STS 0292

VIOLLIER

In what order do I have to use the collection tubes?

Vacutainer®-system (Becton Dickinson)

Citrate tube, light blue (4)

fill up to the printed mark on the tube
Discard tube

Do not centrifuge tube

Serum gel tube, golden

Leave to coagulate for 30 min at room temperature prior to centrifugation

1'300 rcf → 15 min

Li-heparin tube, light green with gel

1'300 rcf → 15 min

EDTA-tube, purple

Generally do not centrifuge
If EDTA plasma is required:
1'300 rcf → 15 min

Glucose tube, gray

Do not centrifuge

Monovette®-system (Sarstedt)

Citrate tube, light blue (4)

fill up to the printed mark on the tube
Discard tube

Do not centrifuge tube

Serum gel tube, golden

Leave to coagulate for 30 min at room temperature prior to centrifugation

2'500 rcf → 10 min

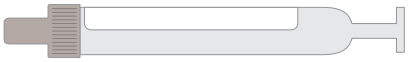
Li-heparin tube, light green

2'500 rcf → 15 min

EDTA-tube, purple

Generally do not centrifuge
If EDTA plasma is required:
2'500 rcf → 10 min

Glucose tube, gray



Do not centrifuge

How do I have to centrifuge urine for the urine sediment?

400 rcf → 5 min

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How do I centrifuge correctly?

What does it mean to centrifuge correctly?

The aim is to centrifuge as intensely as necessary and as gently as possible. If a sample is centrifuged too intensely it may be damaged (alterations of cells, hemolysis). If it is centrifuged too gently cells may remain in the supernatant leading to incorrect results upon analysis.

What happens in centrifugation?

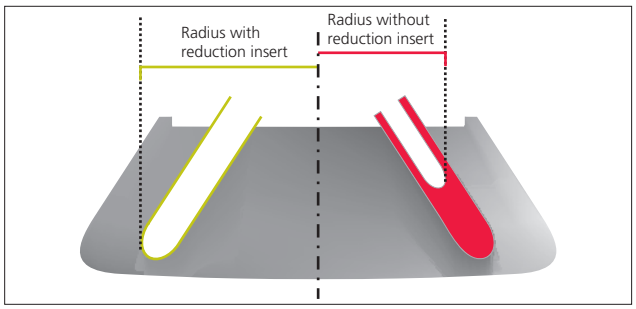
As in the blood sedimentation rate, gravity makes the cell sink to the bottom of the tube owing to their higher specific weight. Centrifugation increases gravity hundred to thousand fold which allows separation in a few minutes.

What factors influence centrifugation?

The artificial gravitational field which pulls cells to the bottom of the tube increases with radius / diameter and speed of the rotor. The result also depends on the duration of centrifugation.

How do I set my centrifuge correctly?

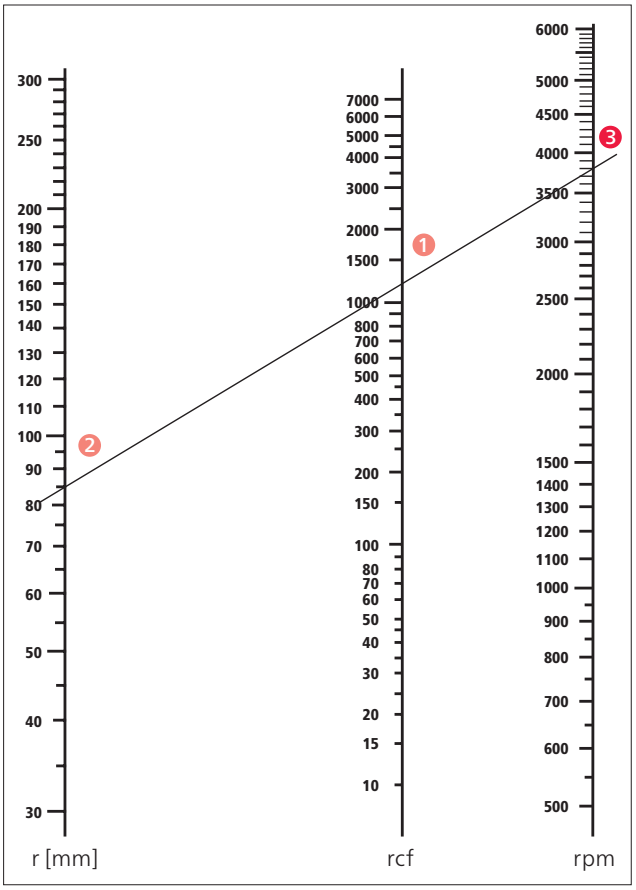
1. What rcf-value ('g-value') is required?
   Depending on sample type (whole blood, coagulation) and tube type / manufacturer.
2. What is the radius (= half the diameter) of my centrifuge?
   If reduction inserts are used for smaller tubes, the radius decreases.
   - Read on the rotor or
   - check in the instructions for use or
   - measure between the middle of the vertical axis the outermost edge of the centrifugation insert or reduction insert, respectively



3. What speed (U/min, rpm, min^{-1}) do I have to set?
   - Insert radius (r) in mm and required relative centrifugal force (rcf) in the formula:

$$\textbf{rpm} = \sqrt{\frac{\text{rcf}}{\text{r} \times 1.118}} \times 1'000$$

   - Entering radius in mm and rcf in the online calculator → www.viollier.ch/rpm-calculator
   - Mark radius in mm and required rcf in the nomogram:



Example:
1 1'300 rcf are required.
2 Radius is 86 mm. Line through 1 and 2
3 Required speed is approx. 3'700 rpm!

