## Continuous Monitoring in Boilers and Furnaces

BoilerSpection HD and SD

- **Capture lost boiler capacity** by reducing unnecessary cleanings

- **Increase efficiency** by improving heat transfer with precise knowledge of slag and ash buildup

- **Lower maintenance costs** by optimizing cleaning and identifying large deposits (clinkers) before they cause damage to boiler tubes

- **Optimize fuel-switching** by directly and accurately measuring ash rate and uniformity as fuel changes

- **Manage combustion** by tracking uniformity of ash deposits

BoilerSpection HD

BoilerSpection SD
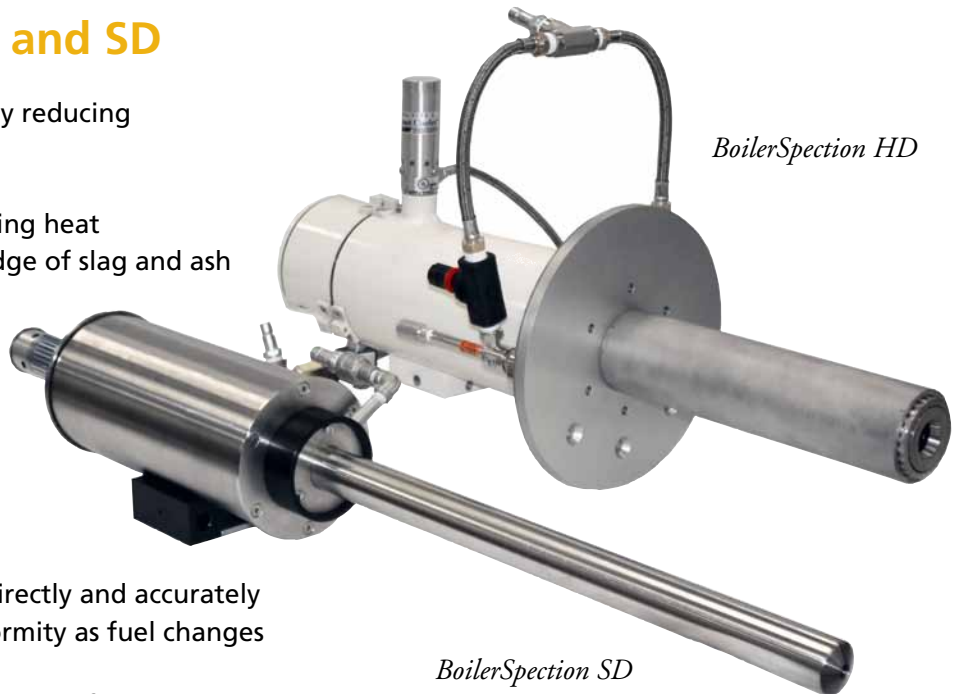
Increasing demand for efficiency and improved emissions and pressure to lower operating costs are the principal challenges faced by coal plant operators today. To solve these problems, plant operators need a view inside the boiler, furnace, or kiln. This insight would provide the necessary information to effectively and optimally manage operations.

LumaSense Technologies, Inc., the global leader in light-based imaging for complex industrial applications, has developed a turn-key solution for boiler and furnace applications. The new BoilerSpection system provides continuous, real-time, through-flame imaging and is resilient and robust enough to withstand the harshest conditions.

BoilerSpection includes state-of-the-art optics, infrared cameras, an auto-retraction device, networking components, and software to control the entire system remotely. The BoilerSpec™ software is a powerful tool for analysis and historical trending, outputs to automation and DCS, along with a real-time web server to broadcast images over the plant's network. Additionally, LumaSense offers commission services, technical support and preventative maintenance for the lifetime of the system.

LumaSense's combination of unmatched infrared expertise and deep industrial experience results in the industry's best through-flame image quality to help coal plant operators achieve necessary efficiencies, best manage emissions, and arrive at real cost savings.
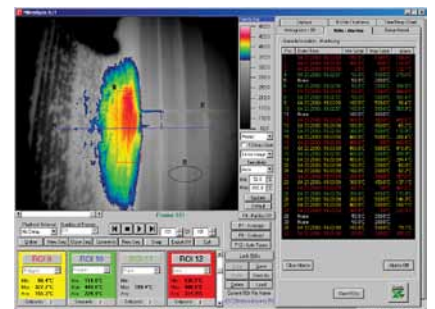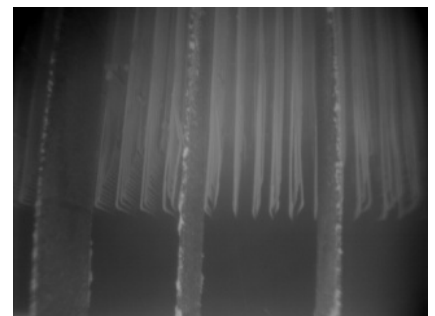
Technical Data

