



cicsa
COMBUSTIÓN INDUSTRIAL Y CONTROL S.A. DE C.V.

BURNERS: FLAME SHAPES/TYPES

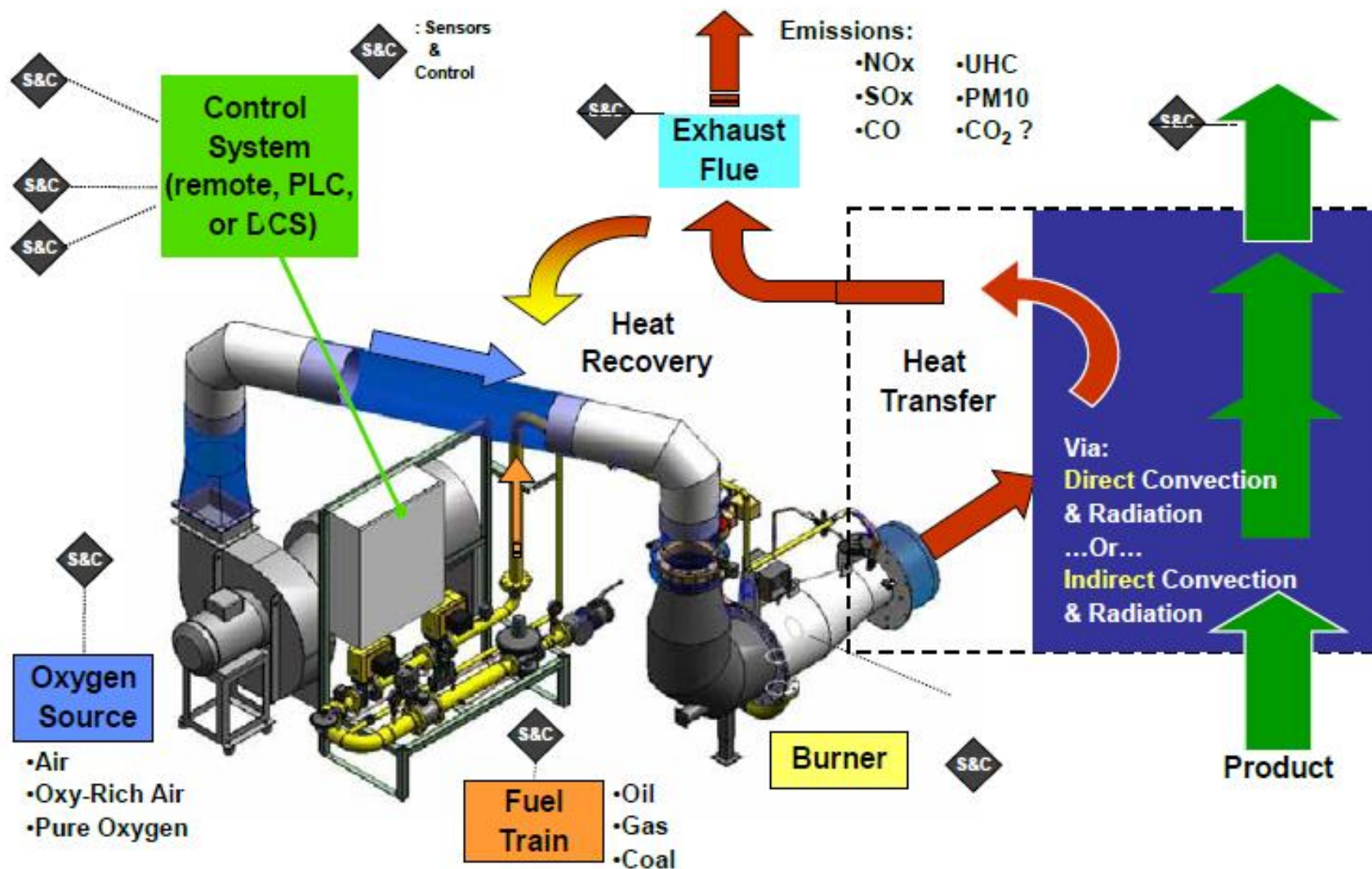
Honeywell


MAXON[®]
A Honeywell Company

LAR Training
May 2015



Typical Industrial Combustion System



