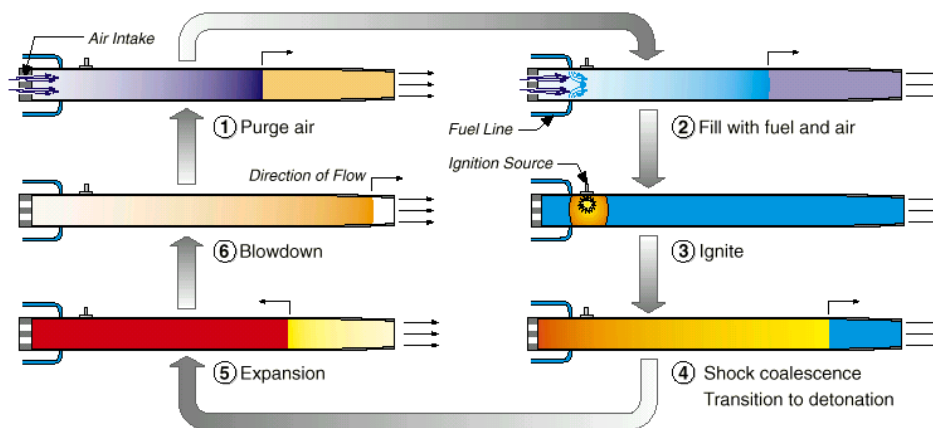




IMPULSE® Cleaning System

The **IMPULSE** cleaning system utilizes a powerful supersonic combustion process to create an exceptional amount of cleaning energy. The combustion process occurs in the chamber of the IMPULSE cleaner, producing strong shockwaves which accelerate to thousands of meters per second before entering the boiler and/or heat exchanger to dislodge buildup on the convection surfaces.

The proactive cleaning cycle (typically operated every 30 min. to 90 min.) prevents deposits from accumulating and solidifying in place and provides steady and improved heat transfer efficiency.



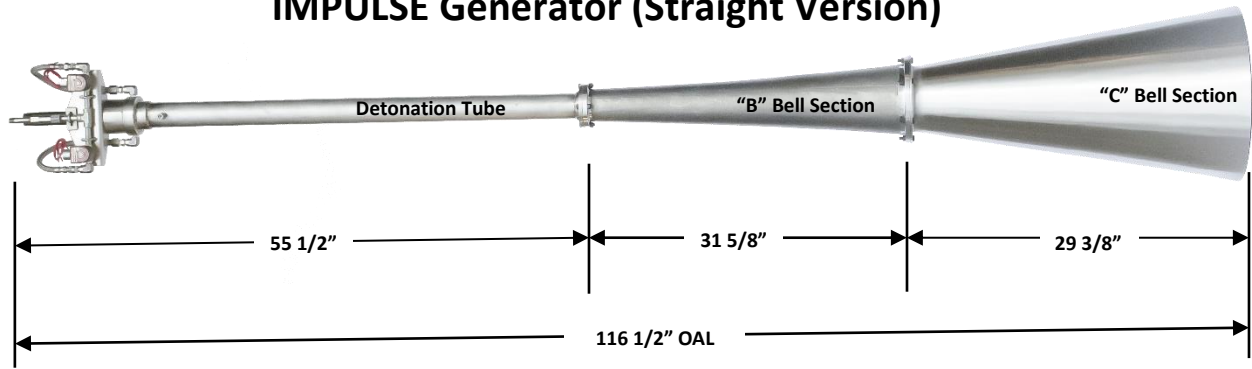
The **IMPULSE** cleaning system is non-erosive and will not damage the boiler. It provides non-line-of-site cleaning energy to remove the buildup that the steam soot blowing cannot reach.

The **IMPULSE** cleaner can greatly reduce, or on many occasions, eliminate the need for steam soot blowing and greatly extend the period of time between downturns caused by the need to off-line clean. The result of this cleaning system is an increase in boiler operation availability and minimization of excessive maintenance expenses created by off-line cleaning.

