RAVEN F-10300 PROCESS CENTRIFUGE

Thank you for purchasing a Raven Environmental Products process control instrument.
Please call 800-545-6953, customer service, it you have any questions or comments about this product.

Do not use the provided polycarbonate centrifuge tubes B-10101-19 with flammables, solvents, or cooking oils. These liquids will destroy the polycarbonate and result in tube breakage and an unbalanced condition which is dangerous.

This model F-10300 is supplied with six polycarbonate centrifuge tubes.

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. Do not centrifuge flammables, solvents or cooking oils. 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. Not for use with flammables, solvents or cooking oils. 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.

Removable Top Cover

ALERT

ALWAYS DISCONNECT THE CENTRIFUGE FROM POWER BEFORE REMOVING THE TOP COVER.

NEVER OPERATE THE CENTRIFUGE WITHOUT THE TOP COVER SECURELY ATTACHED WITH ALL FOUR CLIPS IN POSITION.

ROTOR SPINS AT A HIGH RATE OF SPEED AND CAN CAUSE SEVERE INJURY IF TOP COVER IS NOT SECURELY ATTACHED WITH ALL FOUR CLIPS IN POSITION.

The black top cover is easily removed for cleaning of the interior top bowl. Four plastic clips hold the top cover in place while in operation. The spacing of these clips is important. Place the clips where indicated on the top cover.
To reinstall the clips, position the base of the clip against the upper bowl just below the rim and rotate the clip upward while pressing the clip against the edge of the top cover. The installed clips must be securely mounted on the top cover. The hinged lid should be positioned with the handle above the controller/timer.

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

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.

Spin Test

- **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 with the plastic pipettes included with the unit. With fluid in the tubes, place the pipette in the bottom of the tube and squeeze the bulb to breakup the compacted solids for easy removal.

References

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

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