

Introduction

Thompson Industrial Services, a Clean Harbors Company, introduced the revolutionary EPIC® IMPULSE® Wave cleaning technology to the market in 2020, providing high-quality cleaning for Heat Recovery Steam Generator (HRSG) finned tubes, serving the combined-cycle power industry. Through our dedication to continuous improvement, the cleaning system has undergone significant improvements; it can now service all finned tube applications across a variety of industries, including furnace convection sections, boilers and thermal oxidizing incinerators.

It is with great pride that we now announce the implementation of our third generation with the successful roll out of our EPIC® 3.0 technology.

The Challenge

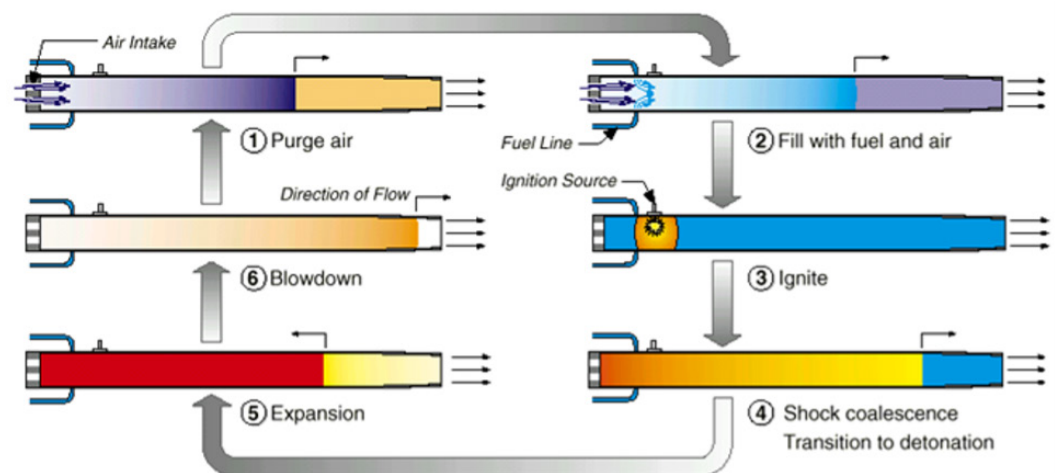
Thompson's dedicated EPIC® technical team provides customized engineering solutions to service each client's individual needs. As such, we are always looking for enhancements that will increase the cleaning depth into finned tube bundles. The evolution of

our EPIC® technology has increased the cleaning power of the system by providing higher pressure IMPULSE® waves deeper into the finned tube bundles, with the ultimate goals of reducing system back pressures to near design conditions and optimizing heat transfer efficiency for the specific application being cleaned.

EPIC® utilizes cyclic combustion events to create supersonic impulses, driven by an injection of fuel and air into an integrated mixing chamber, followed by ignition and propulsion. The subsequent wave is a result of the acceleration of a flame to supersonic speeds within a detonation tube. This process takes place twice per second to produce waves that will fracture and dislodge deeply embedded deposits.

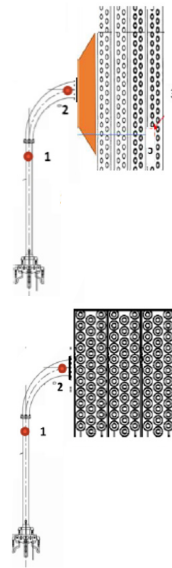
The original design utilized a 2" detonation tube, which was increased to 2.5" in the second generation. Our team took on the challenge of increasing the tube diameter to 3", while still adhering to personnel and support-rigging weight requirements and providing efficient cleaning to the equipment on-site.

Twice per second, our EPIC® 3 technology creates supersonic impulses that easily fracture and dislodge deeply embedded deposits.



The Process

A systematic DOE was undertaken to compare multiple variables between early-stage EPIC® equipment – including the use of directional “hoods” and detonation tube sizes – to the newer design utilizing 3” tubes. The data below demonstrates the findings of the most optimized testing results and confirms that the new design generates *3 times the cleaning power* of the previous generations at nine tubes deep within the bundle. In addition, it was determined that elimination of the hoods provided increased cleaning depth into a tube bundle.



Gen. 2.0 EPIC test results on a HRSG

2.0 Combustion Tube		Pressures
Sensor Location	1	370 PSI
	2	209 PSI
	3	1.77 PSI

2” combustion tube with directional hood

Gen. 3.0 EPIC test results on a HRSG

3.0 Combustion Tube		Pressures
Sensor Location	1	1,853 PSI
	2	836.36 PSI
	3	6.15 PSI

3” combustion tube *without* directional hood (hood did not enhance performance)

The Results

The EPIC® 3.0 system was used in the Fall of 2024 to clean HRSG finned tubes on three units that had been cleaned with previous EPIC® generations in 2022. Prior to the initial cleaning, each of these units had run for 15+ years without any tube cleaning being performed.

The data below shows, the average DP improvement utilizing EPIC® 3.0 was doubled versus the previous cleanings, while the overall CT back pressure was improved by >1 IWC. These results are especially significant given that these units had been cleaned only three years before, with less chance for excessive buildup of debris on the tubes.

	HRSG 1	HRSG 2	HRSG 3	Average
DP Reduction (WC) EPIC 2nd Generation	3.7	2.1	2.7	2.8
DP Reduction (WC) EPIC 3.0	4.0	5.4	8.3	5.9
Back Pressure vs. Design (WC) EPIC 2nd Generation	0.82	2.50	2.50	1.94
Back Pressure vs. Design (WC) EPIC 3.0	0.81	1.00	0.80	0.87

The EPIC 3.0 Advantage

In addition to the increased power and cleaning depth, the EPIC® 3.0 system still provides all the advantages of the EPIC® technology compared to other technologies on the market such as:

- Reduced confined space entry time and elimination of scaffolding, providing no working at heights inside the unit.
- No indiscriminate blasting that could cause

damage to auxiliary components, such as catalysts and expansion joints.

- No tube stretching to reach deep within the bundles.
- The fastest project turnaround time in the market – typically less than half the time of other methods.

Learn more. Scan the QR code, call 803-934-0138 or visit industrial.thompsonind.com