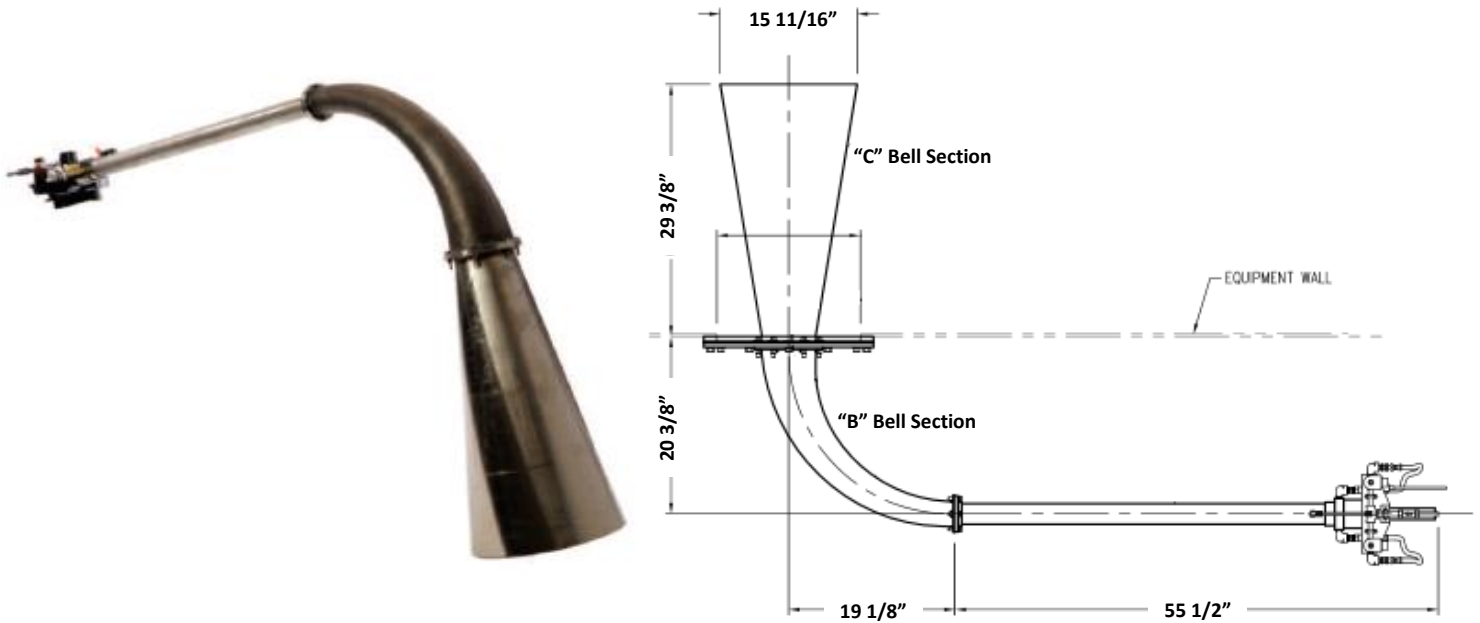
Specifications and Dimensional Information

- Frequency of cleaning cycle.....every 30 minutes to 1 hour (Typical)
- # of impulses per cleaning cycle.....20 bursts (Typical)
- Material.....Stainless steel
- Max Operating Temperature.....1800° F (982°C)
- Weight (Including mounting hardware).....205 lbs. (93 kg)

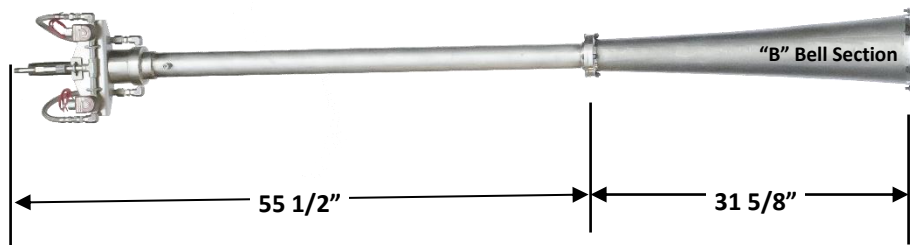
IMPULSE Generator (Straight Version)



IMPULSE Generator (Curved Version)



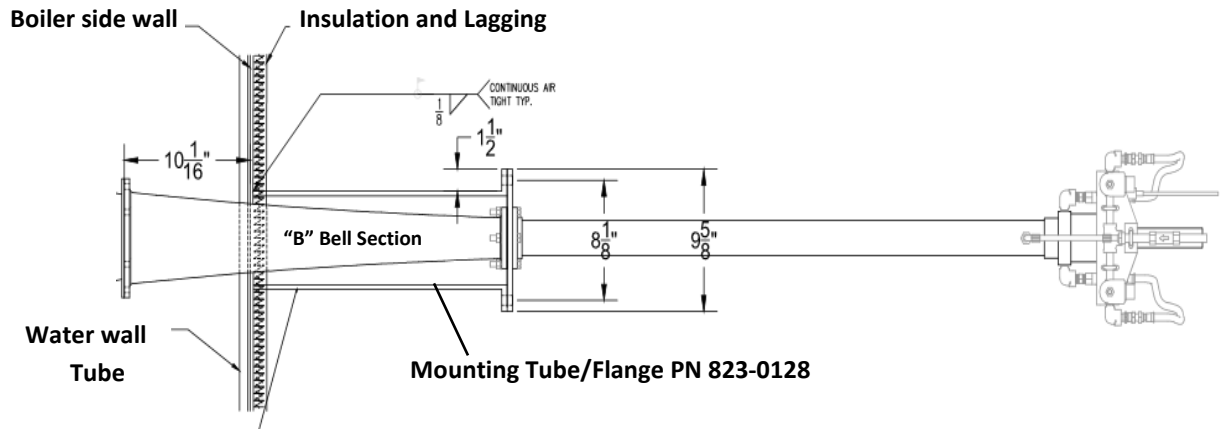
IMPULSE Generator ("Abbreviated" Version-Used in small or tight spaces)



