

## Refineries



### Refinery and FCCU Applications

Kennametal Stellite™ is in the unique position of being able to offer a multitude of solutions for the wear and corrosion problems that plague the refining industry. Whether the solution involves routine overlays of Stellite 6 or more complex remedies such as bimetallic castings, the staff of Kennametal Stellite will recommend and deliver the best solution to your problems.

Stellite solutions offer longer life, reduced unplanned down time, and reduced maintenance expenditures. Over its lifetime, a Stellite component will result in lower maintenance expense and less unplanned down time.

Typical applications in the refinery industry include: **Nozzles, Thermowells, Valves, and Pump Components.**

#### Nozzles:

A variety of nozzle configurations are used in refining and petrochemical processing to handle the injection and introduction of steam, air, hydrocarbon feed, coke, and various other chemicals. Nozzles must be designed to retain their dimensional and structural integrity from turnaround to turnaround. Abnormal erosion or fracture can seriously jeopardize process safety and the economics of the operations. Typical examples of wear resistant nozzles manufactured by Kennametal Stellite include: Riser/Reactor feed nozzles; Regenerator air nozzles; Steam stripping nozzles; Orifice chamber nozzles; Fluid coker nozzles.

#### Thermowells:

Of all metallic components in the refining and chemical processing industry, thermowells are exposed to the most severe of environments and, as such, require special attention. Flame spray or welded coatings of Stellite 6, 12, or 1 are often employed as a first line of defense in extending service life. Further enhancements to service life are achieved by utilizing Stellite 6 or 12 cast components. Maximum life is realized from a combination of Stellite castings overlaid with Stelcar coatings such as T-800 (Tribaloy), JK125 (chromium carbide) or JK117 (tungsten carbide). Thermowells flame sprayed with the Mo containing Stellite 700 series alloys are candidate materials for combating naphthanic acid corrosion in vacuum distillation and hydrochloric acid corrosion in catalytic reformers.

#### Valves:

As metal-to-metal wear is accelerated at high temperatures, valve trim, such as plugs, balls, gates, seats, stems, and slides, must be manufactured or repaired with alloys that exhibit good hot hardness to resist the effects of high temperature softening. A variety of solutions are available, ranging from hardfacing overlays and coatings, to castings and powder metallurgy parts for smaller components.

Cobalt alloys such as Stellite 6, 12, and 1 have been used extensively for years on large control valve seats and slides. While these alloys continue to work well, Tribaloy alloys and composites such as Stellite CRC50 and Stellite TIC20 are designed to resist even higher temperatures. Tribaloy T-800 is used for valves operating in MTBE service.

#### Pump Components:

Pump casings may be cast or selectively thermally sprayed with various Stellite alloys. Casing life may be further extended with the use of replaceable pump liners manufactured from Delcrome alloys (for low temperature service) or Stellite 6 liners (for more corrosive or high temperature service).

Pump impellers that experience high levels of cavitation (such as boiler feed pumps) may be cast from cavitation-resistant Stellite alloys with further enhancements in wear and corrosion protection being provided by selectively thermally spraying high wear areas.

Wear rings are generally hardfaced with Stellite 6 or Deloro 60 (in HF service). In severe wear environments, wear rings are thermally sprayed with Stelcar alloys that incorporate carbides of tungsten (JK117) or chromium (JK 135). Mechanical seal faces may be thermally sprayed with Stelcar alloys containing tungsten carbide.

#### Products

- FCCU Components (Fluidized Cat Cracking Units)
- Feed Nozzles
- Regenerator Air Nozzles
- Steam Stripping Nozzles & Injection Nozzles
- Orifice Chamber Nozzles
- Fluid Coker Nozzles
- Torch Oil Nozzles
- Thermowells
- Valve Trim (seats, stems, bushings, bearings)
- Pump Casings and Internals

