

1976

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Weatherston, R., "The 'Roto-Step' Compressor - a New Type Oil-Free Compressor (Abstract Only)" (1976). *International Compressor Engineering Conference*. Paper 225.
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THE "ROTO-STEP" COMPRESSOR - A NEW TYPE OF OIL-FREE COMPRESSOR

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ABSTRACT

A new type of rotary compressor has been built and tested by the Calspan Corporation of Buffalo, New York. This compressor operates without the need of any liquid sealant and the output gas is oil-free. The compressor design is simple and production feasibility is assured. The performance is competitive with an oil-flooded screw compressor from 100-1000 CFM.

The new compressor design, called "Roto-Step", is of the two-rotor type similar to the screw or Roots compressor; however, it is inherently less leaky than the screw compressor, and, unlike the Roots' type, it provides for a precompression of the gas before discharge which is essential and good performance. Moreover, rotor-to-rotor timing is not critical for either backlash interference or for leakage between the rotors. Inexpensive timing gears may be used.

The new compressor provides for a compression ratio of about 3 per stage and the present Calspan design for the 100-125 pound pressure range employs two compressor stages that are driven by a common drive gear. The present rotor design is a 3 inch pitch diameter. The first stage is 6 inches long and the second stage is 2.25 inches long. When an 8.75 inch drive gear is employed and is driven at standard motor speed of 3500 RPM, the output of the compressor is 200 CFM. For a 1000 CFM compressor the first stage rotor would be 6 inches in diameter and 12 inches long.

The initial application for the Roto-Step compressor is for oil free air. Future applications in the field of air conditioning are being investigated.