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How do I centrifuge correctly?

3. What speed (U/min, **rpm**, min^{-1}) do I have to set?
   - s

Radius (r) in mm

rcf		50	55	60	65	70	75	80	85	90	95	100	105	110	125
	Urine **400**	2’600	2’500	2’400	2’300	2’200	2’100	2’100	2’000	1’900	1’900	1’800	1’800	1’800	1’700
	800	3’700	3’600	3’400	3’200	3’100	3’000	2’900	2’900	2’800	2’700	2’600	2’600	2’500	2’400
	1’200	4’600	4’400	4’200	4’000	3’900	3’700	3’600	3’500	3’400	3’300	3’200	3’100	3’100	2’900
	Vacutainer® 1’300	4’800	4’500	4’300	4’200	4’000	3’900	3’800	3’700	3’500	3’400	3’400	3’300	3’200	3’000
	1’400	5’000	4’700	4’500	4’300	4’200	4’000	3’900	3’800	3’700	3’600	3’500	3’400	3’300	3’200
	1’500	5’100	4’900	4’700	4’500	4’300	4’200	4’000	4’000	3’800	3’700	3’600	3’500	3’400	3’300
	1’600	5’300	5’000	4’800	4’600	4’500	4’300	4’200	4’100	3’900	3’800	3’700	3’600	3’600	3’400
	1’700	5’500	5’200	5’000	4’700	4’600	4’400	4’300	4’200	4’100	3’900	3’800	3’800	3’700	3’500
	1’800	5’600	5’400	5’100	4’900	4’700	4’600	4’400	4’300	4’200	4’100	4’000	3’900	3’800	3’600
	2’000	5’900	5’600	5’400	5’200	5’000	4’800	4’700	4’600	4’400	4’300	4’200	4’100	4’000	3’800
	2’200	6’200	5’900	5’700	5’400	5’200	5’100	4’900	4’800	4’600	4’500	4’400	4’300	4’200	4’000
	2’400	6’500	6’200	5’900	5’700	5’500	5’300	5’100	5’000	4’800	4’700	4’600	4’500	4’400	4’100
	Monovette® 2’500	6’700	6’400	6’100	5’800	5’600	5’500	5’300	5’100	5’000	4’800	4’700	4’600	4’500	4’200
	2’600	6’800	6’400	6’200	5’900	5’700	5’500	5’300	5’200	5’000	4’900	4’800	4’700	4’500	4’300
	2’800	7’000	6’700	6’400	6’100	5’900	5’700	5’500	5’400	5’200	5’100	5’000	4’800	4’700	4’500
	3’000	7’300	6’900	6’600	6’300	6’100	5’900	5’700	5’600	5’400	5’300	5’100	5’000	4’900	4’600

with original reduction	without reduction	short sleeve	long sleeve
max. 6’000 rpm		max. 4’000 rpm	
Hettich EBA 200		**Hettich EBA 270**	

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Centrifuge setting

EBA 200 Fixrotor

max. 6’000 rpm

Radius of the rotor:
with reduction: 67 mm
without reduction: 86 mm

EBA 270 swing rotor

max. 4’000 rpm

Radius of the rotor:
short sleeve: 101 mm
long sleeve: 126 mm

		EBA 200		EBA 270		
		with reduction	without reduction	short sleeve	long sleeve	Duration
Vacutainer®						
Serum, Li-Hep., EDTA	1’300 rcf	4’200 rpm	3’700 rpm	3’400 rpm	3’000 rpm	15 min
Urine	400 rcf	2’300 rpm	2’000 rpm	1’800 rpm	1’700 rpm	5 min
Monovette®						
Serum, EDTA	2’500 rcf	5’800 rpm	5’100 rpm	(4’700 rpm)*	(4’200 rpm)*	10 min
Li-Heparin	2’500 rcf	5’800 rpm	5’100 rpm	(4’700 rpm)*	(4’200 rpm)*	15 min
Urine	400 rcf	2’300 rpm	2’000 rpm	1’800 rpm	1’700 rpm	5 min

* Not suitable for Monovette®, use EBA 200 or switch to Vacutainer®

$$\textbf{rpm} = \sqrt{\frac{\text{rcf}}{\text{r} \times 1.118}} \times 1'000$$

rpm = revolutions per minute
rcf = relative centrifugal force (‘g-force’)
r = radius of the rotor