

November 1970

Brief 70-10609

# NASA TECH BRIEF



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## TFE Coating Extends Life of Flexible Metal Compressor Diaphragm

In certain reciprocating compressors, flexible metal diaphragms are installed in the cylinder heads to separate the working fluid (usually oil) from the gas being compressed (see fig.). As the pistons reciprocate, the pressure on the working fluid in the cylinders

causes the diaphragms to flex, alternately drawing the gas into and discharging the gas from the cavities above the diaphragms. The diaphragms are clamped between bolted upper and lower plates and serve as their own gaskets.

During operation, the diaphragms flex about a single line of action. In actual operations, steel diaphragms, 0.020-inch thick, failed by fatigue cracking in less than 100 hours of operation. The use of stronger material such as Type 301 stainless steel did not significantly extend the diaphragm life.

A TFE (tetrafluoroethylene) aerosol was sprayed onto the entire surface of the diaphragm and acted as a film lubricant which permitted the diaphragm to slide between the upper and lower plates. Flexing could thus occur over an area rather than about a single line of action, which more than quadrupled the operating life of the diaphragms.

### Note:

No additional documentation is available. Specific questions, however, may be directed to:

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### Patent status:

No patent action is contemplated by NASA.

Source: Sol Gorland  
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