



Slim Combination Cutting Tool With AutoShift™



Revolutionizing coke cutting

With more than 100 years of decoking experience through its Worthington®, Pacific® and IDP® heritage brands, Flowserve is the undisputed global leader in hydraulic decoking systems. It has pioneered many significant advancements in decoking and transformed it into an increasingly safe, efficient and automated process. And, with its Slim combination cutting tool with AutoShift, Flowserve has revolutionized the industry.

The Slim combination cutting tool with AutoShift makes remote operation feasible by removing the operator from the cutting deck. Mode shifting is accomplished automatically and remotely by water pressurization and depressurization, not manually as with other tools. As such, there is no personnel exposure to the following dangers:

- High-pressure water
- Hot spots or steam eruptions
- Hydrogen sulfide (H₂S) vapors
- Mechanical hazards

Key advantages

The Slim combination cutting tool with AutoShift provides numerous benefits to decoking operations, including:

- Improved operator safety
- Greater system automation
- Easier maintenance with field-replaceable nozzles
- Increased robustness to prevent tool damage
- Slimmer profile to reduce “stuck” tools
- Shifting flexibility to free “stuck” tools
- Manual shift feature



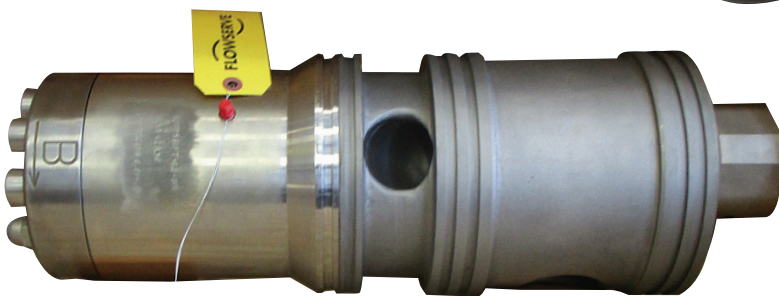
Coke cutting made safer

With the proprietary Slim combination cutting tool with AutoShift, decoking is automated, simplified — and most importantly — safe.

Traditional combination cutting tools require extensive handling to shift cutting modes manually. First, a pilot hole must be bored downward from the top of the drum through the coke bed using downward-oriented nozzles of the decoking tool. Then, the tool must be raised to the top of the drum where either the entire tool or the operating mode of the combination decoking tool is changed to use side-oriented cutting nozzles. Finally, the tool must be rotated and moved vertically downward in the pilot hole, where the side-oriented nozzles cut the balance of the coke and flush it out the open bottom of the drum.

Removal of the cutting tool from the drum, to either change it out or change its cutting mode, is a cumbersome and hazardous operation. Raising the tool out of the vessel can be very dangerous if the proper control system is not in place to terminate the fluid cutting pressure to the cutting tool.

The Slim combination cutting tool with AutoShift eliminates these dangers and reduces cycle times by shifting modes automatically and remotely in the drum. Moreover, its ability to remotely shift operating modes means that operating personnel do not need to be on the cutting deck, risking exposure to hot gases and mechanical hazards. The time savings positively impact the production capacity of the refinery by returning the decoked vessel to service quicker.



AutoShift cartridge

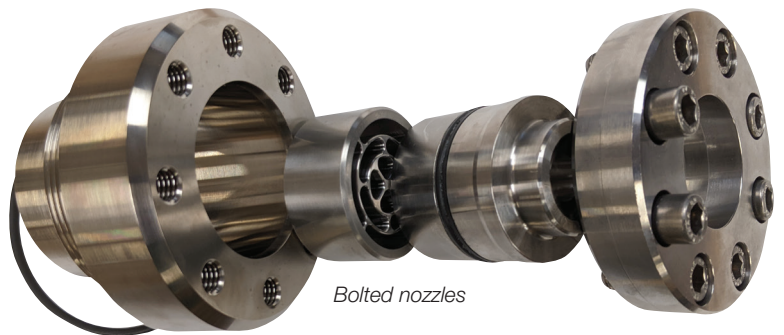
Available upgrade kit

The Slim cutting tool is not just available as new equipment. Existing Flowserve combination cutting tools, like the Combination Tool, RotaryShift and Flowserve Pacific tools, can be upgraded to the same technology used by the Slim combination cutting tool with AutoShift. The Slim tool with AutoShift retrofit kit includes redesigned nozzles and a mounting plate that fit existing Flowserve combination tool bodies.

The conversion requires the following assemblies:

- AutoShift cartridge (for conversion of older combination tools)
- A set of bolted cutting and boring nozzles
- The reduced-profile mounting plate

The conversion comes as a complete kit that can be retrofitted quickly at an authorized Flowserve Service Center. The retrofit includes a documentation package containing updates to the original operating manual.



Bolted nozzles