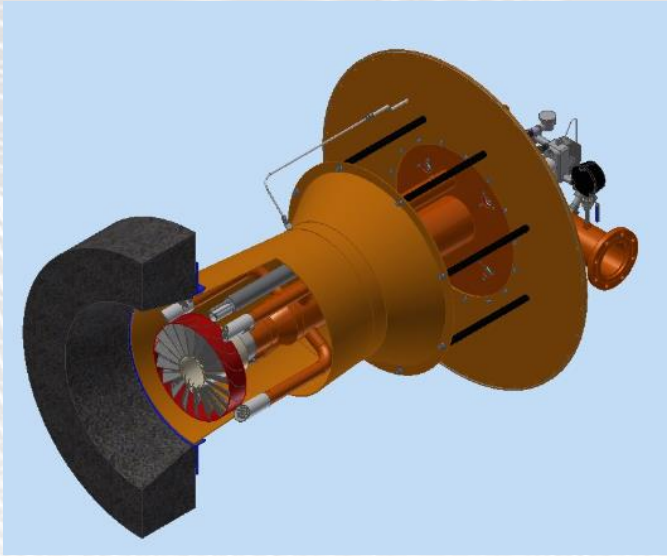
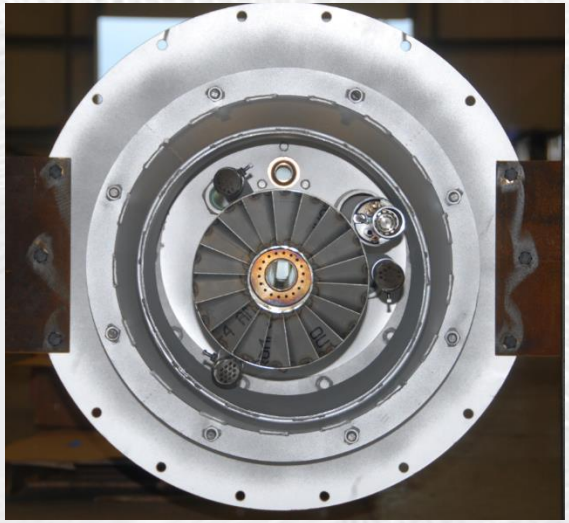
