



## <<< RAVEN F-10300 PROCESS CENTRIFUGE >>>



**Thank you for purchasing a Raven Environmental Products process control instrument.**

**Please call 800-545-6953, customer service, if you have any questions or comments about this product.**

The Raven F-10300 Centrifuge is a rugged precision instrument. The included Raven B-10101-19 centrifuge tubes are made from high impact resistant polycarbonate plastic. Each unit is built with quality and craftsmanship in USA.

### **Unit and Use**

The Raven F-10300 Centrifuge can be used for the Fifteen Minute Centrifuge Test referenced in the *US-EPA Process Control Manual for Aerobic Wastewater Treatment Facilities* and the *WPCF Manual of Practice OM-9: Activated Sludge*.

The Raven Centrifuge with Raven Centrifuge Tubes will provide quick, reliable concentration indications of mixed liquors from aeration basins, clarifier return sludge, and waste sludge removed from activated sludge systems.

### **Equipment and Features**

#### F-10300 Centrifuge

- Six-position rotor with 19mm Centrifuge Tubes rotates at a right angle to the axis of spin and provides a sharp, easily read solids/liquid interface.
- Digital timer (with fifteen minute speed key) to start and automatically switch unit OFF at end of test.
- Corrosion resistant stainless steel and aluminum construction for durability and easy cleaning.
- 1/8 HP, 3000 RPM, Totally Enclosed Fan-Cooled motor designed for use in dirty environments.
- On/Off switch in rear of unit near power cord.

#### B-10101-19 Centrifuge Tubes (19mm)

- Clear, impact resistant polycarbonate plastic eliminates costly breakage and will not cloud.
- Steep tapered conical design for volumetric determination of settleable solids (similar to Imhoff® Cones) that provide accurate measurements at low concentrations, such as those normally encountered with mixed liquor, return or waste sludge samples.
- Bright white markings, which contrast vividly with most sludge samples.

### **Centrifuge Test Procedure**

#### Collect sample

Collect at least 50 ml. of sample for the centrifuge spin in a wide mouth container. If the Settleometer Test is being performed in conjunction with the centrifuge spin, the centrifuge sample can be taken from the same mixed liquor container.

#### Mix sample

The sample to be poured into the centrifuge tube should be gently mixed (but not shaken).

Fill a clean tube with sample, so that the bottom of the meniscus is at the 100% mark on the tube. Samples should be poured quickly to prevent settling in the sample collection container.

#### Prepare tube sample

Remove any air bubbles that may become entrained in the tube by tilting and tapping the outside tip of the tube with your finger.

#### Position tube samples in trunnion rings

#### **Note**

- **Balanced condition must be maintained.**
- **Use only an even number of tube filled samples.**
- **Locate tube filled samples opposite one another (1&2, 3&4, 5&6).**
- **Counterbalance unused trunnion rings.**
- **All six centrifuge ring holders are to be occupied.**

Position centrifuge on a flat level surface. Verify centrifuge is unplugged from power source, before inserting or removing tubes from ring holders. Place sample tubes in centrifuge ring holders opposite one another (1&2, 3&4, 5&6).

All centrifuge tube rings shall have duplicate samples or water filled tubes, to maintain uniform loading on the unit during each test to assure a consistent speed (in RPM) for all spin tests.



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**Spin Test**

**NOTE**

- **Immediately switch [OFF] the centrifuge in the event of an unbalanced condition. (ON/OFF switch is at rear of unit near power cord)**
- **Do not open lid while centrifuge is spinning.**
- **Do not move unit while operating.**
- **Unplug power cord from centrifuge before opening lid.**

Plug centrifuge into power source and switch the ON/OFF switch to the [ON] position. Press the keys on the control panel to the desired period. See control panel instructions attached to centrifuge. The centrifuge will begin spinning and automatically power down at the end of the timer setting. A forty-second "Spin Down" will display on the control panel after the motor has automatically switched off. Do not open lid until centrifuge has come to a complete stop at the end of the forty-second "Spin Down." Switch the ON/OFF switch [OFF] when the forty-second "Spin Down" is complete. Unplug the power cord from the rear of the centrifuge and open the centrifuge lid. Remove the tube samples from the centrifuge ring holders and close lid.

**Test Results**

The Raven centrifuge tubes will indicate the suspended solids concentration in percent volume. This value should not be routinely converted to mg/l concentration because of variations in density and compatibility of different types (sludge quality) and ages of sludge samples. If results are used to convert to mg/l they must be checked by a gravimetric measurement at least once/week or more frequently. The volumetric test is used routinely in operations with the more accurate gravimetric analysis providing density information and serving as a daily check at large facilities (weekly or biweekly at smaller plants).

Typical ranges for samples are:

1. Mixed Liquor: 1-5%
2. Return and Waste Sludge
  - a. Young (bulking): <10%
  - b. Normal: 10-20%
  - c. Old (denitrifying): >20%

**Clean sample tubes**

The centrifuge tubes must be thoroughly cleaned prior to reuse or future results will be inaccurate. Cleaning is best achieved by forcing a high velocity stream of tap water into the bottom of the emptied tube to dislodge the solids.

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**References**

Manual of Practice OM-9: Activated Sludge, Water Pollution Control Federation, 601 Wythe Street, Alexandria, VA 22314-1994, 1987.

Process Control Manual for Aerobic Wastewater Treatment Facilities, EPA 430/9-77-006, US Environmental Protection Agency, Municipal Operations Branch, Office of Water Program Operations, Washington, DC 20460, March 1977.

Operational Control Procedures for the Activated Sludge Process: Part 2 Control Tests, EPA# 330974001B, US Environmental Protection Agency, Municipal Operations Branch, Office of Water Program Operations, Washington, DC 20460, May 1974

**More process control instruments manufactured by Raven Environmental Products:**

- B-10104-19 Replacement centrifuge tubes 19mm per dozen
- B-10104 CORETAKER® Core Sampler with **LIFETIME GUARANTEE**. Compare to The Sludge Judge® Brand.
- SID-10200 Sludge Interface Detector (Hand-Held Infrared meter locates sludge blanket depth)
- C-10102 Settleometer Kit (1.4 liter for sludge settling characteristics)

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