VACUETTE®
one step ahead

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VACUETTE®
Handling Recommendations

VACUETTE®

Blood Collection System

Innovation for
Your Safety!

VACUETTE® - "Take the Original"

For decades glass was the raw material used for the production of evacuated blood collection tubes. However, in the mid 1980's, Greiner Bio-One recognised the safety risks for medical personnel that are associated with the use of glass, and was the **first producer** with the technical competence to make an innovative specimen collection system manufactured from PET, a virtually unbreakable highly transparent plastic.

See for yourself the advantages that "The ORIGINAL" can offer:

- Worldwide technological leadership in the production of specimen collection systems made of plastic
- Special thick-walled tube design to guarantee a longer shelf-life
- Innovative safety products to protect your health
- Complete product range made of virtually unbreakable plastic
- Flexibility for custom-made solutions with highest quality standards

"ONE STEP AHEAD"

VACUETTE® users profit from one of the most modern and highly efficient production facilities in the world. The continual development of new technologies and the state of the art production facilities demonstrate the innovative strengths of the company.

An ingenious quality management system guarantees the high standards of Greiner Bio-One. The use of VACUETTE® products ensures the safety of the user as well as the health and well-being of a magnitude of healthcare workers and patients.

Austrian headquarters of Greiner Bio One

Preparing for Blood Collection 2

a) Patient identification

This is performed by a comparison between the patient's test order form and the patient identification number, barcode, wristband number or other objective criteria.

b) Position

The patient should be suitably positioned for venipuncture (either sitting or recumbent), the position should be maintained for a minimum of 15 minutes prior to performing the venipuncture.

c) Preparation of the Collection Material

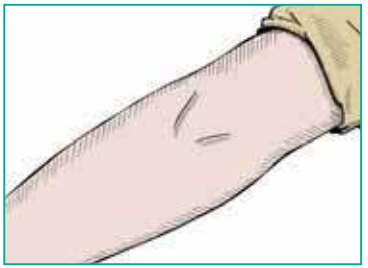
Prior to performing the venipuncture, the following items must be prepared:

- VACUETTE® Blood Collection System (consists of VACUETTE® Multiple Use Drawing Needle, Standard Tube Holder, VACUETTE® Blood Collection Tubes)
- Sterile disposable gloves
- Sterile swab
- Disinfectant or alcohol solution
- Adhesive bandages
- VACUETTE® Tourniquet
- VACUETTE® Sharps Disposal Container
- Label for patient identification (Timing of labelling varies from country to country)

Selection of a Puncture Site 3

Priority list:

1) Blood collection from the antecubital area of the arm (Median, Basilic or Cephalic veins)



2) Blood collection from the dorsal side of the hand (Dorsal veins).

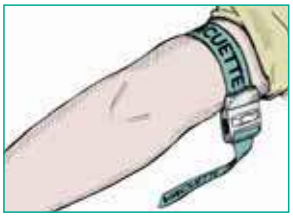
3) Blood collection from the dorsal surface of the foot (Venous arch)

Prior to making the final selection of a site for venipuncture, an inspection of the proposed area is necessary. The selection sequence should correspond to the priority list; whereby 1) and 2) are suitable in 95 % of cases and provide a satisfactory outcome.

Venipuncture 4

- Lightly tap the vein (only in the case of a non-prominent vein).

- Vein stasis with a tourniquet – maximum duration 1 minute.



- **Disinfect** the puncture site (Allow the disinfectant to thoroughly dry).

- **Venipuncture** – Insert the threaded needle into the holder and then insert into the patient's vein. The patient arm should be inclined in a downward position.

- With the second hand, the vacuum tube should be inserted into the holder (the tube cap must point upwards). Ensure that the rubber stopper is fully penetrated. Release tourniquet as soon as blood begins to flow.

Venipuncture

- For patients with prominent veins it is recommended to use the following **VACUETTE®** standard blood collection products:

- **VACUETTE® Multiple Use Drawing Needle** with uniquely sharpened faceting (three needle gauges available in 20, 21 and 22 G) for a patient friendly, pain free blood collection.

- **Standard Tube Holder** with economic design. The specially adjusted surface area allows for improved handling of the holder during blood collection.

- **VACUETTE® Blood Collection Tubes,** available exclusively in PET plastic. All tubes are available with a safety cap. The use of a vacuum system eliminates the possibility of back flow occuring during blood collection.

Venipuncture

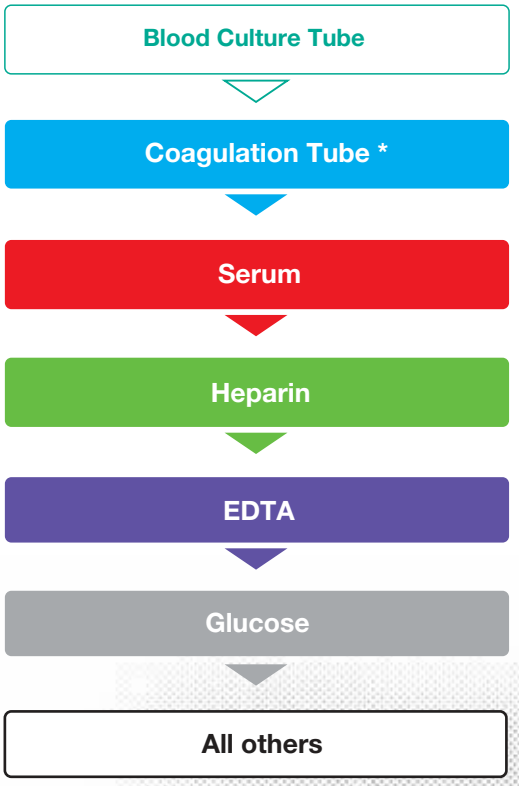
▶ For patients with difficult veins and respectively patients presenting an increased infection risk, it is recommended to use the following VACUETTE® products:

- **Safety Blood Collection Set** to protect your health. The simple to use safety mechanism provides reliable protection against needlestick injuries. The Safety Blood Collection Set is available as a standard version or as two special versions (with Luer adapter and with tube holder).