Combustion is liberation of energy from fuel to create usable heat



Maxon OXY-THERM® LE



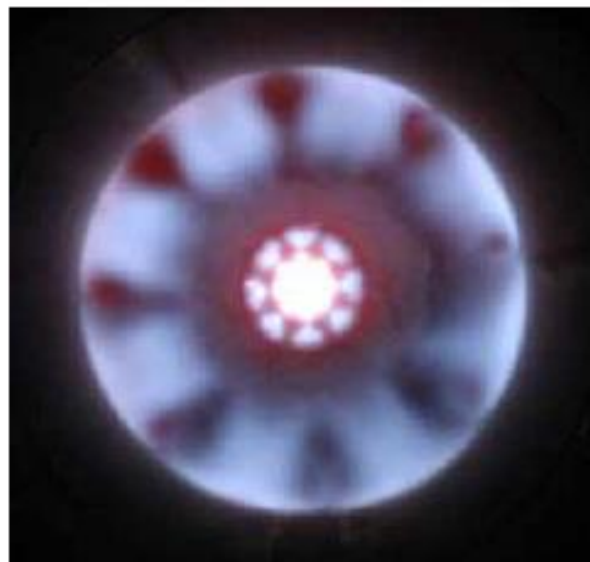
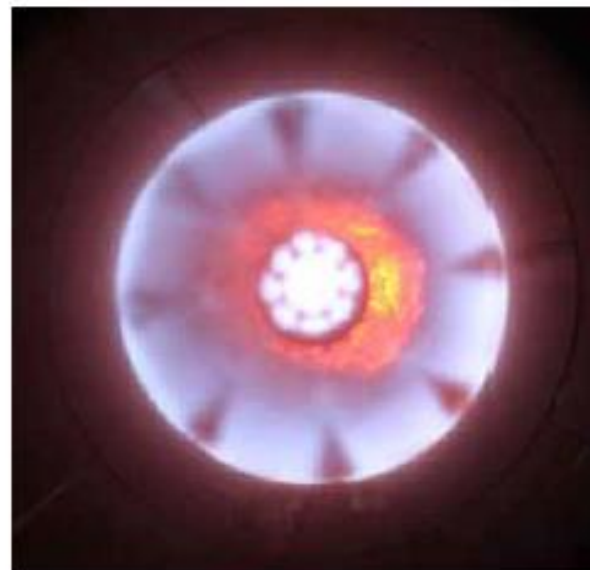
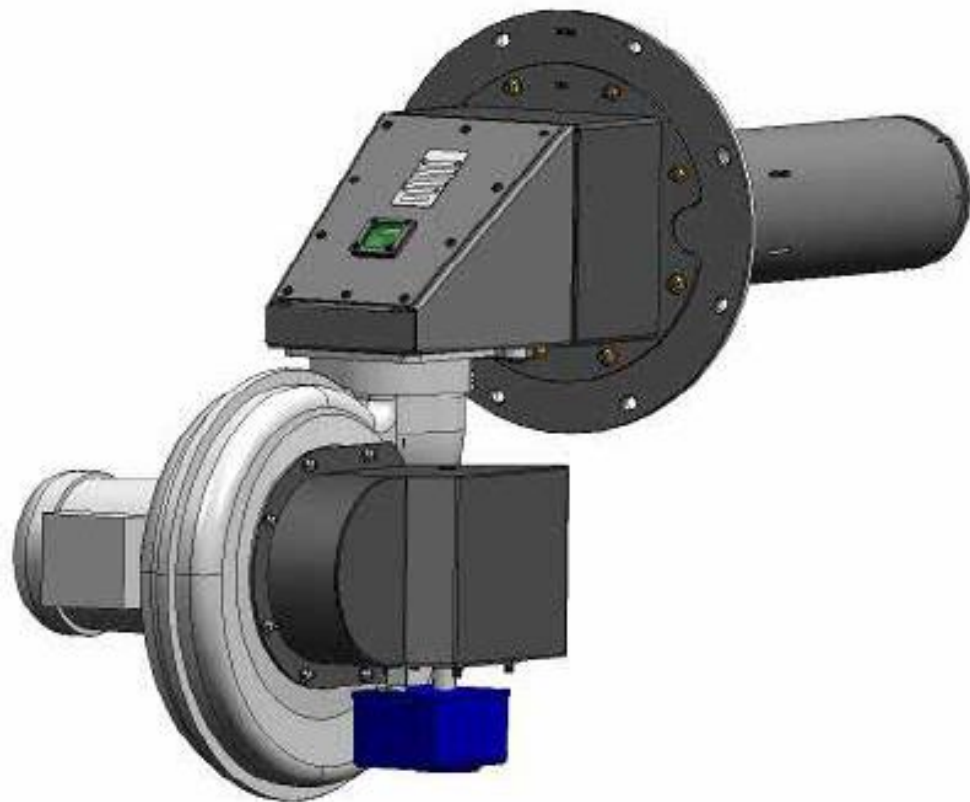