The IMPULSE cleaner is simple and inexpensive to install.

Typical Installation Arrangement-Small Opening or Sootblower Port

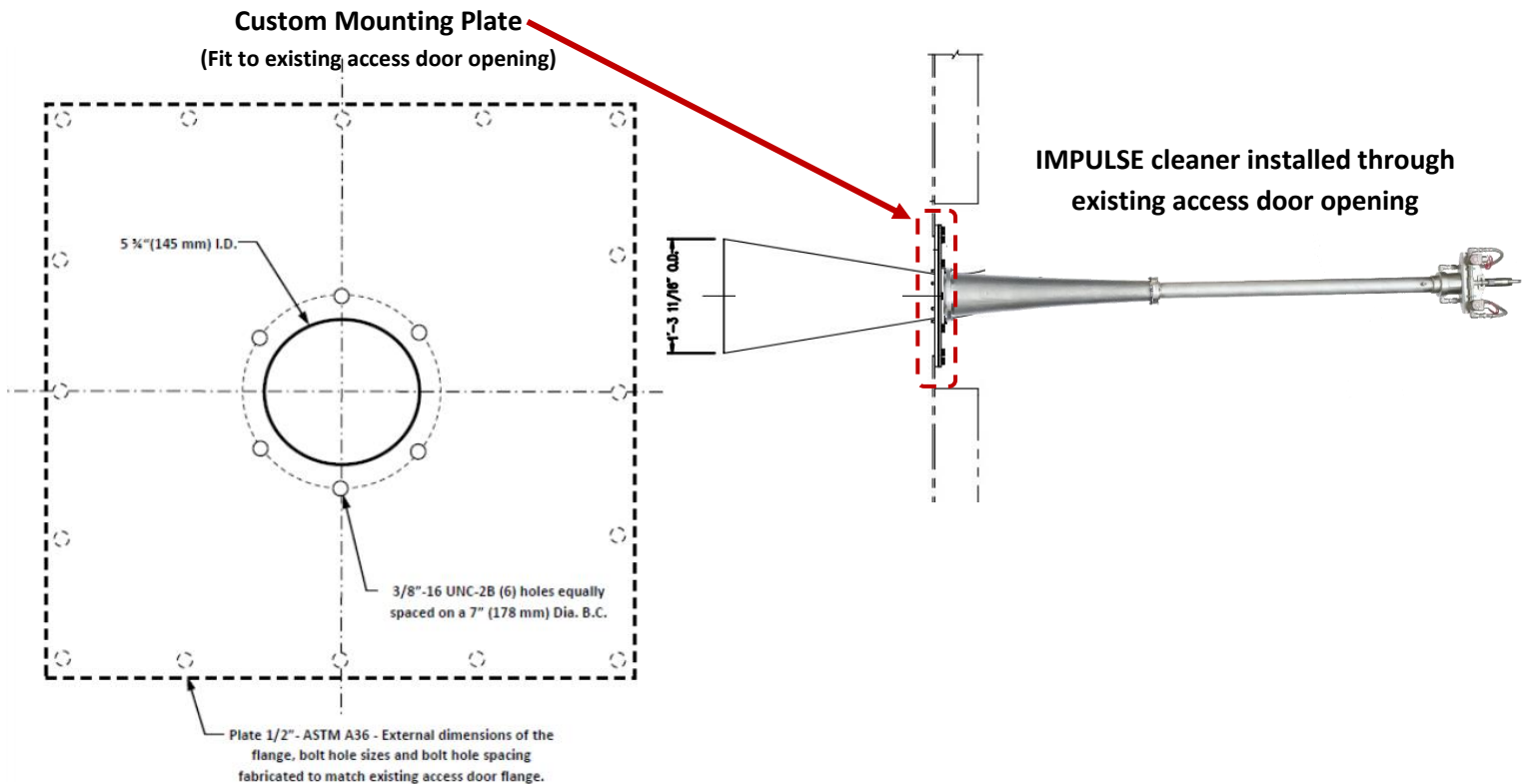
Installed utilizing relatively small boiler opening. The installation would require a mounting tube be welded to the outside of the vessel. The middle bell section would be backed through a 5" dia. to 9" dia. opening and the bell flange would be bolted to the mounting plate on the tube.



