

## MULTI-MODE

### 2 80000-0 SETAVAP ANALYSER

ASTM D5188; D5191; IP 394; IP 409; EN 13016-1; EN 13016-2 (37.8°C)

Correlates with:

ASTM D323; D2533; D4953; D5482; D6378; IP 69; IP 402 (obs); ISO 3007; EN 12 (obs); JIS K2258; NF M07-079

- Five vapour pressure modes, including Reid
- Vapour-Liquid ratio mode
- Automatic operation
- Selectable units
- Integral printer
- RS232 interface



CALIBRATION & VERIFICATION MATERIALS



TECHNICAL DATASHEETS AVAILABLE



80000-0

An automatic multi-mode vapour pressure tester with a pressure range of 0 to 700kPa (0 to 100psi) and a temperature range of 25°C (45°F) below ambient to 100°C (212°F).

Five vapour pressure test modes, including a Reid vapour pressure mode, allow single or multiple vapour pressure tests to be carried out on a sample at static, ramping or stepped temperatures. A vapour-liquid mode enables the user to determine the temperature required to produce a pre-set pressure.

All functions are accessed via a membrane keypad/digital display, while audible and visual prompts advise the status of the instrument and progress of the tests. Units of pressure can be presented in kPa, psi (lbf/in<sup>2</sup>), kg/cm<sup>2</sup>, mbar, mmHg, or inHg, and units of temperature can be set to °C or °F.

The Setavap Analyser is fully automatic apart from the injection of sample. To ensure gas tight operation, the septum is in strip form and automatically advances for each test. A septum strip is sufficient for up to 50 tests.

At the end of the test the sample is automatically drained and the test results, with time, date, and sample identity, are output via the integral printer and RS232 port.

Calibration is automated and can be carried out at either full vacuum, atmospheric pressure, or high pressure. A calibration certificate can be printed out.

**SUPPLIED WITH:** 5ml syringe, 3 needles, 3 septum strips, paper/ink package, flask, mains lead and instruction manual.

#### CONSUMABLES – Setavap Analyser

2 Years/2000 Tests	Qty
40000-007 PAPER/INK PACKAGE .....	12
80000-016 SEPTUM STRIP, pack of 5 .....	8
80000-017 FLASK, USED SAMPLE, pack of 5 .....	4
81003-001 SYRINGE, 5ml c/w LeurLock .....	1
81003-002 NEEDLE for 81003-001, pack of 2 .....	1
80009-0 SYRINGE, 1ml c/w LeurLock and needle .....	2

#### SPECIFICATIONS

<b>Test Temperature Range:</b>	25°C below ambient to 100°C (45°F below ambient to 212°F)
<b>Temperature Resolution:</b>	0.1°C (0.2°F)
<b>Units of Temperature:</b>	°C or °F
<b>Test Pressure Range</b>	0 to 700kPa
<b>Pressure Resolution:</b>	0.1kPa (0.1psi)
<b>Units of Pressure:</b>	kPa, psi (lbf/in <sup>2</sup> ), kg/cm <sup>2</sup> , mbar, mmHg, inHg (User selectable)
<b>Reid Mode:</b>	Display shows RVP equivalent
<b>Chamber Volume:</b>	15ml ±1%
<b>Vacuum Requirement:</b>	better than 0.01kPa (abs)
<b>Computer Interface:</b>	RS232C
<b>Voltage:</b>	110/120V or 220/240V, 50/60Hz (Switchable)
<b>Power:</b>	200W
<b>Size (HxWxD):</b>	35 x 45 x 37cm
<b>Weight:</b>	22.8kg

#### ACCESSORIES – Setavap Analyser

##### REQUIRED

22422-6 VACUUM PUMP, (for details see page 136).

##### OPTIONAL

80003-0 TRANSFORMER, for use where electrical supply falls below 105V.

80004-0 VACUUM PUMP (for details see page 136).

80009-0 SYRINGE, 1ml c/w LeurLock and needle.

93700-2 LABORATORY REFRIGERATOR, (for details see page 140).

##### CALIBRATION, VERIFICATION & TRAINING

80005-2 PRESSURE CALIBRATOR, recommended for recalibrating when testing above 200kPa, (for details see page 25).

80007-3 MCLEOD GAUGE, (for details see page 146).

99910-0 PORTABLE DIGITAL BAROMETER, 75 to 115kPa absolute (for details see page 145).

99922-0 DIGITAL THERMOMETER, (for details see page 130).