Maxon OXY-THERM® LE - FF





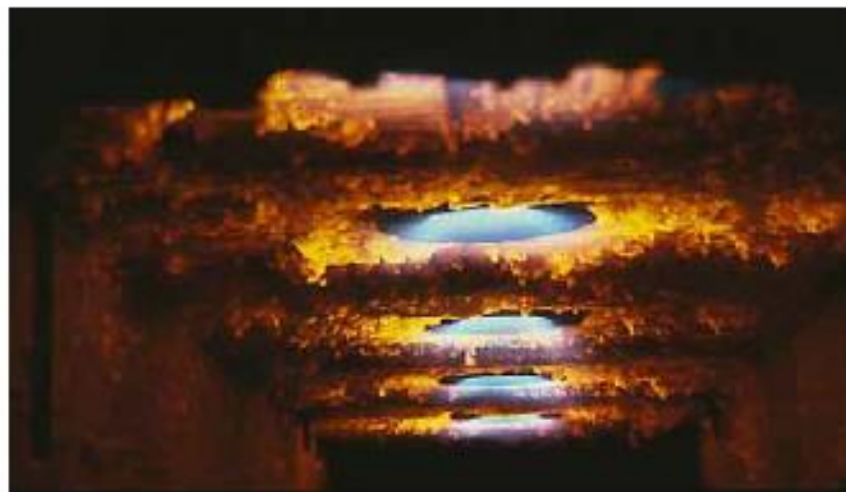
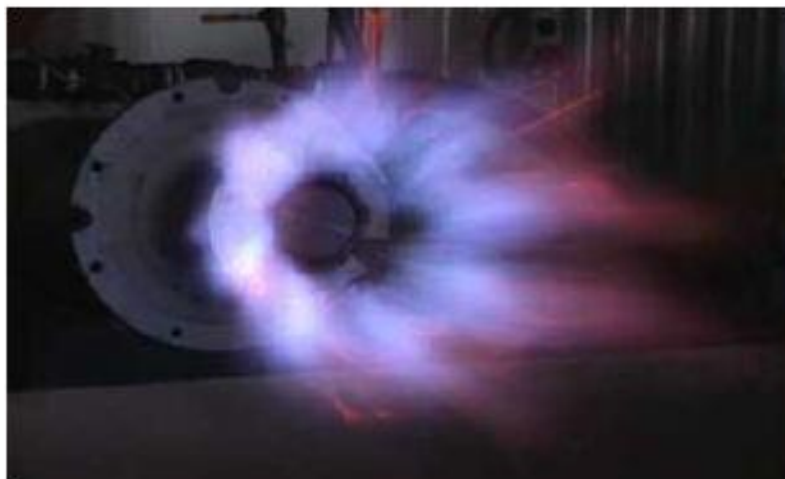
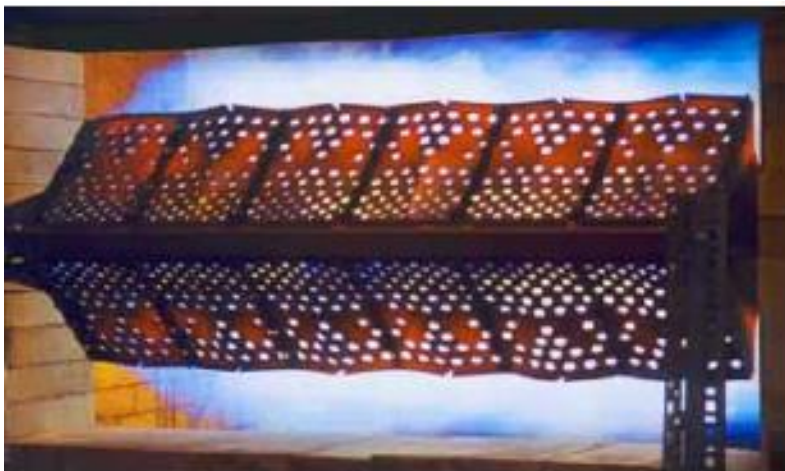
Maxon XPO® Low NOx Burner



XPO Burner
Operation Range
Sub 10ppm NOx at 4.5 - 5.2% O2
Sub 20ppm NOx at 3 - 4 % O2

