

# **MECHANICAL PIGGING Technology**



**Specialist Decoking of  
Fired Heaters & Transferlines**

**For decoking of fired heater tubes there are two primary choices: steam air decoke or mechanical pigging.**

## STEAM AIR DECOKE?

Steam air or thermal decoking is widely recognized as the traditional method for removing hydrocarbon contaminations from the internal surfaces of fired heater tubes.

Within the skill limitations of this procedure, it can clean radiant tubes effectively. However, there are known drawbacks in aspects of technical, commercial, safety and environmental concerns. When mechanical decoking using scraper pigs became available from the early 1990's, many refiners were quick to grasp the opportunity to benefit from the clear advantages of this new decoking process.

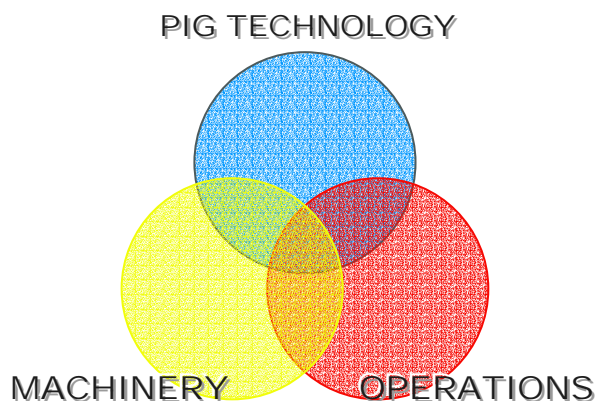
## MECHANICAL PIG DECOKE?

After more than 10 years use, advantages from pigging have become easy to identify:

*Minimize downtime – save up to 24 hours in a typical heater decoke*  
*A cleaner, smoother tube coil; coke, inorganics and obstructions removed*  
*Contaminations collected – no mess, eliminating polluting emissions*  
*A measured result where removed coke can be seen and evaluated*  
*Both convection and radiant tubes cleaned efficiently and thoroughly*  
*U-bends and mule/box headers cleaned without heater modification*  
*Inlet and outlet transfer lines can be cleaned simultaneously with process tubes*  
*No tube damage – especially avoiding internal erosion damage to u-bends*  
*A safer and more predictable decoke, saving time in other areas*  
*Potential improvement to heater run lengths and general reliability*

So, given that a case is made for pigging - which system should be chosen for best results? Is it soft core pigging, or hard solid pigs? With our *innovative* technology, we offer a new and more efficient alternative.

For best results and honest achievement, control of all three essential components is ideal. Without disconnected Licensees, we offer genuine single point responsibility. Regional centers in shared ownership have the highest level of knowledge, authority and responsibility.



## MECHNAICAL PIGS - their design and manufacture

In order to blend strength & durability with essential flexibility, the pigs are of a complex laminated construction using high performance polymers mixed with gas filled thermoplastics. Each pig is produced through eight separate casting processes.

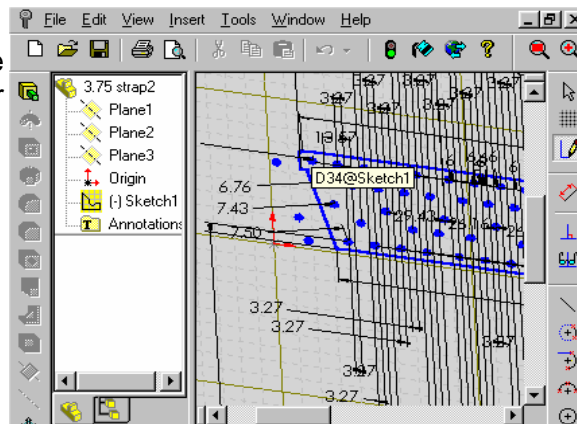


All pigs are prepared and cast identically, each being tested for compressibility quotients. Manufacture and stock control are managed at our own premises under ISO 9001 internationally accredited quality systems. With such close control of design and production, feedback from site operations is regularly used to adjust technology for continuous improvement.

*Mechanical* pigs need no modification for passage through mule header returns and are capable of passing bi-directionally from inlet to outlet whilst thoroughly cleaning convection & radiant sections.

Our pigs are not a standard hard bodied scraper pig, nor standard soft core. Its design and construction uniquely combines strength and flexibility to produce consistently a thorough clean bore decoke in reduced downtime.

The latest computer aided design software is used to set out abrasive appendages for optimum tube wall coverage. Cleaning studs are positioned accurately in planned sequences to avoid tracking and patching. As an example, the most commonly used size - 3<sup>3</sup>/<sub>4</sub>" – is made up of 106 individual component parts and uses six specially machined alloy moulds in its production.



Mechanical pigs need no preparation or adjustment on site, and are made to be sacrificial in order to prioritize tube protection. Coke deposits are typically removed in shale pieces and fine material like black sand with all particulate larger than 750 microns retained in two stages of stainless steel primary filtration.

## SPECIALIST DECOKING MACHINERY & EQUIPMENT

Based on the knowledge & experience gained over 10 years, the new Double Pumping Unit is the only one of its type designed and built in the 21<sup>st</sup> Century. Designated the SERIES 21, these machines incorporate the latest measurement technology for accurate pressure/flow rate detection and comparison.

All incoming data is recorded and displayed in the computerized control room. In this organized environment, the decoking operation is brought to a predictable conclusion. Two trained Control Operators are able to manage the procedure with complete inter-communication, and with the clearest live display scientific monitoring.



Proper control of decoking is in-built. Pigs are recorded and tracked in such a way which limits the likelihood of pigs becoming lodged or lost. Such close management diminishes time wasting and promotes quality decoking. An insulated steel framed control room is equipped with air-conditioning and heating to cope with operations in all environmental extremes +40°C & -40°C. Built into the new machinery are integrated storage areas for comprehensive on-board inventory of valves, launchers, tools & consumables. This well organized facility provides for complete on site resource. Significant further compartmented storage is created by the stainless steel geodetic style engine and pump mounting frame, accumulating total on-board storage to more than 400 cubic feet. Additional to this is a standard carried stock of 700 feet of certificated hard alloy tube and flexi connection tubing.



### MACHINE DIMENSIONS & DATA:

Length overall: 40 feet (12.6m)  
 Width: 8 feet (2.5m)  
 Height: 13½ feet (4.0m)  
 Road weight: 25 tons

Clean water capacity: 3,000 gallons  
 Diesel fuel capacity: 300 gallons

Twin Waterous Pumps.  
 Max pressure: 600 psi  
 Max flow: 2,000 gal/min (each)

The machinery is specially designed for prompt & accurate measurement for scientific enhancement of operations, and to produce a prompt, valuable and detailed Operations Report. The Refinery Client will be given a printed folder containing useful decoking management data, including critical before & after pressure flow comparisons presented in chart form for immediate close analysis and understanding of improvements.

