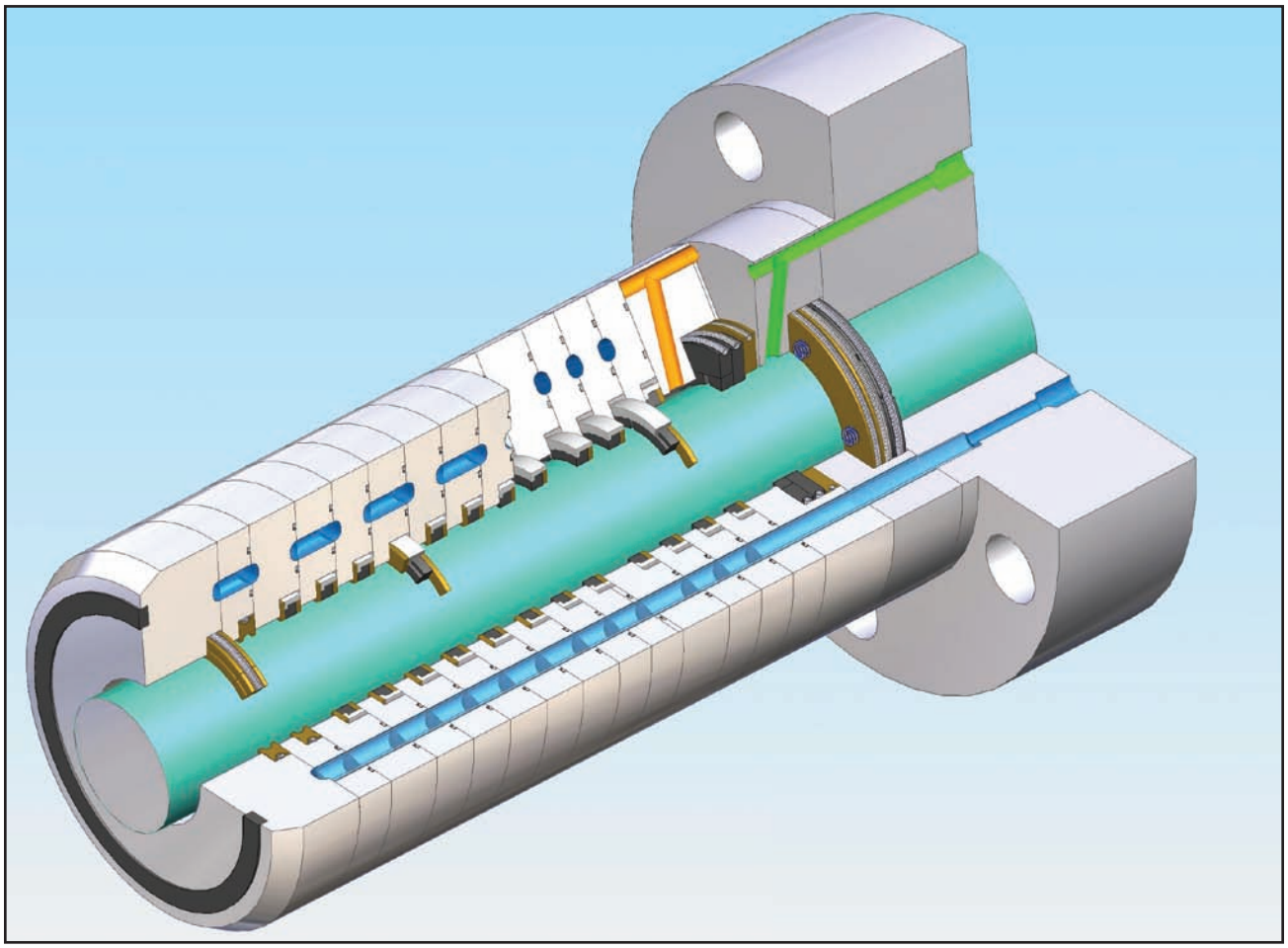


■ This packing case, with triple circle rings, is especially suitable for high pressure, nonlube applications. It is just one example of Castanet's successful labyrinth-type packing cases used on recycle compressors with extremely high pressures, up to 5800 psi (400 bar), and low pressure differentials.