81000-2 SETAVAP 2

ASTM D5191; IP 394; IP 409 (37.8°C); IP 481; EN 13016-1; EN 13016-2 (37.8°C)  
 Correlates with: D323; D4953; D5482; D6378; IP 69; IP 402 (obs); ISO 3007; EN 12 (obs); JIS K2258; NF M07-079

- Rapid automatic vapour pressure testing
- Automatic drain and purge
- "Mini" method uses only 3ml sample size
- Selectable units - kPa or psi
- Results available as Ptot, DVPE, EPA, Crude, Pabs
- Audible and on-screen prompts
- RS232 interface

The Setavap 2 is an automated instrument for the measurement of the vapour pressure of gasoline, solvents, light crude oils, and other similar products using the "Mini" test method.

Fully evacuated chamber technology guarantees that the sample is tested under a full vacuum, as required by the "Mini" test methods, unlike the expansion technologies that rely on moving pistons.

All functions are accessed via a two button keypad and a rotary control. The digital display leads the operator through the test sequence, displays the instrument status and the test results. An audible prompt is sounded when an action is required from the operator.

A sample is injected through a septum into a fixed volume chamber that is maintained at 37.8°C ± 0.1°C. The vapour to liquid ratio is 4:1. The pressure is automatically measured at one minute intervals until three readings are within 0.1 kPa, which determines the end of the test.

Results can be displayed as total pressure (Ptot), dry vapour pressure equivalent (DVPE), EPA requirements, or Reid (crude) using pre-programmed correlation equations, and may be printed via the integral RS232 port and optional 81002-0 printer. A facility is included to allow two part tests (Pabs) to be conducted at 37.8°C.

All valve operations are automated including sample draining and chamber venting and purging. The valves utilise solvent resistant Kalrez seals.

Calibration of temperature and pressure is automated and simple to carry out.

SUPPLIED WITH: Septum holder, waste container, mains lead, and instruction manual.

SPECIFICATIONS	
Test Temperature:	38.7°C (100°F) ± 0.1°C
Test Pressure Range:	0 to 200kPa ± 0.5kPa (0 to 29psi ± 0.1psi)
Pressure Resolution:	0.1kPa (0.1psi)
Sample Size:	3ml
Vapour to Liquid Ratio:	4:1
Display Units of Pressure:	kPa or psi (User selectable)
Vacuum Requirement:	better than 0.01kPa (abs)
Voltage:	110/120V or 220/240V, 50/60Hz (switchable)
Power:	70W
Size (HxWxD):	37 x 13 x 20cm
Weight:	3.5kg

81000-2 Test Sequence



81000-2 with 81003-0

- CALIBRATION & VERIFICATION MATERIALS
- SETALERT COMPATIBLE
- SETAPLUS EXTENDED WARRANTY AVAILABLE
- TECHNICAL DATASHEETS AVAILABLE

ACCESSORIES - Setavap 2

REQUIRED	
22422-6	VACUUM PUMP
22420-033	SEPTUM, pack of 250 (1 required per test).
81003-0	SYRINGE, 5ml and needles.
OPTIONAL	
80004-0	VACUUM PUMP (for details see page 136).
81002-2	PRINTER
93700-2	LABORATORY REFRIGERATOR, (for details see page 140).
45000-0	SETAPLUS EXTENDED 12 MONTH WARRANTY
CALIBRATION, VERIFICATION & TRAINING	
80007-3	MCLEOD GAUGE, (for details see page 146).
80008-0	DIGITAL VACUUM GAUGE, (for details see page 148).
99910-0	PORTABLE DIGITAL BAROMETER, 75 to 115kPa absolute, (for details see page 145).
99922-0	DIGITAL THERMOMETER, (for details see page 130).

CONSUMABLES - Setavap 2

2 Years/2000 Tests		Qty
22420-033	SEPTUM, pack of 250	3
81003-0	SYRINGE, 5ml and needles	1
81003-001	SYRINGE, 5ml, c/w LeurLock	1
81003-002	NEEDLE for 81003-001, pack of 2	1

## REID VAPOUR PRESSURE (RVP)

2

### 22210-3 SETA REID VAPOUR PRESSURE BATH

ASTM D323 Procedures A, C & D; D1267; D4953 Procedure A; IP 69 Procedures A, C & D; IP 402 (obs); IP 410; BS 2000 Parts 69, 402 (obs), 410, ISO 3007; ISO 4256; EN 12 (obs); FTM 791 1201; NF 12 (obs); NF M07-007; NF M41-010 (LPG); JIS K2258

- Accepts up to 6 pressure cylinder assemblies
- Temperature range ambient +5°C to 90°C (194°F)
- Uniformity better than  $\pm 0.1^\circ\text{C}$  @ 37.8°C ( $\pm 0.2^\circ\text{F}$  @ 100°F)
- Digital temperature control
- Low fluid level and over-temperature protection



22210-3  
(Cylinders & gauges supplied separately)

A floor standing water bath specifically designed for the determination of vapour pressure with Seta Reid or Seta Vapour pressure cylinders.

