Model RK

Pneumatic Deadweight Tester

**PRODUCT DESCRIPTION**

The RK tester is a floating ball type, pneumatic deadweight tester. This model is engineered to offer user-friendly features, safe operation, and an optimal performance in the field or in the lab.

**Self-regulating pressure standard**

The AMETEK RK Pneumatic Deadweight Tester is a primary standard that produces a pressure by applying force (weight set) over area (the ceramic ball and nozzle). The RK tester is NIST traceable and accurate to ±0.015% using stainless steel weights calibrated to International standard gravity of 9.80665 m/s² or local gravity as specified. The RK tester is self-regulating with accuracy independent of the operator. The tester utilizes a virtually frictionless ceramic ball floating on a layer of air within a stainless steel cylinder. The RK tester features a quick-leveling system for field or lab setup. The unit may also be mounted on an optional tripod for more convenient setup. The tester may be operated with the cover opened or closed. Weights are located in foam-protective slots in the case.

**Pressure Range**

1 to 2,000 kPa (0.145 to 300 psi)

**Accuracy**

to ±0.015% of Indicated reading

Accuracy ±0.025 and 0.050% is also available

**Repeateability**

±0.005% of indicated reading

**Available units**

psi, kg/cm², bar, kPa, inH₂O, cmH₂O, inHg

**Special Calibrations/Local Gravity**

RK testers are supplied standard with masses calibrated to International Standard gravity of 9.80665 m/s². Local gravity calibration is available on all models.

**Gas Industry Models**

Standard testers in inH₂O or cmH₂O are calibrated reference water columns at 20°C (68°F) per ISA recommended practices. Calibration to reference water columns at 60°F per AGA standards is available.

**Exceptional Performance and Safety Built-In**

- Floating Ball Operation
- Self-Regulating
- Rugged Ceramic Measuring Ball
- Overhung Weight Carrier
- Non-Contaminating Test Fluid
- Closed Cover Operation
- Ball Valves for Inlet and Outlet
- Interchangeable Weights
- NIST Traceable
FEATURES

The following are some of the features and characteristics inherent to the AMETEK RK deadweight tester.

Floating Ball
While in operation, the RK tester’s ball and weights float freely, supported only by a thin film of air which is virtually frictionless. This eliminates the necessity to rotate the weights during testing and allows the user to concentrate on the instrument calibration.

Self-Regulating
The instrument’s built-in flow regulator automatically adjusts the input air flow to maintain the ball and weights in a float position. The regulator also compensates for variations in pressure from the air supply. These features eliminate the necessity of having to continually adjust the supply during the test and provides for an easy up and down scale calibration.

Overhung weight carriers
Another feature of the RK deadweight tester is the way that the weights are positioned on the carrier. M&G utilizes an overhung weight carrier design. This design employs a tube carrier that is positioned over the column and onto the ceramic ball. The center of gravity for the stack of weights is lowered, reducing side thrust and friction; which lengthens the life of the ball/nozzle and carrier. This also improves measurement accuracy.

Closed Cover Operation
The RK tester is designed to operate with the cover closed, thus eliminating the effects of wind during field operation.*

Rugged Ceramic Measuring Ball
The floating ball is manufactured from aluminum oxide ceramic - a material with near-diamond hardness. The ball, unlike steel and carbide pistons, may be dropped on hard surfaces without damage.

Ball Valves
AMETEK floating ball testers, such as the RK tester, incorporate multi-position ball valves for both the inlet and outlet valve connections. These ensure trouble free operation that is both fast and efficient.

Easy Leveling
AMETEK floating ball testers incorporate a bulls-eye level for reference when preparing the unit for use. The tester also employs a 3-leg leveling system which is more convenient and is superior to a 4-leg system.

Quick Setup and Operation
The setup for the RK tester is completed by simply connecting two tubes, one for the supply and one for the unit-under-test, leveling the RK, and adding the appropriate weights. Operation is fast and efficient with no valves to adjust and no regulation needed between set points. Pressure regulators are not required if the air supply is within the tester’s operational requirements.

Non-Contaminating Test Fluid
The instrument’s test fluid is Nitrogen or instrument quality air complying with the ISA Standard S7.3. This fluid is non-contaminating to virtually all processes, thus eliminating the need to clean instruments after calibration and before use.

Designed for field or lab use
The RK tester is designed for precision and is accurate enough for lab use. However, the construction is rugged enough to allow for reliable field operation as well. The instrument includes a built-in tripod mount. A tripod may be ordered separately.