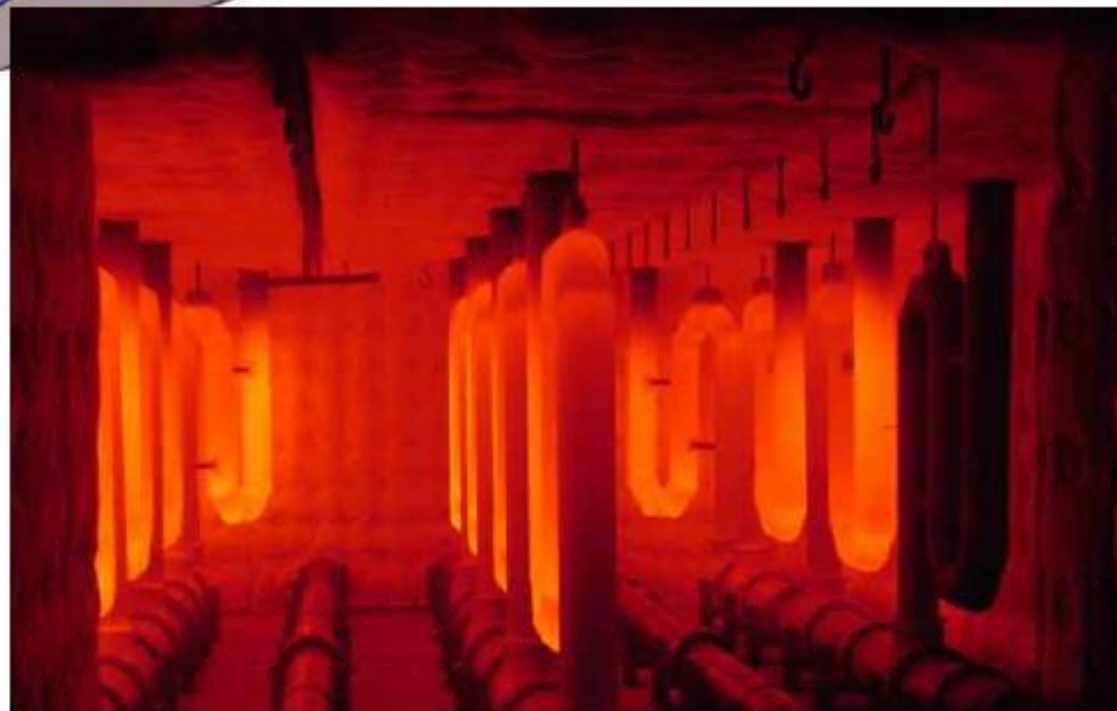
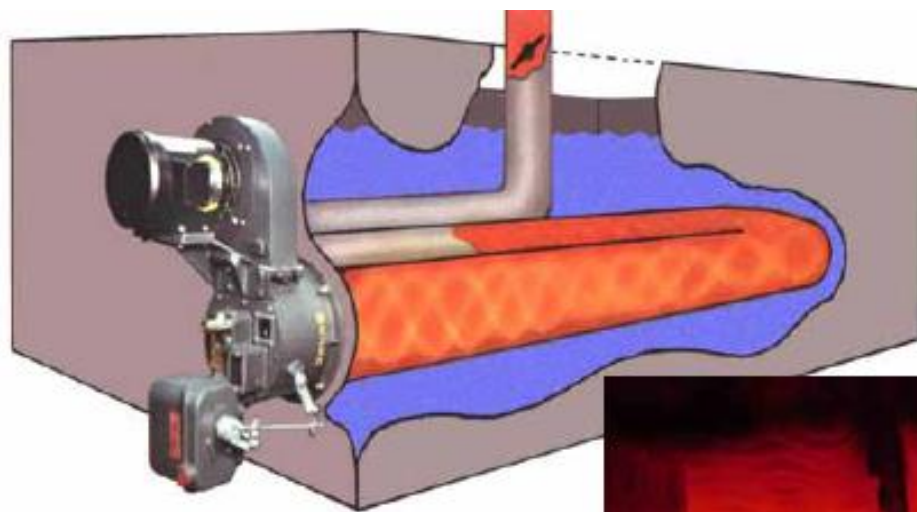


In-Duct, Incineration, and Conductive (Flat Flame)





Fired Tube Burner





This is What We Don't Want!