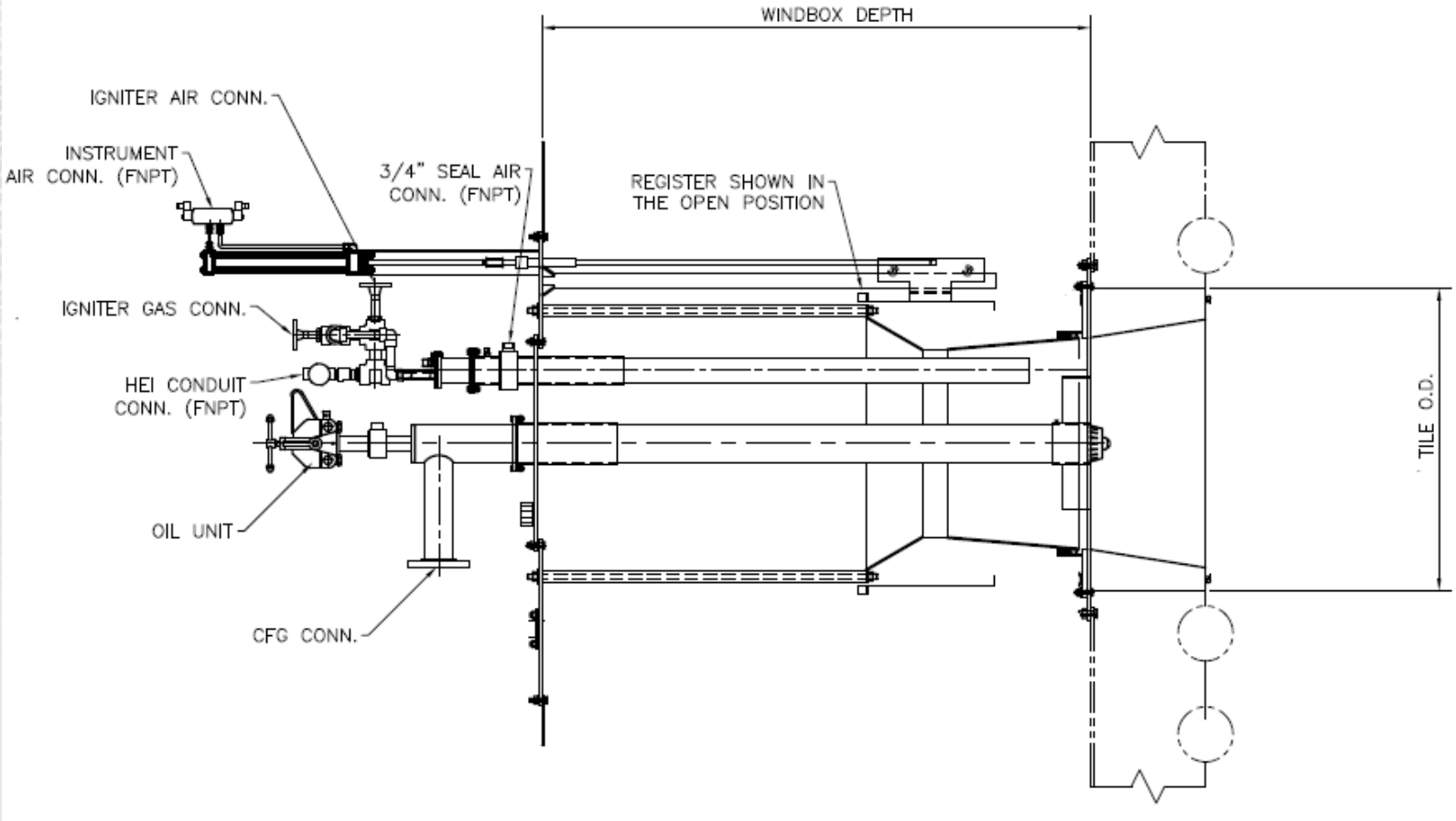
GB Low NOx Burner Technology:

- **Years of experience with staged gas /oil technology.**
- **Low cost, high reliability** - 25 ppm NOx gas – 80 ppm FO
- **Register design proven for 40+ years**
- **More compact flame fit versus competition – smaller boiler / no impingement**
- **Multi-fuel capability**
- Efficient – FGR and Excess air
- Can achieve **+18-1 turndown**
- Low CO2 footprint..
- +**360 mmbtu/hr** single burner..
- **Multi applicability (Fluid Bed boilers, etc.)**

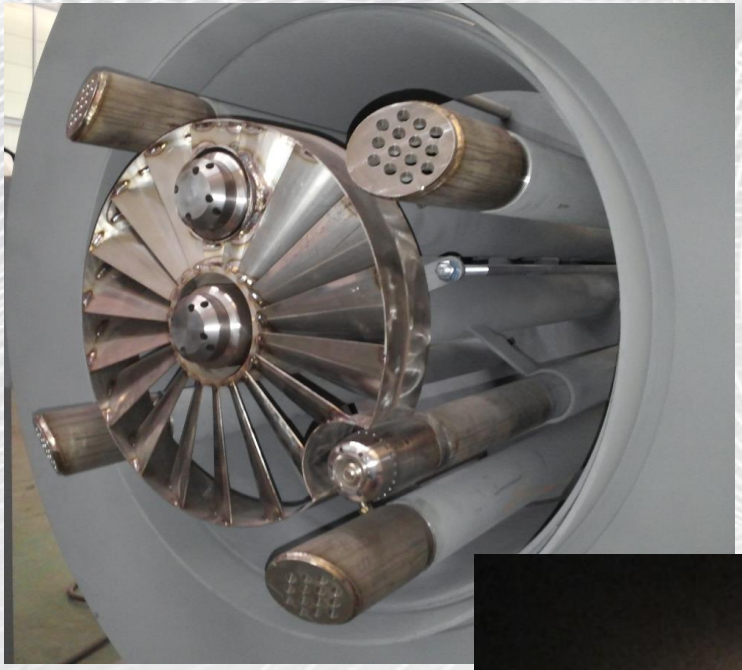


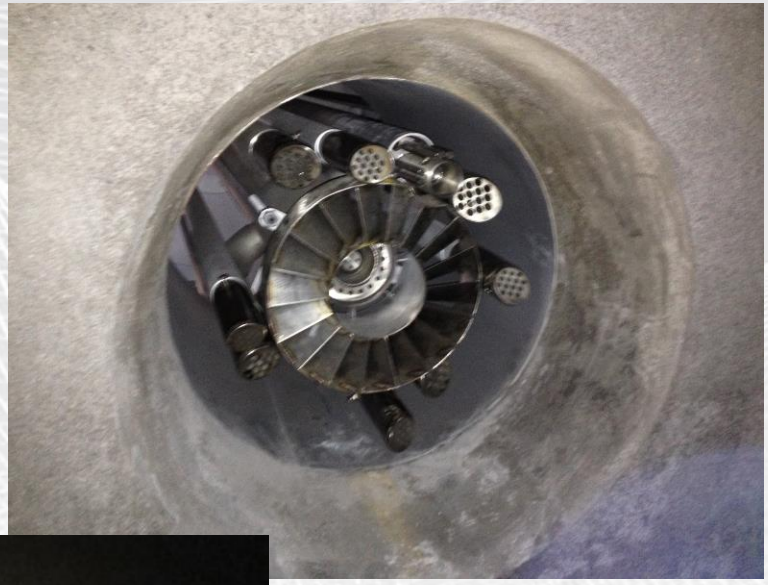


GB-V Low NOx Burner



Multi-fuel GB burners (up to four fuels):

