



REFERENCE DATASHEET · CORE ANALYSIS

Coretest UC-200 High-Speed Core Centrifuge

Refrigerated core centrifuge for air-liquid drainage by the gravimetric method



1" or 1.5"

core plugs up to 2" long, fixed rotor

up to 11,000 rpm

with the standard rotor

Gravimetric

each plug weighed after every speed step

Sealed holders

displaced liquid kept outboard of the plug

10-step programs

speed, time and temperature per step

Refrigerated

chamber cooling with pre-cooling

1 System function

The UC-200 drains liquid-saturated core plugs with air (or a lighter liquid) in a series of speed steps. Each step imposes a capillary pressure that is highest at the inlet face of the plug and zero at the outlet face. The rotor runs a step until production stops, then stops; each plug is taken out and weighed, and its average saturation at that step is calculated from the mass change. The next speed step follows.

Main uses:

- water saturation after drainage at a specified capillary pressure, including the end-point used as S_{wi} under your laboratory criterion;
- drainage capillary pressure curves calculated from the equilibrium steps;
- preparation of plugs at low water saturation for further tests.

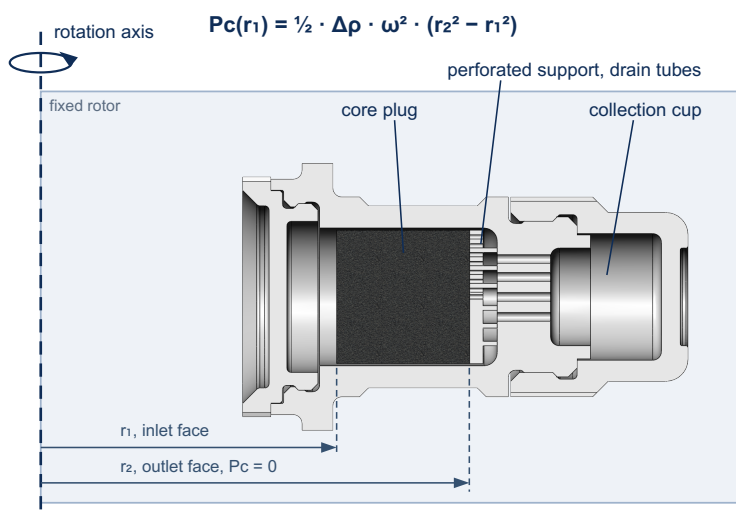


Figure 1. Measurement principle, schematic (holder section from the holder model; rotor radii are fixed in the approved rotor drawing). The holders sit radially in a fixed rotor. Displaced liquid leaves the outlet face through the drain tubes into the collection cup at the outer end of the holder and cannot flow back into the plug after the rotor stops.

2 Controlled variables and measured outputs

Controlled	Measured or calculated
Rotor speed or RCF per step, set in 50 rpm steps	Plug mass before the run and after each step (laboratory balance)
Step duration, 1 min to 99 h 59 min	Average water saturation per step, from mass change and fluid density
Acceleration (9 levels) and deceleration (10 levels)	Inlet-face capillary pressure per step, from the formula in section 4
Chamber temperature setting	Drainage curve from the equilibrium steps

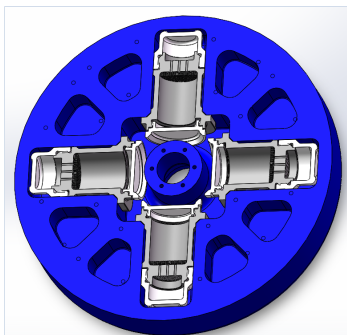
A step is taken as at equilibrium when the plug mass changes by less than the limit set in your procedure between two consecutive runs at the same speed. Local capillary pressure curves are derived from the average saturations with the Hassler–Brunner or Forbes approximation.

3 Rotor and holders

The rotor is a fixed rotor with radial holders; the number of holders depends on the plug size (for example 4 × 1 in or 3 × 1.5 in). Each holder is a sealed stainless-steel body with knurled end caps. The plug sits in the inner part on a perforated support with drain tubes; the outer part is the collection cup for displaced liquid. The rotor layout drawing, with the plug face radii, is issued for approval before manufacturing.