The stainless steel 80 litre water bath has a temperature range of ambient +5°C to 90°C and can achieve a test temperature of 37.8°C (100°F) with a uniformity of  $\pm 0.1^\circ\text{C}$  (0.2°F).

A programmable, digitally controlled thermostir unit combines the functions of heater, temperature controller, timer and stirrer. The thermostir unit is equipped with an RS 232 port, a switched output for an external relay, a socket for an external PT100 temperature probe and alarms and cut-outs for low fluid level and over-temperature.

The 22210-3 will accept up to four 22410-0 and up to six 22400-0 Seta Vapour Pressure Cylinder / Ullage Chamber assemblies.

**SUPPLIED WITH:** 4 pressure cylinder mounting brackets, mains lead and instruction manual.

#### SPECIFICATIONS

<b>Test Temperature Range:</b>	ambient +5°C to 90°C (9°F below ambient to 194°F)
<b>Temperature Uniformity:</b>	$\pm 0.1^\circ\text{C}$ @ 37.8°C
<b>Bath Volume:</b>	80 litre
<b>Bath Fluid:</b>	Water (De-ionised)
<b>Cylinder Capacity:</b>	Up to 6 cylinder assemblies
<b>Voltage:</b>	220/240V, 50/60Hz
<b>Power:</b>	2.2kW
<b>Size (HxWxD):</b>	77 x 55 x 51cm
<b>Weight:</b>	70kg

#### ACCESSORIES - RVP Bath

**REQUIRED - Gasoline & Volatile Crude Oil**

##### PRESSURE CYLINDER

Select from RVP CYLINDERS below.

##### THERMOMETERS

ASTM18C/IP23C

**REQUIRED - LPG**

##### PRESSURE CYLINDER & ULLAGE CHAMBER

Select from VAPOUR PRESSURE CYLINDERS on page 26.

##### THERMOMETERS

ASTM65C

**OPTIONAL**

22210-301 VESSEL SUPPORT BRACKET, for extra cylinders, stainless steel, pack of 2.

## RVP CYLINDERS

ASTM D323; D4953 Procedure 'A'; IP 69; IP 402 (obs); BS 2000 Part 69 & 402 (obs); EN 12 (obs); FTM 791 1201; ISO 3007; NF M07-007; JIS K2258

- Reid vapour pressure of non-viscous petroleum products and volatile crude oil
- Accurate chamber volume ratio
- Quick leak-free bayonet connection between chambers
- Chromium-plated brass construction

### 22400-0 SETA REID PRESSURE CYLINDER ASSEMBLY

- Pressures up to 180kPa (26psi)
- ASTM D323 & IP 69 Procedures A & D
- Hydrostatically pressure tested to 690kPa (100psi)

### 22410-0 SETA REID PRESSURE CYLINDER ASSEMBLY

- Pressure range 180 to 700kPa (26 to 100psi)
- ASTM D323 & IP 69 Procedure C
- 1/2 inch gate valve between gasoline and air chambers
- 1/2 inch needle valve to gasoline chamber
- Hydrostatically pressure tested to 1380kPa (200psi)



Typical RVP Cylinder Assemblies  
(Gauge and Manometer Adaptor supplied separately)

#### ACCESSORIES - Reid Pressure Cylinder Assembly

**REQUIRED**

##### PRESSURE GAUGES

Select from SETA RVP GAUGES on page 25.

**OPTIONAL**

22460-0 SETA MANOMETER ADAPTOR, adapts customer's manometer to Seta 22400-0 Pressure Cylinder using plastic/rubber tubing, pack of 2.

##### CHARGING SYSTEMS

Select from TANK SAMPLING EQUIPMENT FOR RVP on page 123.

### SETA REID VAPOUR PRESSURE GAUGES



ASTM D323; IP 69; BS 2000 Part 69

- Pressures up to 700kPa (100psi)
- Accuracy  $\pm 1\%$  fsd
- 150mm dial
- Mirror scale in kPa and psi
- $\frac{1}{4}$  inch BSP fitting
- Sturdy handle



CALIBRATION CERTIFICATE (WORKS)

A range of Bourdon-Tube type pressure gauges with 150mm diameter mirror band dials to eliminate paralax errors while reading. The graduations are marked in kPa and psi (lbf/in<sup>2</sup>).

The gauges have a bottom entry  $\frac{1}{4}$  inch BSP fitting and a heavy duty stainless steel case with a large carrying handle suitable for lifting a complete pressure vessel assembly from a bath.

The gauges conform to EN 837 S2, Accuracy Class 1  $\pm 1\%$ fsd.