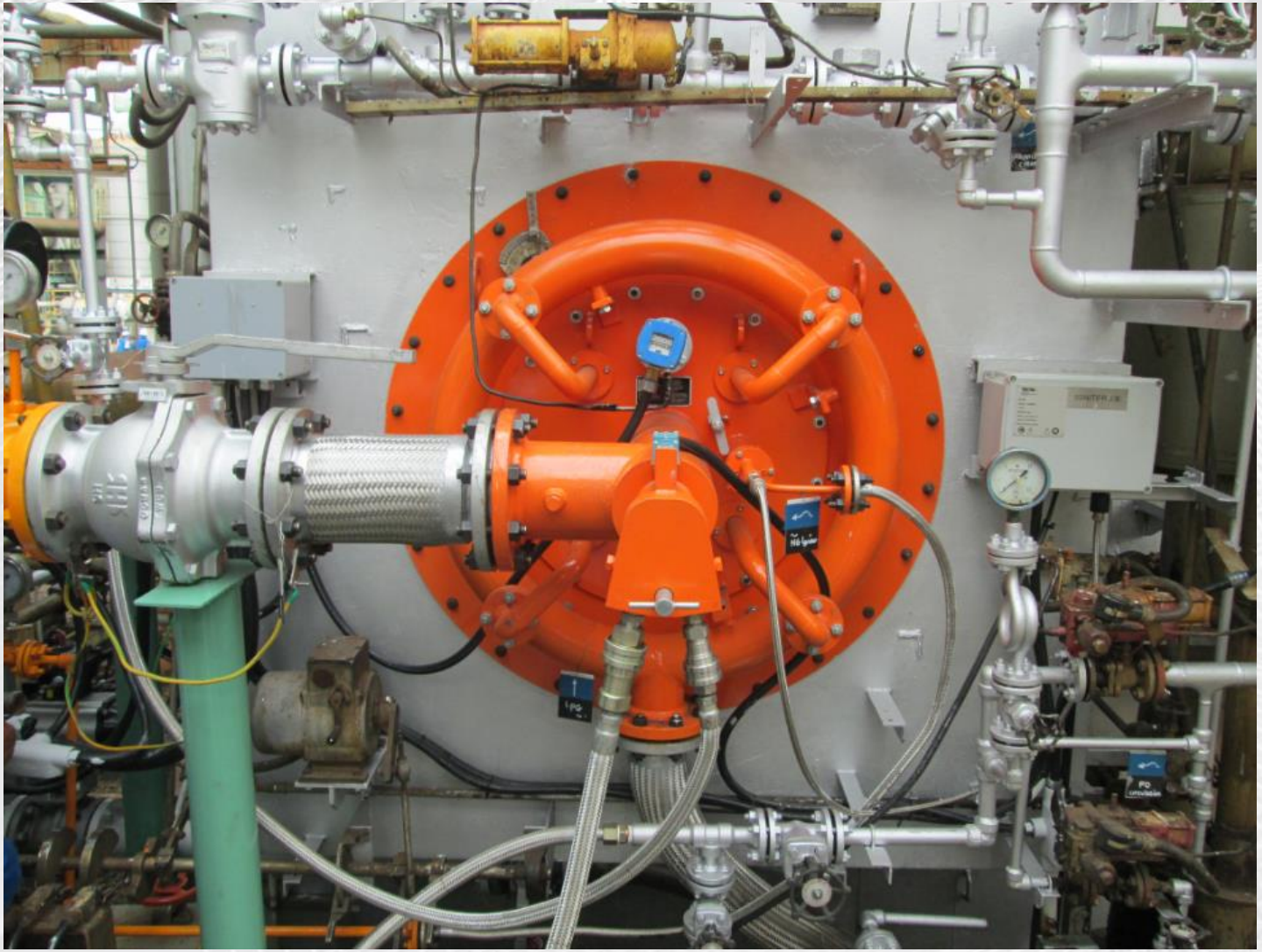




Fuel Oil firing:

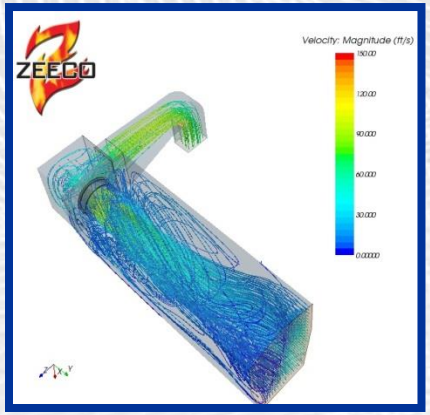
- Capacities up to 360 mmbtu/hr
- Applied to all burner types
- Typ. 80 ppm #2 fuel oil potential
- Available for steam or air atomization
- Constant pressure / constant differential
- Very low steam usage on constant pressure
- Single or multi-burner systems
- Multi-viscosity oils adaptability
- Waste liquid fuels

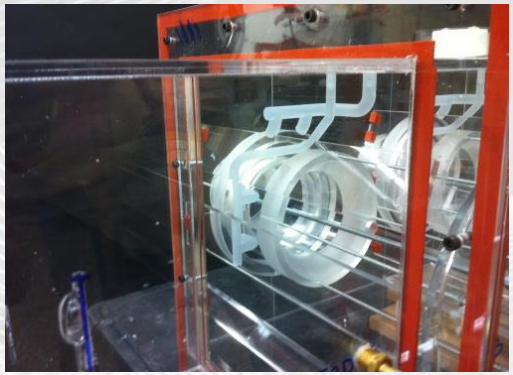
Front plate side:



Physical / CFD Modeling

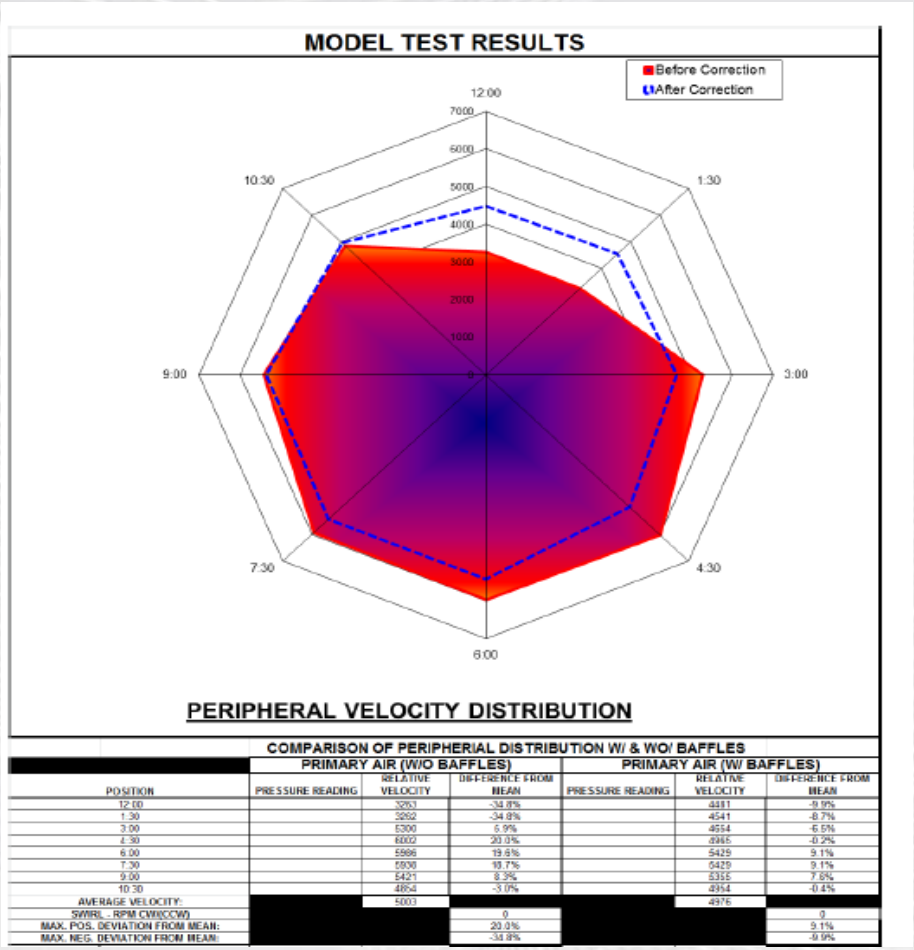
- 95% mass thru burner is air
- Requires balance
- Lowers excess air
- Lowers CO2 footprint
- Burners / OFA / FGR systems
- Low pressure fuel systems
- Coal units…





Physical / CFD Modeling

- Airflow Distribution +/-2% to each burner is key.
  - Fuel should be “balanced” to each burner
- Flame fit equalized for each burner
- Temperature distribution equalized with firing rate
- System design assistance for balance and pressure drop optimization



PERIPHERAL VELOCITY DISTRIBUTION

COMPARISON OF PERIPHERIAL DISTRIBUTION W/ & WO/ BAFFLES

	PRIMARY AIR (W/O BAFFLES)			PRIMARY AIR (W/ BAFFLES)		
POSITION	PRESSURE READING	RELATIVE VELOCITY	DIFFERENCE FROM MEAN	PRESSURE READING	RELATIVE VELOCITY	DIFFERENCE FROM MEAN
12:00		3253	-34.8%		4481	-9.9%
1:30		3262	-34.8%		4541	-8.7%
3:00		5300	5.9%		4954	-0.5%
4:30		6002	20.0%		4965	-0.2%
6:00		5986	19.6%		5425	9.1%
7:30		5936	18.7%		5429	9.1%
9:00		5421	8.3%		5355	7.6%
10:30		4864	-3.0%		4954	-0.4%
AVERAGE VELOCITY:		5003			4976	
SWIRL - RPM CW/(CCW)			0			0
MAX. POS. DEVIATION FROM MEAN:			20.0%			9.1%
MAX. NEG. DEVIATION FROM MEAN:			-34.8%			-9.9%

Fuel Valve Control Skids:

Zeeco BMS Systems and Controls:

- **Single, multi and unison** fired burners.
- Variety/combination of fuels including **low fire changeover and simultaneously firing of multi-fuels.**
- **Any type of PLC for the BMS or BCS** - Allen Bradley Control Logix, Compact Logix to GE Fanuc, Modicon Premier and Siemens S7 systems.
- **Zeeco – Global codes / standards / approvals**
- Fuels:
  - Natural Gas
  - Fuel Oil (#2, #6, etc)
  - Blast Furnace Gas
  - Coke Oven Gas
  - Refinery Gas
  - Landfill Gas
  - Pitch / Bitumen
  - Opportunity fuels