UOP Callidus Ultra-Blue Burner (CUBL)

DESIGNED FOR ULTRA-LOW NOₓ EMISSIONS

Advanced burner technology
UOP Callidus Ultra-Blue (CUBL) Burners

The UOP Callidus Ultra-Blue (CUBL) is rapidly becoming the preferred Ultra-low NOx process burner. An innovative design has been employed which increases the burner's stability and allows for optimal performance on typical refinery fuel gases and 100% natural gas. The new design also increases the tile exit velocity which enhances fuel/flue gas/air mixing, providing a shorter, “stiffer” flame as compared to other next generation Ultra-low NOx burner designs.

Using our extensive engineering experience and ground breaking innovation, UOP Callidus designed the CUBL to meet our customers’ challenges.

With specific requests and developmental mandates from the industry’s leading companies, the CUBL was created with these distinct advantages:

No special operating needs
- The CUBL does not require start-up lances or special procedures
- Operations are no different than a conventional burner

Able to fit in virtually any application
- Natural draft or forced draft
- Flat flame or round flame
- 2 MM Btu/hr to 45 MM Btu/hr with higher levels possible
- Round flame tile has the smallest diameter of any comparable duty, ultra-low NOx burner available, allowing for retrofits without floor modifications
- Fires — vertical (up or down) or horizontally
- Operates with a wide range of fuels
- Perfect for retrofit of older heaters originally designed for conventional raw gas and premix burners

Extremely Stable
- The CUBL is stable and can achieve 10 to 1 turndowns

Shorter Flame Lengths
- Typical flame length of (1.56 m/MW)

Better NOx Reduction
- 10-20 ppmv are typical without any additional technologies (steam, external flue gas, etc.)
- The CUBL is a highly staged, internal flue gas recirculation burner

Reduced Maintenance
- No metallic flame holders to burn up
- Primary tips are well away from the combustion and cooled by air stream
- Staged tips are shielded by refractory

CUBL Capacities

Heat Release vs. Airside Pressure Drop

CUBLF
- Designed for cracking and coking furnace applications, the CUBLF is suitable for firing up a wall, across the floor or free standing in the furnace.
- Mechanical safety and integrity
  - Burner tiles use no metallic parts creating better thermal expansion while providing longer burner life

Control flame quality
- Reduced tile size results in thinner flames eliminating rollover
- All tip drillings are carefully engineered and tested to optimize heat flux profile

No special operating needs
- CUBLF does not require start-up lances or special procedures
- Emissions with less than 40 ppmv in the field

CUBL-DF
- The CUBL-DF takes the proven CUBL technology one step further incorporating the use of separate manifolds to fire PSA or off-gases. The results are incredibly low NOx levels. Additionally, the improved exit velocity from the CUBL-DF tile minimizes the flame leaning that can sometimes occur in a down fired reformer. UOP Callidus has supplied thousands of down-fired CUBL-DF burners for reformers in hydrogen, ammonia and methanol service.
- Key Features:
  - Fuel source flexibility
  - Low maintenance
  - Outstanding combustion performance
  - Ultra-low NOx

CUBLX
- Based on the proven CUBL technology, the CUBLX burner uses a series of primary combustion air inductors designed to maximize the amount of air that is introduced into the primary combustion zone of the burner.
- This added technology provides outstanding performance for furnaces with low-draft operations, short radiant box heights, tight burner-to-burner spacing or internal currents that prove to be a challenge for other “Next Generation” burner technology. This advanced technology gives the CUBLX its ability to produce 40% more heat capacity in comparison to other “Next Generation” burner that require larger heater floor cut-outs.
- Key Features:
  - More duty from a smaller burner
  - Shorter, stiffer flames (1.3 m/MW)
  - Smaller burner circles or more burner to burner spacing
  - Ultra-low NOx

CUBL-HC
- The CUBL-HC burner takes advantage of the CUBL technology and applies it in high capacity, forced draft situations. In these applications, large heat releases are required and there is additional need for shorter flames than traditional ultra-low NOx burners. Utilizing the high airside pressure drop available on most high heat release, forced draft projects, the CUBL-HC yields ultra-low NOx emissions and compact flames.
- Key Features:
  - Flame Lengths as short as 0.5 ft/ MMBtu (0.52 m/MW)
  - Compact design retrofits into the most challenging furnaces
  - Suitable for high airside pressure drop applications.
  - Stable through a 10:1 turndown
  - Modular design is adjustable for retrofit projects using existing cut-outs and air delivery systems
Test Facility

The UOP Callidus test facility is in continual use for combustion technology research and development as well as customer witnessed demonstrations. Our array of test systems allows us to closely match actual field operating conditions, providing results which will more accurately predict actual measured performance.

Global Coverage

UOP Callidus reaches the global market through our headquarters located in Tulsa, Oklahoma, USA with regional direct sales offices and independent sales representation around the world. Meeting our customers’ expectations and setting the standards for the combustion industry have always been our company goals. Each burner, flare, thermal oxidizer and catalyst system we design and manufacture is built with those goals in mind.