IR Camera

Wavelength	Narrowband 3.9 μm
Resolution	320 x 240
Detector Type	Uncooled Focal Plane Array VOx Microbolometer
Protective Housing	**SD:** IP66; **HD:** IP54; both with Integrated Vortex Air Cooling
Measurement Range	**SD:** 500 to 1600°C (932 to 2912°F) **HD:** 400 to 1600°C (752 to 2912°F)
Ambient Environment	Up to 60°C (140°F)
Camera Weight	**SD:** 30 lbs (13.5 kg); **HD:** 60 lbs (27 kg)

Lens

Construction	Stainless steel with air cooling and purge
Field of View	**SD:** 50° H x 38° V **HD:** 46° H x 35° V
Focus	**SD:** Manual; **HD:** Motorized
Protection	Sapphire window tip with air purge shield
Diameter	**SD:** 1.65" (42 mm); **HD:** 3.39" (86 mm)

Facility Connection Requirements

Power	110-240 VAC, two 15 AMP lines to support six camera
Electrical Cabinets	All cabinets/panels are NEMA 4 / IP65
Air Supply	**SD:** 20-30 scfm at minimum 80 psi per camera **HD:** 40-45 scfm at minimum 80 psi per camera

Automatic Retraction Device and Mounting

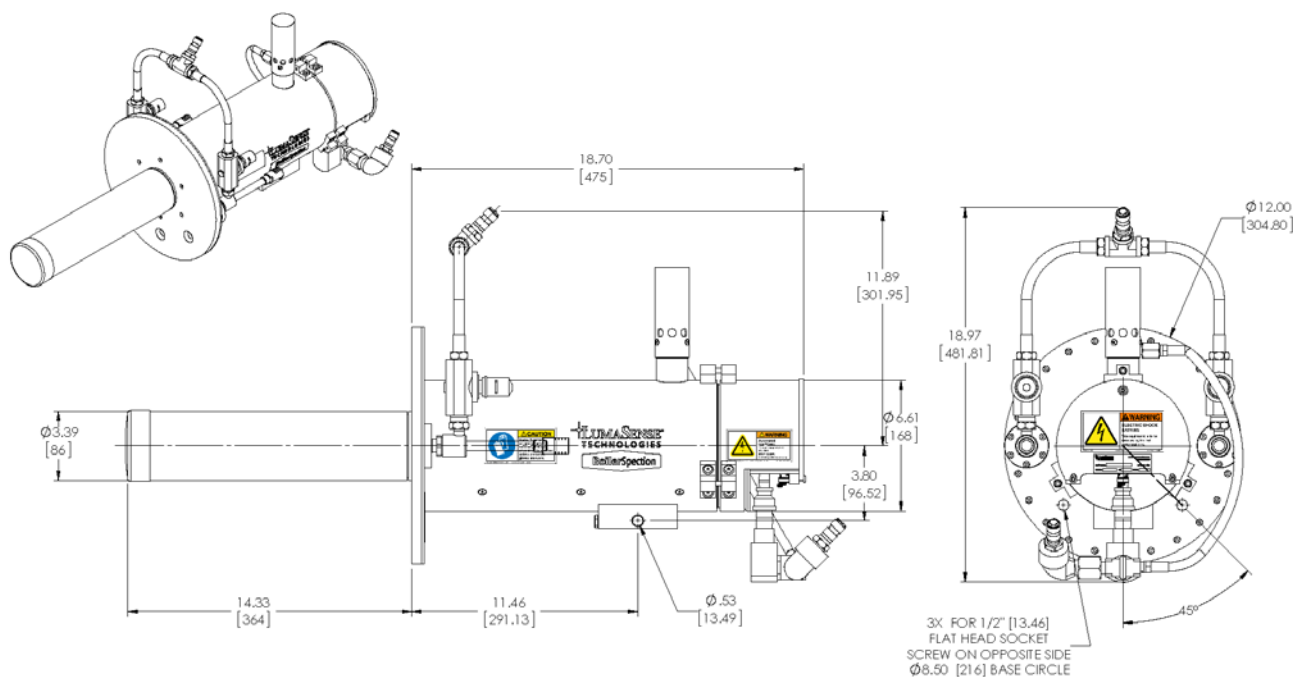|	
Controls	Automated retraction if air or power is disrupted
Air Filters	Two stage filter system
Air Regulators	Included
Mounting	Weld- or bolt-on mounting plates
Waterwall Opening	**SD:** 2" (50 mm) gap; **HD:** 4" (100 mm) gap
Weld-on thru Hole	**SD:** 2.5" (64 mm) circle; **HD:** 5" (127 mm) square
Furnace Pressure	Negative, balanced, or positive pressure