Small incremental weight sets
Small incremental weight sets are available to provide fractional output pressures. These are available for the RK deadweight tester in psi, bar, kPa, kg/cm², inH₂O and cmH₂O.

* Use of the large diameter weights is not possible with the cover closed.
FUNCTIONAL SPECIFICATIONS
Model: .......................................................... RK
Type: .......................................................... Pneumatic, ball type
Pressure range: . to 2,000 kPa / 300 psi (model dependent)
Accuracy (12 months): .......................... ±0.015% rdg
Repeatability: ............................................ ±0.005% rdg
Temperature coefficient: ±0.00167% of rdg/°C (@ on 23 °C)
Increments (low - min):............. 1 psi, 0.01 kg/cm², 0.01 bar, ................................. 1 kPa, 4 inH₂O, 10 cmH₂O, 1 inHg
Increments (small): Small incremental weight sets available
Gravity: ...................... 9.80665 m/s² (international standard) ........................................ or Local gravity (specify when ordering)
Water column temp ref: .............. 20°C (ISA) (standard) .................................. or 60°F (AGA) (optional) (specify when ordering)
Weight sets:.......................... Single (as ordered)
Pressure source: .............. Nitrogen or instrument/shop air .................................................. (ISA quality standard 7.3)
Supply pressure (max): ......................... 31 bar / 450 psi
Supply pressure (min): ......................... 2.1 bar / 30 psi ........................................ or 150% of desired output pressure
Flow rate: .................. 28 slh at 1 kPa/1 scfh at 0,15 psi output .......................... 1700 slh at 2000 kPa/60 scfh at 300 psi output
Test connections: .............. 1/8” NPT
Weight material: .............. Stainless steel and .................................. aluminum (small incremental weights)
Ball material: .......................................................... Ceramic
Engineering units: .................. psi, kg/cm², bar, kPa, .......................................................... inH₂O, cmH₂O, inHg
Cases: .................................................. 1 or 2 (model dependent)

PHYSICAL SPECIFICATIONS
Connections: ............................................ 1/4 in NPT female
Weight:
Tester only.......................... 8.2 - 14.3 kg / 18 to 31.5 lbs
Weights .................................. 8.0 - 30 kg / 17.5 to 61.5 lbs
Shipping dimensions (L x W x H):
Tester .................. 38.1 x 24.1 x 20.3 cm / 15.0 x 9.5 x 8.0 in
Weights ..................... 21.6 x 30.5 x 29.2 cm / 8.5 x 12.0 x 11.5 in
Configuration: .......................................................... Pneumatic deadweight
delivery: .................................. Tester base, weight set, manual, .................................. and NIST traceable certification

General Process Information for Calibrated Parts
- Local gravity values must be specified by customer in gals, cm/s² or m/s².
- Include serial number, accuracy, gravity, and model number of deadweight tester when ordering weight sets or calibrated parts.
- Masses for weights ordered separately, including tolerance, must be supplied by customer; unless combined with tester on same order.
- Calibrated parts may be made to archival data if requested on the purchase order.
- Calibrated parts are certified for physical dimension only (mass or area) and not for accuracy unless ordered with a new tester or the tester is returned for proper calibration of parts.
- RK weight set changes and additions require a matching weight carrier and/or conversion ring for the proper incremental output values.

Certification of Accuracy and Traceability
A Certification of Accuracy and Traceability to NIST is included with every AMETEK floating ball-type deadweight tester. An optional Certification of Accuracy with area, mass and intrinsic correction factors is available.

Notes: For ±0.015% testers, ±0.025% accuracy below 30” H₂O, 1 psi, 7kPa, 100 cm H₂O or 0.07 bar. Gravity 9.80665 m/s² or user’s local gravity when specified. H₂O (water column) models are calibrated to water at 20°C (68°F) but can be calibrated to water at 60°F.