CASTANET'S SKILLED MATCHMAKING SEALS LONG AND HAPPY LIFE

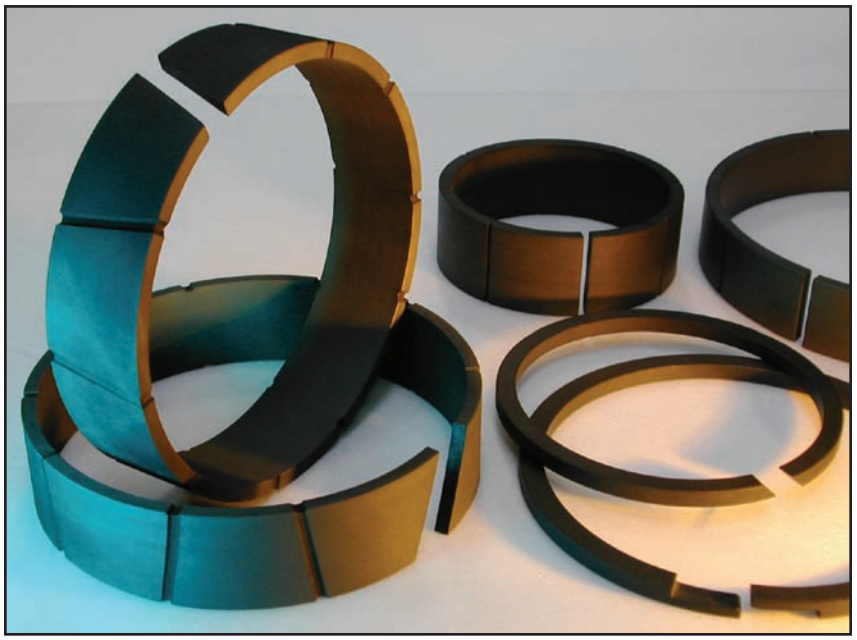
French Company Selects Materials According to their Intended Service to Extend the Life of Sealing Components

By Roberto Chellini

Castanet, the French specialist in sealing components for reciprocating compressors, is permanently engaged in developing and experimenting with new materials (metallic and plastic) that will improve the service life of single components and whole packings. Experience stemming from a wide range of applications on compressors of different makes, compressing a variety of gases at different pressure levels in an array of operating conditions, Castanet said, has allowed the company to acquire an unmatched know-how. With more than 30 years of experience, the company said its products can improve the performance of its customers' machines in terms of efficiency, reduced downtime and maintenance costs.

In the polymer material sector, Castanet uses a wide variety of materials, including new grades that have been developed to meet different service requirements. These sealing components are made from perfectly homogenous blends, with fillers selected to reduce the expansion rate of the PTFE, but especially to radically improve their mechanical characteristics and their wear and extrusion resistance. These compounds have improved heat stability and optimal friction properties (low friction coefficient, high self-lubricating power) which are particularly suited to nonlube service and allow the wearing-in time to be reduced. The heat generated between the sealing components and the friction surfaces is thus minimized, increasing the power efficiency of the compressor.

Castanet has developed a wide range of compression-molded (sintered) PTFEs to meet the requirements of most service conditions. The company said that the process by which Castanet-filled PTFEs are transformed is rigorously controlled. The curing cycle settings are monitored in real time on computer terminals. Material identification and traceability is also controlled. The company explained that it is in the position to fully trace all items



■ **French company Castanet manufactures a full range of piston and rider rings in high-performance polymer and other materials.**

supplied (from the base powder to the finished sealing component) from just an order number. It can also perform heat analyses to check that the bushing manufacturing cycle is correct.

For high-pressure and high-temperature applications, Castanet can offer PEEK-based composite materials with higher mechanical properties than filled PTFEs. They have higher mechanical and heat resistance (low expansion coefficient), and show no signs of extrusion under high pressure. These PEEK-based grades are an interesting alternative to metals, especially when the gases compressed under high pressures are too corrosive to allow metals to be used, or when the working temperatures are greater than those withstood by filled PTFEs. PEEK is particularly used to replace cast-iron or bronze components if it is possible to change the design (in terms of the overall dimensions). Unlike bronze, these compounds can withstand temporary lubrication deficiencies without causing serious damage to the cylinders or piston rods.