Networking

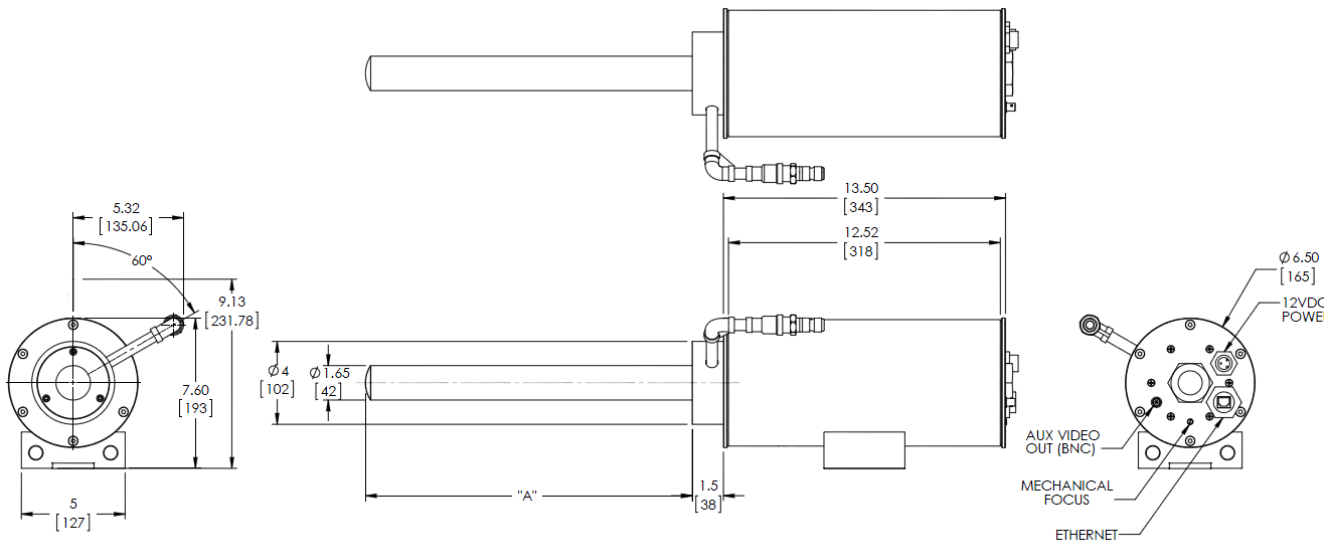|	
Number of Cameras	Up to 24 with a single controller
Camera Connection	100 Base T Ethernet
Field Switch Enclosure	NEMA 4 / IP66 enclosure with Ethernet Switch
Connection to Control Room	Fiber Optic Link, 50/125μm core/cladding diameter multi-mode fiber, 850/1310nm wavelength