Seta Part	Scale Range		Division		Sub-Division	
	kPa	psi	kPa	psi	kPa	psi
22500-0	0 to 35	0 to 5	5	1	0.5	0.1
22510-0	0 to 100	0 to 15	10	3	0.5	0.1
22520-0	0 to 200	0 to 30	25	5	1	0.2
22530-0	0 to 300	0 to 45	25	5	1	0.2
22540-0	0 to 400	0 to 60	50	10	1.5	0.25
22550-0	0 to 700	0 to 100	50	10	2	0.5

### 22430-3 SETA PRE-PRESSURISED MANOMETER

- Verification of pressure gauge up to 135kPa (19.5psi)
- 0.2kPa graduations

Mercury type, unbreakable plastic construction, wall mounting.

SUPPLIED WITH: needle valve, isolation valve, quick release coupling, neoprene tube and instruction manual.

Note: Supplied without mercury.



CALIBRATION CERTIFICATE (WORKS)

### 22470-3 SETA MANOMETER

- Verification of pressure gauge up to 135kPa (19.5psi)
- 0.5kPa graduations

Mercury type, unbreakable plastic construction, wall mounting.

Note: Supplied without mercury.



CALIBRATION CERTIFICATE (WORKS)

### 80005-2 SETA PRESSURE CALIBRATOR

- For verification above 180kPa (26psi)
- Accuracy  $\pm 0.015\%$  indicated pressure

A deadweight tester with integral handpump and pressure gauge.

SUPPLIED WITH: set of calibrated weights.

Note: Refer to Section 22, CALIBRATION, for more details.



CALIBRATION CERTIFICATE (UKAS)

### RVP VERIFICATION INSTRUMENTS



22430-3

## VAPOUR PRESSURE CYLINDERS

2

ASTM D1267; IP 161 (obs); IP 410; BS 2000 Part 410; EN ISO 4256; NF M41-010

- Pressure Tested & UKAS Certified to 6900kPa (1000psi)
- Stainless steel construction



Used to determine the vapour pressure of LPG to avoid exceeding pressure safety limits during storage, handling and use.



### 22300-2 SETA MAIN CHAMBER

- Ullage to cylinder ball valve
- Fine control bleeder valve

### 22310-2 SETA 20% ULLAGE CHAMBER

- Fine control ullage inlet valve

### 22320-2 SETA 33 1/3% ULLAGE CHAMBER

- Fine control ullage inlet valve

## ACCESSORIES - Vapour Pressure Cylinders

### REQUIRED FOR 22300-2

- 22490-0** SETA GAUGE ADAPTOR, 1/2 inch BSP male to 1/4 inch BSP female. For fitting gauge to 22300-2 Main Chamber, pack of 2.
- 22330-0** SETA CORROSION RESISTANT SAMPLING CONNECTOR, 3ft long, one end suits ullage chamber inlet valve, connects apparatus to sample.

### PRESSURE GAUGES

Select from SETA VAPOUR PRESSURE GAUGES below.

### OPTIONAL

- 22090-0** SETA COOLING UNIT, for LPG, with inlet and outlet valves, requires solid CO<sub>2</sub> (for details see page 118).

Typical Cylinder Assembly  
(Gauge and Ullage Chamber supplied separately)

## VAPOUR PRESSURE GAUGES

### SETA VAPOUR PRESSURE GAUGES



ASTM D1267; IP 410; BS 2000 Part 410

- Pressures up to 3500kPa (500psi)
- Accuracy ±1% fsd
- 150mm dial
- Mirror scale in kPa and psi
- 1/4 inch BSP fitting
- Sturdy handle



A range of Bourdon-Tube type pressure gauges with 150mm diameter mirror band dials to eliminate paralax errors while reading. The graduations are marked in kPa and psi (lbf/in<sup>2</sup>).

The gauges have a bottom entry 1/4 inch BSP fitting and a heavy duty stainless steel case with a large carrying handle suitable for lifting a complete pressure vessel assembly from a bath.

The gauges conform to EN 837 S2 (up to 2,500kPa) or S3 (2,500kPa and above), Accuracy Class 1 ±1%fsd.

### SETA VAPOUR PRESSURE GAUGES

Seta Part	Scale Range		Division		Sub-Division		Method
	kPa	psi	kPa	psi	kPa	psi	
22550-0	0 to 700	0 to 100	50	10	2	0.5	D1267
22560-0	0 to 1750	0 to 250	100	25	2.5	0.2	D1267
22561-0	0 to 3500	0 to 500	250	50	25	2	D1267
22570-2	0 to 700	n/a	50	n/a	2	n/a	IP 410
22580-2	0 to 2000	n/a	100	n/a	5	n/a	IP 410
22590-2	0 to 3500	n/a	250	n/a	25	n/a	IP 410