Compression of air and process gas by lubricated or nonlubricated compressors serve a variety of applications. For example, Castanet has acquired experience in compressing air at high pressure, 580 psi (40 bar) (PET) up to 3626 psi (250 bar), in nonlubricated compressors both in the saturated state (ambient air) and in the dry state (processed with an air drier, dewpoint 37°F to -40°F [3°C to -40°C]).

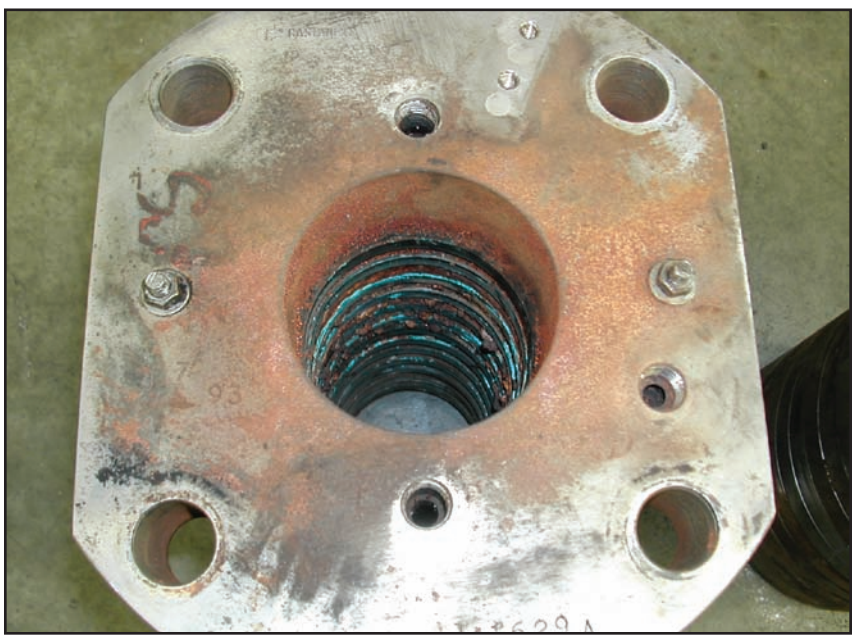
Process gases also may be compressed in the dry or lubricated conditions and sealing materials have to be selected according to the duty and the characteristics of the gas (flammable, inert, sour, dirty or toxic). Special care has to be taken when handling oxygen. In the case of oil-free compression of dry gases, there are three different service types:

- **Dewpoint >32°F (0°C).** In this case, Castanet recommends grades of material with specially selected fillers that were developed for standard oil-free operations (in non-extreme conditions).
- **-40°F< dewpoint <32°F (-40°C< dewpoint <0°C).** Castanet provides a new proprietary, middle range, polymer-filled material combining both economical and performance properties.
- **Dewpoint <40°F (<-40°C) "bone dry" gases.** Castanet has developed high-performance and high-strength polymer-filled PTFEs or more elaborate sintering processes.