BoilerSpec Control Room Server/Software

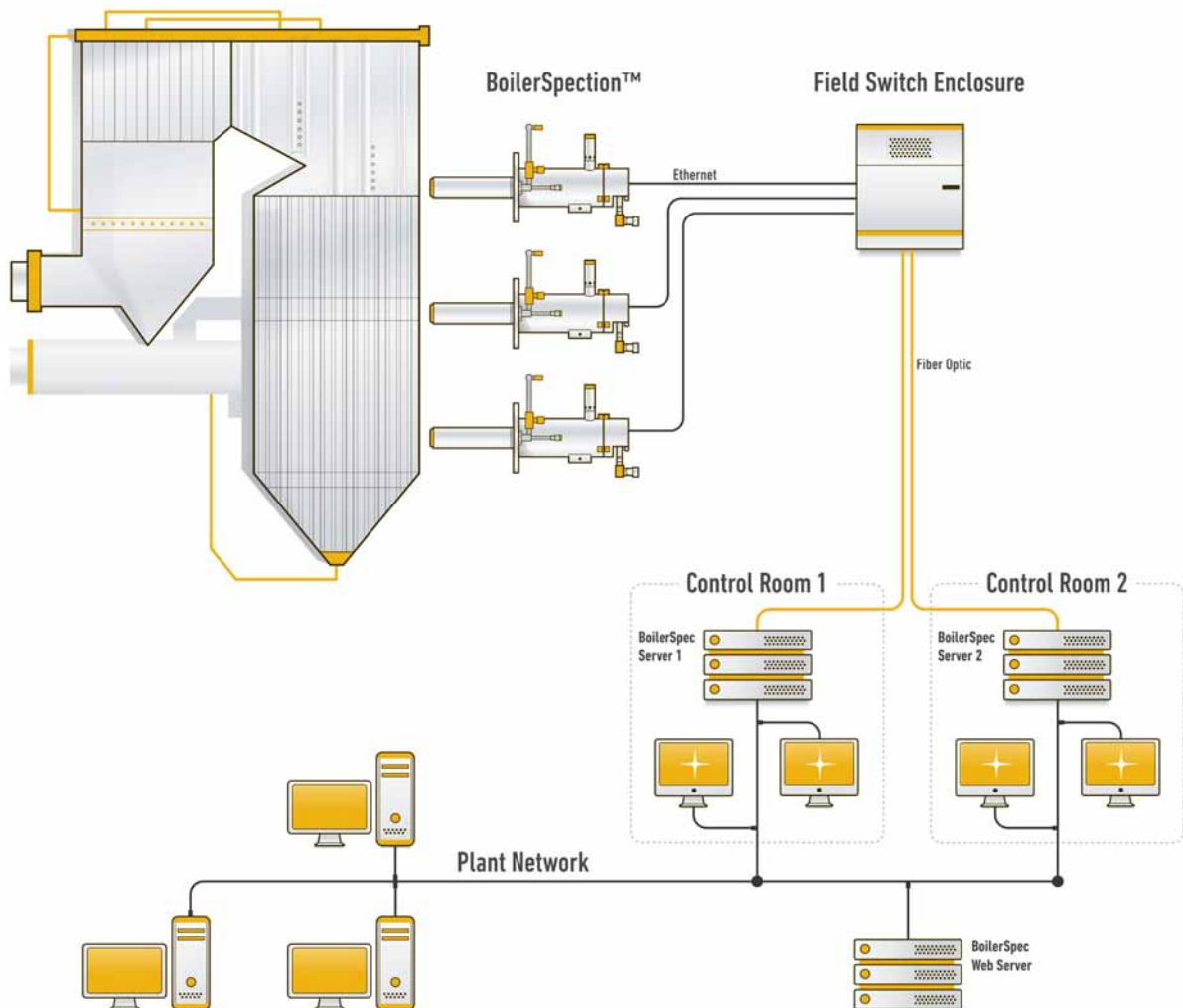|	
Key Features	Alarms, automated image analysis, regions of interest analysis, auto archiving
Server	Single server controls up to 24 camera systems

HD Dimensions

SD Dimensions

5.32
[135.06]

60°

9.13
[231.78]

7.60
[193]

5
[127]

13.50
[343]

12.52
[318]

⌀4
[102]

⌀1.65
[42]

"A"

1.5
[38]

⌀6.50
[165]

12VDC
POWER

AUX VIDEO
OUT (BNC)

MECHANICAL
FOCUS

ETHERNET

BoilerSpection System Configuration

Typical installations have anywhere between three (3) and twelve (12) cameras per boiler. BoilerSpection is configurable to meet different requirements.

BoilerSpection™

Field Switch Enclosure

Ethernet

Fiber Optic

Control Room 1

Control Room 2

BoilerSpec Server 1

BoilerSpec Server 2

Plant Network

BoilerSpec Web Server

Installation

The BoilerSpection system can be installed and commissioned either while the boiler is operating or during an outage. The cameras system mounts to the furnace wall via a mounting plate. LumaSense offers a choice of weld-on or bolt-on mounting plates. Exact dimensions can be customized by request.

BoilerSpection HD

BoilerSpection SD

The standard BoilerSpection system has the following requirements:

• Facility connections

• Ports with a 3.5" (90 mm) clearance for HD or 2" (50 mm) for SD systems

• Less than 330' (100 m) distance between cameras and the field switch cabinet

• Less than 820' (250 m) distance from field switch cabinet and control room

• Instrument grade air

Ordering and Configuration Details

Available Options
• BoilerSpec web server software for remote broadcasting of data over plant network(s)
• I/O outputs and relay outputs for DCS, PLC or connection to trigger cleaning equipment
• Interface for third party plant historical archiving programs
• OPC server
• RAID memory systems

Service Offerings
• Installation and commissioning
• Preventative maintenance
• Training
• Extended warranty

Available Documentation
• User's manual
• Installation planning guide
• Mounting drawings
• Mechanical drawings

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