Combustion Safeguard and Good Control





Sizing Fuel Trains & Control Valves

$$d = \sqrt{\frac{Q_A \times 4}{60 \text{ ft/s} \times 3600 \text{ s/hr} \times \pi}} \times 12''/\text{ft}$$

$$Q_A = Q_{\text{stp}} \times \frac{460 + T_2}{460 + T_1} \times \frac{14.7 + P_1}{14.7 + P_2}$$



OVENPAK® LE

LAR Training



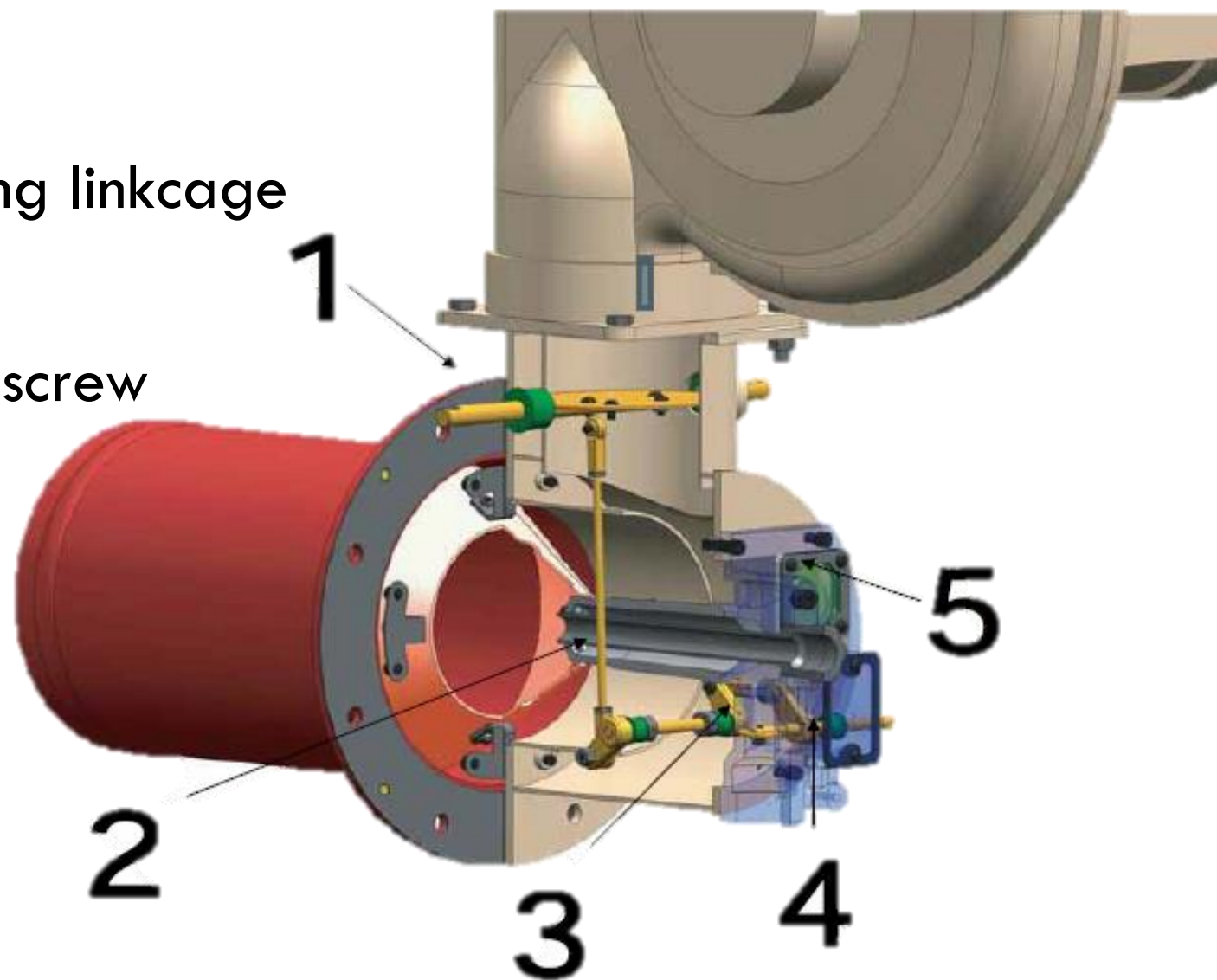
Low Emissions Burner





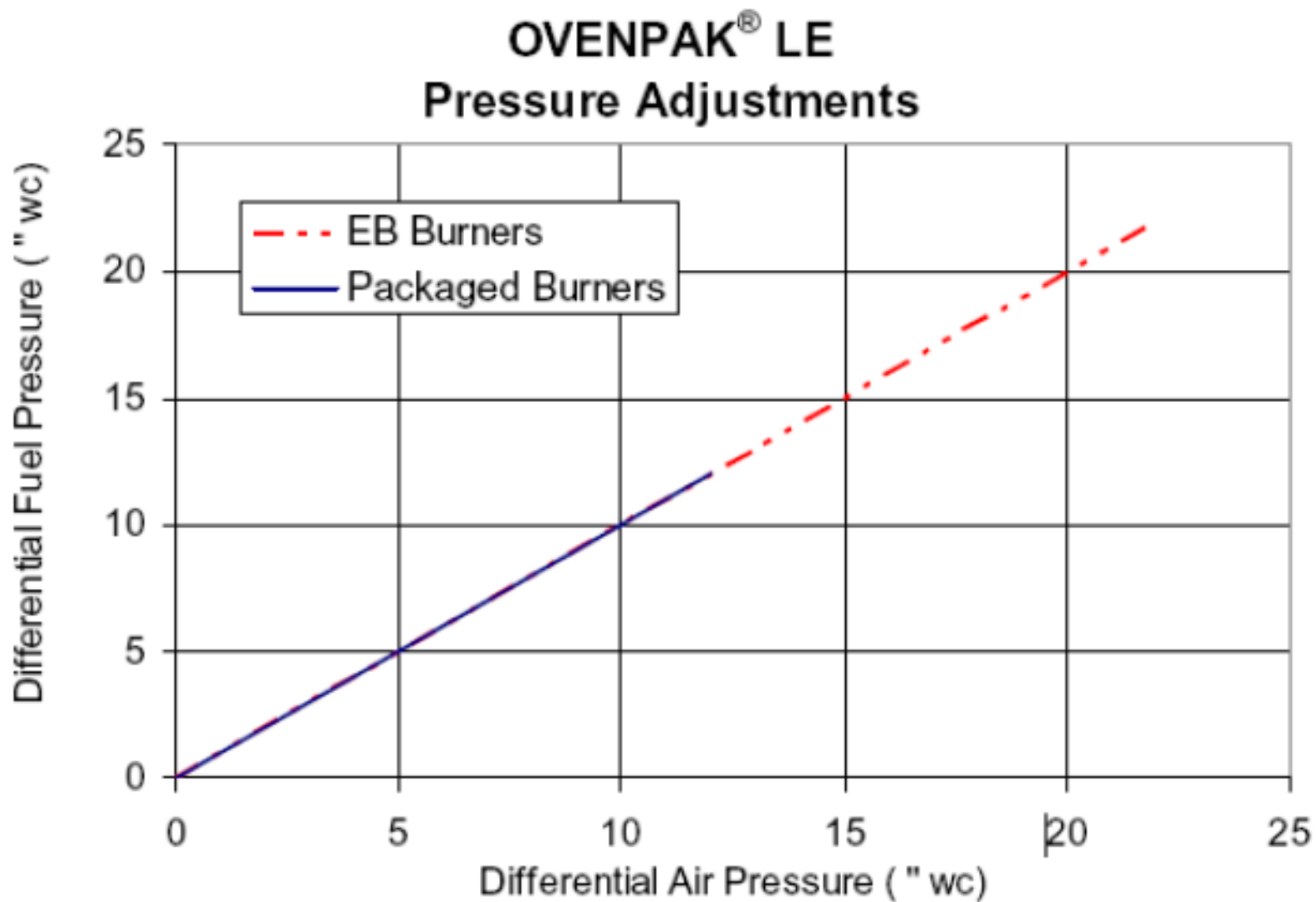
OVENPAK® LE

1. Air control valve
2. High precision connecting linkcage
3. Fuel control valve
4. Access cover to turning screw
5. Viewing window





Burner Operating Pressures





Where used?

- ▶ **Emission requirements**
 - Less than 50ppm NO_x
 - Less than 200ppm CO
- ▶ • **High turndown requirements**
 - 50 to 1 thermal turndown on packaged burners
 - 100 to 1 thermal turndown on EB burners
 - 10 to 1 emission turndown on all burners
- ▶ **Capacities up to 6.5 MM Btu/hr**
- ▶ **Where standard OVENPAKS can't meet emissions**
- ▶ **Where Ultra Low Emissions burners exceed emission requirements, are too expensive, or have insufficient turndown**
- ▶ **ANY NEW APPLICATION**