Notes: Deadweight tester and deadweight gauge accuracy is expressed as “Percent of Indicated Pressure”. A 1,000 psi tester with an accuracy of ±0.01% of indicated pressure will have an allowable error of 0.1 psi at 10 psi, ±0.1 psi at 100 psi and ±1.0 psi at 1,000 psi. Generally, deadweight testers are used only in the upper 90% of the range.
**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Model</th>
<th>Certified Range</th>
<th>Increment</th>
<th>W/C and Ball Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>RK-50</td>
<td>1 to 51 psi</td>
<td>1 psi</td>
<td>1 psi</td>
</tr>
<tr>
<td>RK-100</td>
<td>1 to 101 psi</td>
<td>1 psi</td>
<td>1 psi</td>
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<tr>
<td>RK-200</td>
<td>1 to 201 psi</td>
<td>1 psi</td>
<td>1 psi</td>
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<tr>
<td>RK-300</td>
<td>1 to 301 psi</td>
<td>1 psi</td>
<td>1 psi</td>
</tr>
<tr>
<td>RK-4M</td>
<td>0.01 to 4 kg/cm²</td>
<td>0.01 kg/cm²</td>
<td>0.01 kg/cm²</td>
</tr>
<tr>
<td>RK-6M</td>
<td>0.01 to 6 kg/cm²</td>
<td>0.01 kg/cm²</td>
<td>0.01 and 0.02 kg/cm²</td>
</tr>
<tr>
<td>RK-20M</td>
<td>0.01 to 20 kg/cm²</td>
<td>0.01 kg/cm²</td>
<td>0.01 and 0.02 kg/cm²</td>
</tr>
<tr>
<td>RK-2B</td>
<td>0.01 to 2 bar</td>
<td>0.01 bar</td>
<td>0.01 bar</td>
</tr>
<tr>
<td>RK-4B</td>
<td>0.01 to 4 bar</td>
<td>0.01 bar</td>
<td>0.01 bar</td>
</tr>
<tr>
<td>RK-8B</td>
<td>0.01 to 8 bar</td>
<td>0.01 bar</td>
<td>0.01 and 0.02 bar</td>
</tr>
<tr>
<td>RK-12B</td>
<td>0.01 to 12 bar</td>
<td>0.01 bar</td>
<td>0.01 and 0.02 bar</td>
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<tr>
<td>RK-20B</td>
<td>0.01 to 20 bar</td>
<td>0.01 bar</td>
<td>0.01 and 0.02 bar</td>
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<tr>
<td>RK-200N</td>
<td>1 to 211 kPa</td>
<td>1 kPa</td>
<td>1 kPa</td>
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<tr>
<td>RK-400N</td>
<td>1 to 411 kPa</td>
<td>1 kPa</td>
<td>1 kPa</td>
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<tr>
<td>RK-800N</td>
<td>1 to 811 kPa</td>
<td>1 kPa</td>
<td>1 and 2 kPa</td>
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<tr>
<td>RK-1200N</td>
<td>1 to 1,211 kPa</td>
<td>1 kPa</td>
<td>1 and 2 kPa</td>
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<tr>
<td>RK-2000N</td>
<td>1 to 2,011 kPa</td>
<td>1 kPa</td>
<td>1 and 2 kPa</td>
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<tr>
<td>RK-1000WC</td>
<td>4 to 1,041 inH₂O</td>
<td>1 inH₂O</td>
<td>4 inH₂O</td>
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<tr>
<td>RK-3000WC</td>
<td>4 to 3,141 inH₂O</td>
<td>1 inH₂O</td>
<td>4 inH₂O</td>
</tr>
<tr>
<td>RK-6000WC</td>
<td>4 to 6,141 inH₂O</td>
<td>1 inH₂O</td>
<td>4 inH₂O</td>
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<tr>
<td>RK-11000WC</td>
<td>4 to 11,141 inH₂O</td>
<td>1 inH₂O</td>
<td>4 inH₂O</td>
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<tr>
<td>RK-16000WC</td>
<td>4 to 16,141 inH₂O</td>
<td>1 inH₂O</td>
<td>4 inH₂O</td>
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<tr>
<td>RK-500CM</td>
<td>10 to 510 cmH₂O</td>
<td>10 cmH₂O</td>
<td>10 cmH₂O</td>
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<tr>
<td>RK-1000CM</td>
<td>10 to 1,010 cmH₂O</td>
<td>10 cmH₂O</td>
<td>10 cmH₂O</td>
</tr>
<tr>
<td>RK-2000CM</td>
<td>10 to 2,010 cmH₂O</td>
<td>10 cmH₂O</td>
<td>10 cmH₂O</td>
</tr>
<tr>
<td>RK-3000CM</td>
<td>10 to 3,010 cmH₂O</td>
<td>10 cmH₂O</td>
<td>10 cmH₂O</td>
</tr>
<tr>
<td>RK-4000CM</td>
<td>10 to 4,010 cmH₂O</td>
<td>10 cmH₂O</td>
<td>10 cmH₂O</td>
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<tr>
<td>RK-100H</td>
<td>1 to 112 inHg</td>
<td>0.1 inHg</td>
<td>1 inHg</td>
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**Calibration Options**