IMPULSE cleaner backed through existing soot blower, inspection port or other small opening. Can be backed through a 5" to 9" opening. "B" Bell section will be in direct contact with the gas stream.

Typical Installation Arrangement-Access Door

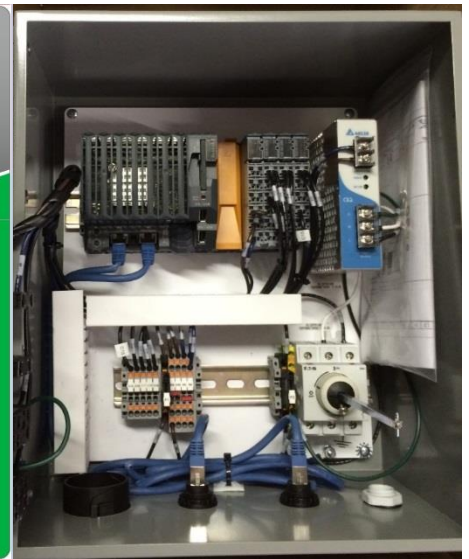
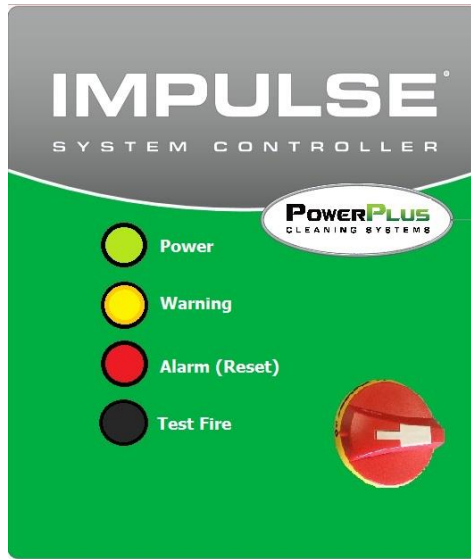
Install IMPULSE Cleaners through the current access door openings, utilizing a custom fabricated mounting plate, bolted onto the studs used to affix the existing door flange.



IMPULSE Cleaning System Controller

The IMPULSE System Controller coordinates all of the operations for the IMPULSE cleaner.

- Solid state components provide greater reliability and allow for easy replacement and repair.
- Intuitive and informative graphic user interface
- Monitoring capability for gas and airline pressures.
- Very robust multi-spark ignition system.
- UL Documentation



Graphic Interface/Programming Screens

The screenshot displays the graphical user interface (GUI) for the IMPULSE SYSTEM CONTROLLER, accessed via a VNC viewer. The interface is divided into several sections:

- Cleaning Cycle Definition:** A table for configuring the cleaning cycle.

Parameter	Value	Range
Pre-Cycle Air:	5	Seconds (5 - 60)
Post-Cycle Air:	10	Seconds (10 - 60)
Impulses Per Cycle:	20	(1 - 40)
Fuel Fill Time:	250	mSecs (70 - 400)
Time Between Impulses:	500	mSecs (max. 10000)
Time Between Cycles:	1	Mins (1 - 1440)
Max Misfire Count:	10	
Impulse Threshold:	25	PSI (min. 5)
- System Settings:** A section for configuring system parameters.

Low Fuel Limit:	1	PSI
Arming Delay:	5	Seconds (3-10)
Prefire Signal:	30	Seconds (0-60)
System Enable:	<input type="radio"/> Enable	
System Mode:	<input type="radio"/> Timer <input checked="" type="radio"/> Trigger	
- Network Settings:** A section for configuring network parameters.

Controller IP:	192	:	168	:	1	:	2
Subnet Mask:	255	:	255	:	255	:	0
Default Gateway:	0	:	0	:	0	:	0
- Monitoring:** A section for monitoring system status.

Enable	Next Fire	Air (PSI)	Fuel (PSI)
Disabled		0.0	0.0
- Commands:** A section for controlling the system.
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- Alarms:** A section for acknowledging alarms.
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- Config:** A section for accessing the configuration menu.
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