

ES5001 Compressor re-aero

Put your compressor back on the map when operating conditions change

energy

Engineered solution purpose

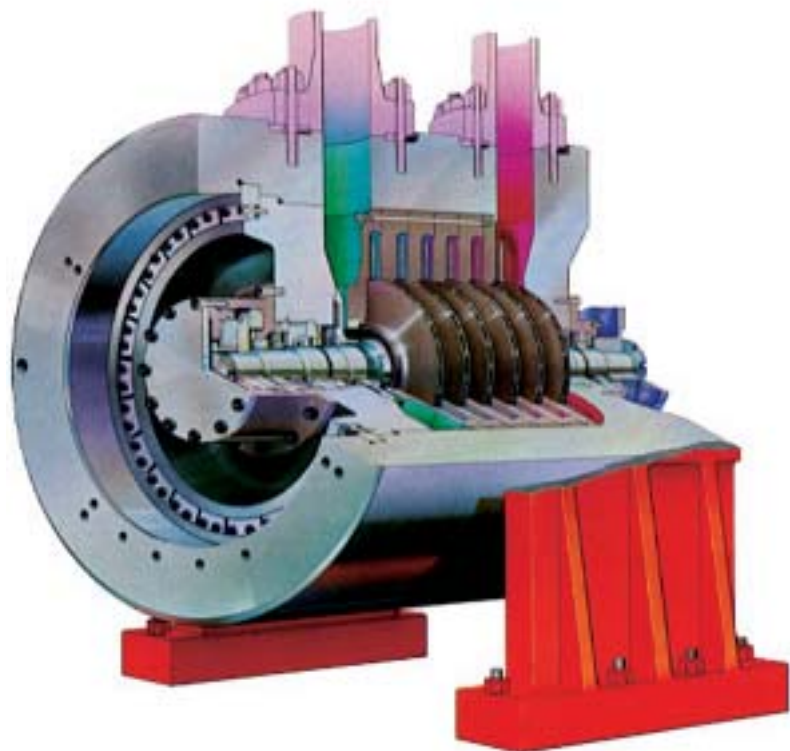
The original aerodynamic components in any compressor were designed to meet specified line conditions. As operating conditions change, compressor performance can change accordingly. The compressor inlet volume flow or head may have increased or decreased with regard to the original design point. The molecular weight of the gas may have changed due to new gas supplies. The smallest decrease in compressor efficiency can result in excessive fuel costs and increased life-cycle costs. At a fraction of the cost for a new compressor, the aerodynamic bundle can be re-worked to meet the new site conditions and re-store operational efficiency.

Applicability

All Rolls-Royce barrel and pipeline centrifugal compressors.

Technical description

In many cases, compressor re-aeros do not require any additional upgrades or modifications. Some applications may, however, require changes in couplings, bearing replacement, gearbox ratios, seals, lube oil system or driver. An engineering study will be needed to determine if any additional



Benefits

This engineered solution increases compressor efficiency, head, capacity, and operating envelope. The new components used incorporate design improvements with an increased number of parts being steel machinings rather than castings.

Efficiency improvements of up to 4% can be expected through improved design and manufacturing techniques. Further savings can result when a compressor is in an off-design situation.

Experience

Rolls-Royce has over 50 years of experience in the aerodynamic and mechanical design of centrifugal compressors.

State-of-the-art computer software is used to apply this technology to engineering functions such as the development of aerodynamic configurations, designing components and assemblies, and determining performance. Many hundreds of re-compressor aero conversions and upgrades have entered commercial service.

Fact sheet

Scope of work

The aerodynamic components internal to the compressor are changed out for new components which more closely match current operating conditions.

These include:

- Rotor
- Diaphragms
- Diffuser vanes
- Inlet guide vanes
- Discharge wall
- Inlet scoop
- Impeller eye seal
- Shaft seals
- Balance piston seal
- Controls modification

Undertaken

At overhaul

Bundling opportunities

By upgrading the gas turbine driver in addition to a new or refurbished compressor aero, investment can be further maximised by using the incremental power gained from this approach to determine the optimum aerodynamic package sizing, thereby generating even greater savings over the replacement cost of an entire new package.

Additional compressor upgrades can apply new technology such as dry gas seals, barrier seals, axial inlet conversions, improved thrust and journal bearing designs, dry coupling conversions, alignment solutions, and polymer coatings to reduce down time. We continue to incorporate comments from the field with regard to compressor tooling. These design improvements will result in a considerable reduction in down time.

Dry diaphragm coupling conversion [\[ES5002\]](#)

Compressor dry gas seal compressor conversion [\[ES5004\]](#)

Compressor wet seal upgrade [\[ES5005\]](#)

Compressor barrier seal retrofit [\[ES5007\]](#)

Health Evaluation Legacy Programme [\[ES6002\]](#)

Controls upgrade [\[ES6006\]](#)

Instrumentation upgrade [\[ES6007\]](#)



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ES163-10/03
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