PROCESS/ON-LINE

ON-LINE VACUUM DISTILLATION MONITOR

41464 & 41466 NEC Class 1, Division 1, Group D

Measure distillation characteristics of high boiling point products… continuously & completely on-line!

PSPI's Vacuum Distillation Monitor *continuously* measures specific boiling points of liquid petroleum fractions that would normally decompose if distilled at atmospheric pressure.

- Measure bottoms boiling temperature over an atmospheric-equivalent range of 343º to 537ºC (650º to 1000ºF)
- 90% setpoint is standard, but may be configured between 5% to 95%
- Measurements correlated to ASTM D 1160 distillation at 10 mmHg vacuum pressure
- Integrated sample conditioning system
- No sample recovery system required for return pressures up to ½ inlet pressure
- Variable Heat Controller allows convenient adjustment for stream or seasonal process variations

THEORY OF OPERATION

Stream enters the distillation tower through a variable inlet valve controlled by a float that responds to liquid level changes in the reboiler pot. Sample then flows through a preheating tube in the reboiler and returns to the upper distillation tower, where it disperses through the tower packing. The sample is not preheated to a specific temperature but adopts a temperature equilibrium, which is dependent upon boiling point characteristics of the sample. Feed rate equals the sum of the overhead and bottoms withdrawal rates, preset by metering pumps and selected to assure a predetermined overhead-to-bottoms withdrawal ratio.

Tower distillate accumulates in the water-cooled condenser. An overflow tube returns excess distillate to the tower top as reflux, automatically balancing heat within the system. A change in the feed's end point changes the ratio between total sensible heat required and total heat of evaporation. For example, as end point increases, more heat is required in the tower and reboiler, less sample vaporizes, and there is less reflux to the tower. Boiling point of sample reaching the reboiler increases, and the bottoms temperature reading reflects an end point increase; reflux is therefore free to vary slightly as required tower heat varies. Changes in tower loading and separation, as a result of small reflux variations, have negligible effect on readout temperature.

The vacuum system includes a condenser to the vacuum pump. A small amount of condensate may accumulate in the surge vessel during operation. A drain vessel allows periodic removal of this condensate without upsetting analyzer vacuum pressure.

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SPECIFICATIONS

Performance

- **Measurement Range**: 90% distilled standard; can be factory set between 5% and 95% distilled
- **Temperature Range**: up to 343ºC at 10mmHg vacuum pressure equivalent to 537.8ºC (650º to1000ºF) atmospheric boiling range
- **Accuracy**: Bottoms boiling temperature correlated with ASTM D 1160
- **Repeatability**: ±1% of sample boiling range
- **Ambient Conditions**: 22º to 50ºC (72º to122ºF); weather protection required; no direct sunlight

Sample Requirements

- **Fast Loop Flow Rate**: Sample flow velocities from 0.6 to 1.5 meters/second (2–5 feet/second)
- **Analyzer Flow Rate**: 8.7 liters/hr (2.3 gallons/hr) typical
- **Sample Pressure**: 3.5 to 17.5 kg/cm^2 (50–250 psig)
- **Sample Return Pressure**: 1.4 kg/cm^2 (20 psig) maximum

Utility Requirements

- **Electrical**:
  MODEL *41464*: 230VAC (±10%), **60 Hz**, single phase, 5750 watts
  MODEL *41466*: 230VAC (±10%), **50 Hz**, single phase, 5750 watts
- **Water**:
  FLOW: 37.9 liters/hr (10 gallons/hr) minimum
  TEMPERATURE: 37.8ºC (100ºF) maximum
  PRESSURE: 0.7 to 3.5 kg/cm^2 (10–50 psig)
- **Steam**:
  FLOW: 11.4 to 22.8 kg/hour (25–50 lbs/hour)
  PRESSURE: 1.4 to 2.1 kg/cm^2 (20–30 psig)
- **Instrument Air**: 2.1 to 8.4 kg/cm^2 (30–120 psig), dry, filtered

Signal Outputs

- **Analog Outputs**: One isolated 4–20 mAdc (standard)
- **Alarm Relays**: SPST fail-safe alarm relay (standard)

Dimensions & Weight

Uncrated:	**H**	**W**	**D**	**units**
250 kg (550 lbs)	1905	1168	965	mm
	75	46	38	inches

Crated:	**H**	**W**	**D**	**units**
318 kg (700 lbs)	2058	1270	1067	mm
	81	50	42	inches

Optional Accessories

- **Sample Recovery System** collects and periodically returns analyzed sample to process line; no sample recovery system is required for return pressures up to half the inlet pressure

Due to PSPI's commitment to continual product development, specifications are subject to change without notice.

For more information, please contact us:

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