Fixed rotor with radial holders



Holder section: plug, support and collection cup

Item	Value
Rotor type	fixed, radial sealed holders; holder count per rotor
Plug diameter / length	1 in (25.4 mm) or 1.5 in (38.1 mm) / up to 2 in (50.8 mm)
Maximum speed	about 11,000 rpm with the standard rotor; 9,000 rpm with the 3 × 1.5 in rotor
Holder mass matching	holders loaded to equal mass, difference ≤ 2 g
Displaced liquid	collected in the cup at the outer end of each holder
Working fluids	brine 1.00–1.25 g/cm ³ ; kerosene or refined oil

The control system identifies the rotor and limits the speed to its rating. Rotor inspection intervals and service life are stated in the rotor passport supplied with the rotor.

4 Capillary pressure calculation

Inlet-face capillary pressure for each step: $P_c = \frac{1}{2} \cdot \Delta \rho \cdot \omega^2 \cdot (r_2^2 - r_1^2)$, where $\Delta \rho$ is the density difference of the fluid pair in kg/m³, $\omega = 2\pi \cdot \text{rpm} / 60$ in rad/s, r_2 the radius of the plug outlet face and $r_1 = r_2 - \text{plug length}$, both in m; P_c is in Pa. The outlet face is taken at $P_c = 0$. r_2 is given in the approved rotor drawing.

5 Specifications

Parameter	Value
Maximum speed	about 11,000 rpm (standard rotor); 9,000 rpm (3 × 1.5 in rotor)
Speed setting step / accuracy	50 rpm / ±50 rpm (speed or RCF entry)
Drive	brushless variable-frequency motor, direct drive
Acceleration / deceleration	9 / 10 levels (level 0 = free coast)
Chamber temperature	setting -20 to +40 °C, 1 °C steps; during rotation the chamber is held down to about +10 °C at medium speed and +15 °C at full speed
Timer	1 min to 99 h 59 min; countdown from set speed or from start
Programs	100 stored; up to 10 speed steps each (current controller)
Control	colour touch screen; last settings retained at power-up
Noise	≤ 65 dB(A), base unit
Power supply	220 V ±10 %, 50 Hz, single phase, 20 A line, grounded; 3.5 kW
Dimensions (L × W × H)	approx. 800 × 740 × 930 mm
Net weight	approx. 300 kg

6 Protection and interlocks

Faults below block the start or stop the rotor under control and show an error code on the display.

Group	Protection
Lid	start blocked with lid open; lid locked until the rotor slows to a safe speed; lock position monitoring; manual release for power failure
Rotor	imbalance shutdown; overspeed shutdown at 500 rpm above set point; automatic rotor identification, stop on missing or mismatched rotor; stop if set speed is not reached
Drive	speed (Hall) sensor fault; drive over-current and over-temperature; brake over-voltage
Supply	over-voltage (above 242 V AC) and under-voltage
Temperature	chamber over-temperature; temperature sensor fault

7 Installation requirements

- Level floor; clearance at least 15 cm at each side and 10 cm at the rear.
- Indoor use; ambient 5–40 °C, best at about 20 °C; relative humidity up to 80 % at 31 °C and 50 % at 40 °C, no condensation.
- Room of at least 10 m², with no direct sunlight or direct air-conditioner flow on the unit.
- Single-phase 220 V ±10 %, 50 Hz line rated 20 A with independent protective earth. Wait at least 3 minutes before switching on again after power-off (compressor protection).
- Safety zone of 30 cm around the unit kept clear during operation.

8 Standard project deliverables

Item	Qty
UC-200 centrifuge	1
Fixed rotor with sealed holders and collection cups, for the plug size ordered	1
Rotor tool	1
Spare parts kit for scheduled maintenance	1
Rotor layout drawing for approval; rotor passport	1
Operation manual and factory test report	1

Installation, commissioning, training, delivery and warranty terms are defined in the commercial proposal. A laboratory balance is not included.

9 RFQ inputs

- plug diameter, length and typical dry mass;
- saturating fluid and its density (brine salinity or oil type);
- highest capillary pressure needed and your equilibrium criterion;
- number of plugs per month;
- site power supply (voltage, frequency, phases).

This document defines the product family. Guaranteed performance, included hardware, exclusions, interfaces and acceptance criteria are stated only in the project-specific technical proposal and approved datasheet. Images are for reference; delivered configuration may differ.