to communicate should be directed to authorized Fitch Distributor Paul Barone, paul@gesusa.us. Mr. Barone acts as liaison to the Madison Kipp management.