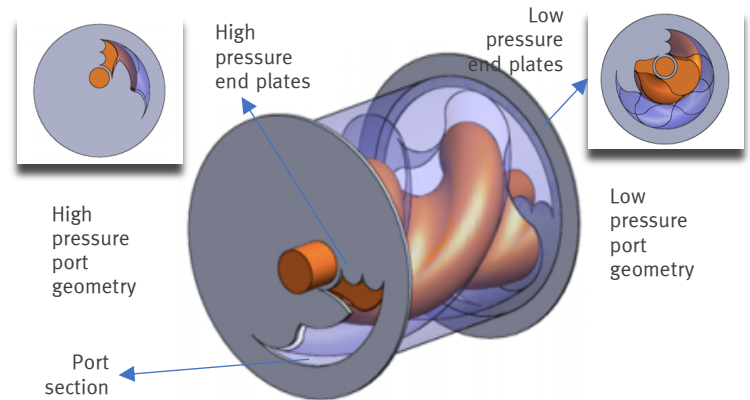


Internally-geared screw machine



Internal screw machine model with ported end plates

Source: Centre for Compressor Technology, City, University of London

TECHNOLOGY

The researchers from the Center for Compressor technology at City, University of London have developed a new type of screw machines, capable of reducing leakage and friction. This is achieved with one rotor arranged inside the other, and at least one ported end plate to enable compression or expansion of a working fluid, in contrast to 'conventional' twin-screw, in which the rotors are arranged side-by-side.

The screw machine includes outer and inner rotors which have helical profiles with continuous lines of contact upon relative rotation of the rotors. This allows the formation of enclosed working chambers whose volume varies with the angular position of the rotors. In order to achieve compression or expansion, a stationary end plate is located at the high-pressure end of the rotors. For compressors, this 'high-pressure end plate' has a specially shaped port that allows fluid to leave the working chamber once the required volume ratio has been achieved. A low-pressure end plate can also be located at the low-pressure end of the rotors to ensure that the working chamber is closed once the maximum volume is reached (M G Read, I K Smith, N Stosic, 2017).

BENEFITS

- The length of the leakage paths can be approximately half those of a conventional twin-screw machine.
- Viscous drag can be reduced due to the much lower relative speed at the contact lines between rotors, as compared to the rotor-casing leakage lines in a conventional machine
- There can be less distortion due to thermal expansion, as the rotation of both rotors will lead to a uniform circumferential temperature in each during operation (M G Read, I K Smith, N Stosic, 2017)

APPLICATION

The design can be used for most types of compressors and expanders, similar to applications for twin screw machines.

STAGE OF DEVELOPMENT:

On-going research

OPPORTUNITY

Seeking development and commercial partners

Licensing

IP STATUS:

GB PATENT: GRANTED

Patent: "Internally-geared screw machine"

Inventors: Matthew Read, Ian Kenneth Smith, Nikola Rudi Stosic, Application number: GB1522452.0

REFERENCE

M G Read, I K Smith, N Stosic. (2017). Internally geared screw machines with ported end plates. IOP Conf. Series: Materials Science and Engineering 232(2017)012058. IOP

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