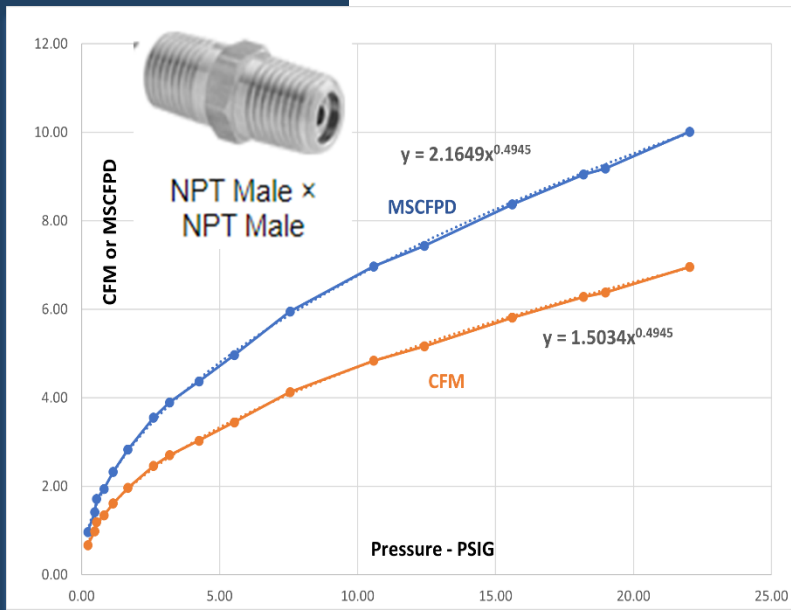


## VAPER (Vent Audit for Packing Emission Reduction) An App and Kit Enabling Intelligent Control of Packing Leaks



A 2017 paper<sup>1</sup> from Colorado State University concluded that 52% of compressor packing vent emissions come from 5% of machines. Due to the changing regulatory environment, methane leaks are now on everyone's radar, elevating the importance of controlling compressor rod packing case emissions. VAPER allows operators to quantify and track these losses, so that intelligent control methods can be deployed.

Measurement of rod packing leakage does not require custody transfer precision, and it needs to be inexpensive and simple. The solution is in the technique employed by the "Orifice Well Tester", which was used for decades to measure gas being vented to atmosphere.

The VAPER kit uses a 1/8" orifice nipple, which does not cause backpressure on the Ariel compressor frame when the packing is in good condition, but a packing case leaking at Ariel's suggested alarm point of 1.7 to 3.4 CFM would create 1 to 5 psi of backpressure as shown on the orifice test data graph to the left. Since the frame is rated for 25 psi, this measurement system is acceptable.

### EASY TO INSTALL

Orifice nipple hardware installation is a 5-minute job

### TEST ON YOUR TIMETABLE

Test whenever you desire

### APP CORRECTION FACTORS

App uses local pressure and temperature factors with gas gravity data to correct calculated flow rate

### QUALITY CONTROL

User interface prevents unreasonable entries

For more information, please visit us on the Web at: [www.enclinelift.com](http://www.enclinelift.com)

<sup>1</sup>. <https://www.osti.gov/servlets/purl/1506681>

## Measuring Leak Rate with VAPER

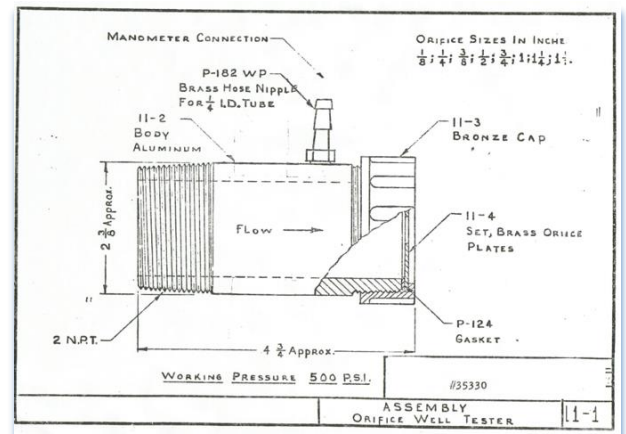
In order to measure the leakage rate, the location where the packing case gas exits the compressor skid must be identified. A 30 psi pressure gauge, a precision 1/4" x 1/8" orifice nipple, 1/4" 3 way ball valve, and several 1/4" fittings are installed to allow unrestricted flow during normal conditions.

STEP 1: Measure the unrestricted flow pressure

STEP 2: Slowly swap the 3 way ball valve position, routing the leaking gas through the orifice

STEP 3: Read the pressure

STEP 4: Follow the App instructions to obtain rate



### VAPER SUBSCRIPTION INCLUDES:

1. User registration authenticated by client and Encline administrators.
2. Users populate database of packing loss history by frame/operator/field office/machine owner.
3. Software prevents unreasonable measurement entries to enhance data quality.
4. Users can simply dropdown a list of their compressors to facilitate data entry.
5. Periodic reports are provided to client to review control opportunities.
6. Loss trends by field, gas quality, and rental provider available to participating clients.