<table>
<thead>
<tr>
<th>Model Suffix</th>
<th>Accuracy</th>
<th>Gravity</th>
<th>Data</th>
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</thead>
<tbody>
<tr>
<td>NONE</td>
<td>±0.050% rdg (standard)</td>
<td>Standard or local gravity (specify)</td>
<td>None</td>
</tr>
<tr>
<td>-1B</td>
<td>±0.025% rdg (optional)</td>
<td>Standard or local gravity (specify)</td>
<td>None</td>
</tr>
<tr>
<td>-1A</td>
<td>±0.015% rdg (optional)</td>
<td>Standard or local gravity (specify)</td>
<td>None</td>
</tr>
<tr>
<td>/C</td>
<td>±0.050% rdg (standard)</td>
<td>Standard or local gravity (specify)</td>
<td>Yes</td>
</tr>
<tr>
<td>-1B/C</td>
<td>±0.025% rdg (optional)</td>
<td>Standard or local gravity (specify)</td>
<td>Yes</td>
</tr>
<tr>
<td>-1A/C</td>
<td>±0.015% rdg (optional)</td>
<td>Standard or local gravity (specify)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Accessories**

<table>
<thead>
<tr>
<th>Order no.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RWS-1WC</td>
<td>Aluminum weight set, Converts 1&quot; H₂O units to 0.1&quot; H₂O increments</td>
</tr>
<tr>
<td>RWS-1KPA</td>
<td>Aluminum weight set, Converts 1 psi units to 0.1 psi increments</td>
</tr>
<tr>
<td>RWS-1CM</td>
<td>Aluminum weight set, Converts 10 cm H₂O units to 1 cm H₂O increments</td>
</tr>
<tr>
<td>RWS-001B</td>
<td>Aluminum weight set, Converts 0.01 bar units to 0.001 bar increments</td>
</tr>
<tr>
<td>RWS-001M</td>
<td>Aluminum weight set, Converts 0.01 kg/cm² units to 0.001 kg/cm²</td>
</tr>
<tr>
<td>K-1562</td>
<td>Tripod</td>
</tr>
<tr>
<td>1GT-99</td>
<td>Gauge pointer puller set</td>
</tr>
</tbody>
</table>

Small incremental weight sets available in psi, bar, kPa, kg/cm², inH₂O and cmH₂O

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**AMETEK Calibration Instruments**

**Headquarter:**

AMETEK Denmark A/S
Gydevang 32-34 • 3450 Allerød • Denmark
Tel: +45 4816 8000 • ametek@ametek.dk

Sales & Service:
Europe, Asia, Africa, Middle East and South America

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**AMETEK Calibration Instruments**

www.ametekcalibration.com
www.jofra.com

**Sales & Service Offices:**

AMETEK Mansfield & Green (North America)
Tel: +1 800 527 9999 • cal.info@ametek.com

AMETEK Singapore Pte. Ltd. (Singapore)
Tel: +65 6 484 2388 • aspl@ametek.com.sg

AMETEK Inc. Beijing Rep. Office (China)
Tel: +86 10 8526 2111 • jofra@ametek.com.cn

AMETEK GmbH (Germany)
Tel: +49 2159 9136 510 • info.mct-de@ametek.de

**AMETEK Calibration Instruments (UK)**
Tel: +44 (0) 1489 486 404 • jofra@ametek.co.uk

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AMETEK Calibration Instruments is one of the world’s leading manufacturers and developers of calibration instruments for temperature, pressure and process signals as well as for temperature sensors both from a commercial and a technological point of view.

**JOFRATemperature Instruments**
Portable precision thermometers. Dry-block and liquid bath calibrators: 4 series, with more than 25 models and temperature ranges from -90° to 1205°C / -130° to 2200°F. All featuring speed, portability, accuracy and advanced documenting functions with JOFRACAL calibration software.

**JOFRAPressure Instruments**
Convenient electronic systems ranging from -1 to 1000 bar (25 inHg to 14.500 psi) - multiple choices of pressure ranges, pumps and accuracies, fully temperature-compensated for problem-free and accurate field use.

**JOFRASignal Instruments**
Process signal measurement and simulation for easy control loop calibration and measurement tasks - from handheld field instruments to laboratory reference level bench top instruments.

**JOFRAJF Marine Instruments**
A complete range of calibration equipment for temperature, pressure and signal, approved for marine use.

**FP Temperature Sensors**
Pneumatic floating-ball or hydraulic piston dead weight testers with accuracies to 0.015% of reading.

**M&G Pressure Testers**
Pressure generators from small pneumatic “bicycle” style pumps to hydraulic pumps generating up to 1,000 bar (15,000 psi).

**M&G Pumps**
For temperature, pressure and signal, for industrial and marine use.

"because calibration is a matter of confidence"