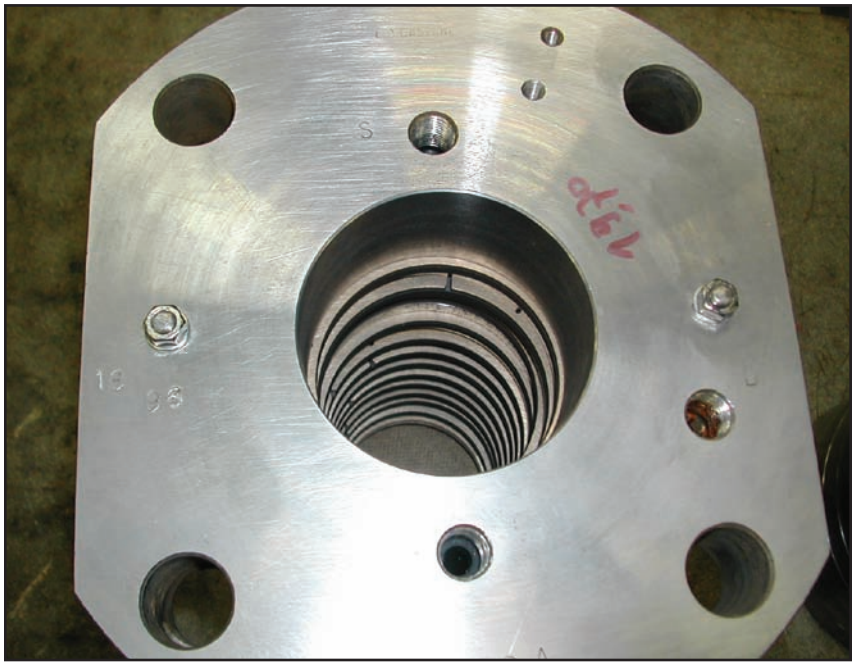
High-technology materials are essential for all these applications. When recommending high-performance materials, it is also essential to offer the optimal design and configuration of the sealing system in order to provide a reliable operation of the reciprocating compressors. Castanet has the necessary experience to do this.

The French company is also experienced in providing sealing components for high-pressure application of lubricated and nonlubricated compressors. For lubricated service in hypercompressors, the company manufactures packing cases for pressures up to 36,260 psi (2500 bar) and piston rings for differential pressures up to 5076 psi (350 bar). For nonlubricated service Castanet offers packing cases for discharge pressures up to 5800 psi (400 bar) and piston rings for differential pressures up to 218 psi (150 bar).

The piston ring is an essential part of a reciprocating compressor, and to optimize the flow rates and pressure characteristics the leakage rate of the piston ring must be kept to a minimum. Castanet manufactures its piston rings in a wide range of extremely wear-resistant materials in order to minimize



■ **Castanet provides a full packing case reconditioning service. After carefully inspecting the worn packing cases, the cups are repaired, finished, ground and lapped. The company follows the same manufacturing process as it uses for new components.**



■ **Once reconditioned, the packing cases, fitted with new packing rings, are just as reliable as new ones and can be remounted with no need to adapt the original dimensions. This is the same packing case illustrated before reconditioning in the previous photo.**

wear at the cut and to avoid any residual leakage. The company also offers a wide range of designs for improving sealing function according to the pressure, molecular weight of the gases (in the case of low-density gases) and the materials used. The company evaluates different types of cut and configurations to minimize residual leakage and the effects of wear on sealing performance. All of these technical solutions extend the service life of compressors and thus reduce operating costs through improved volumetric efficiency and increased service between scheduled overhauls.

Castanet reports that its pressure packing cases are recognized by customers for their excellent reliability. They are designed with standard segmental packing rings (radial/tangent) but also with labyrinth-type rings ("double and triple circle" packing rings), which are especially suited for high-pressure, nonlube applications. The company said it has an outstanding track record for labyrinth-type packing cases used on compressors with extremely high pressures. All of its packing cases are available with options such as vent, lube, water cooling connections and, above all, with inert buffer gas connection to avoid gas fugitive emission into the atmosphere.

Castanet supplies highly efficient oil wiper packing, which prevent any oil contaminating the cylinder, especially in the case of oil-free compressors where there should be absolutely no trace of oil. They ensure efficient scraping properties owing to their specially designed drain-off profile, the company said. Reliable control of crankcase oil leaks is economically vital in view of the increasing price of oil, and care for the environment is also an important consideration, Castanet said.

Economical operation of a compression plant depends not only on the life of components subject to wear, but also on the possibility of reconditioning old components and reusing them to achieve additional service life.

To that end, Castanet provides a full packing case reconditioning service. After carefully inspecting the worn packing cases, the cups are repaired, finished, ground and lapped. The company follows the same manufacturing process as it uses for new components. Once reconditioned, the packing cases, fitted with new packing rings, are just as reliable as new ones and can be remounted with no need to adapt the original dimensions.

Castanet said that its service is flexible enough to offer quick overhaul service to meet the deadlines imposed by tight maintenance schedules. A stock of spare parts can be maintained as part of an annual maintenance contract, something the company has in effect with a number of its best customers. ■

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