- **HOLDEX® Single-Use Holder** with eccentric nozzle. This holder is especially suitable for difficult vein conditions. The puncture is guaranteed through the off-centre cannula connection providing an optimal puncture angle for a patient friendly blood collection. The HOLDEX® Single-Use Holder can be used together with a Luer needle or with a blood collection set.

- **VACUETTE® QUICK-SHIELD Safety Tube Holder;** the practical safety holder with integrated protective cover to prevent needlestick injuries. Activation of the protective cover takes place when the needle is removed from the patients-vein. The holder should be used exlusively with VACUETTE® Multiple Use Drawing Needles.

Recommended Order of Draw for Multiple Specimen Collection: 5



*Coagulation tubes may be the first tube to be drawn for routine testing only (PT and aPTT).

Note: Always follow your facility's protocol for order of draw.

Troubleshooting 6

What should you do if no blood flows into the tube?

Possible cause	Solution
The bevel of the needle tip is sucked against the wall of the vein	Gently rotate the needle within the lumen of the vein
The needle penetrated the vein wall	Gently pull both the tube holder and the needle backwards
The needle is not fully within the vein	Gently push the needle forwards
The tourniquet was too tight or in place too long	Loosen the tourniquet
The tube was already used, or was previously opened	Dispose of and select a new tube

Blood flow ceases midway through the collection

Possible cause	Solution
The tube was removed from the holder too soon	Reinsert the tube into the holder until the vacuum is totally depleted
Suction is too strong for the vein (collapsed vein)	Pull the tube out of the holder for a second and then reinsert it
The needle position has altered during the procedure, or the needle is outside the vein	Repeat venipuncture at different site when haemotoma occurs.

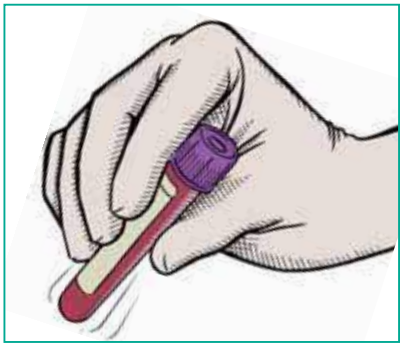
Troubleshooting

Haemolytical sample material

Possible cause	Solution
Too long stasis of the vein (longer than 1 minute)	Exact control of stasis time (maximum 1 minute)
Transfer from a syringe into a tube	For save blood transfer, use the VACUETTE® Blood Transfer Unit
Too intense mixing of the sample	**Gently** invert the tube 8 times (coagulation tubes 4 times)
Tubes, that are not adequately filled	Ensure that the tube is correctly filled to the fill mark on the tube label

Mixing of Specimen Material and Labelling of Tubes 7

- Following blood collection, all tubes should be gently inverted 8 times (coagulation tubes 4 times). Thorough mixing is necessary to ensure adequate performance of the tube contents (additive) with the blood sample. A full inversion is when the air bubble moves from one end of the tube to the other.



- In order to ensure unique identification of the specimens, it is necessary to write on the tube labels or use a barcode system to label the tubes.

Transport 8

- The recommended transport and storage temperature for tubes prior to use is 4-25 °C (40-77° F). Exceeding the recommended storage temperature may lead to impairment of the tube quality.
- Avoid direct exposure to sunlight in storage and during transportation of samples, especially light-sensitive analytes such as Bilirubin.
- For safe transport, it is recommended that the VACUETTE® Transport Boxes - especially developed for this purpose - be used in combination with the appropriate transport carton.

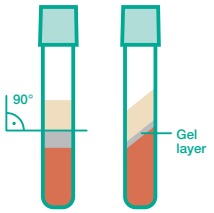
Centrifugation 9

Centrifugation recommendations for VACUETTE® Blood Collection Tubes

	Centrifuge speed	Time
Coagulation tubes		
Platelet rich plasma (PRP)	150 g	5 min.
Platelet poor plasma (PPP)	1500 – 2000 g	10 min.
Platelet free plasma (PFP)	2500 – 3000 g	20 min.
Serum tubes	min. 1500 g	10 min.
Serum Sep C/A	1800 g	10 min.
Serum Beads C/A	1800 g	10 min.
Plasma tubes	2000 - 3000 g	15 min.
Heparin Sep	2200 g	15 min.
EDTA Sep	1800 – 2200 g	10 min.

Serum tubes should be centrifuged within 30 minutes after blood collection.

Important:
The type of centrifuge being used can influence the composition of the gel barrier. Through the use of a swing-out rotor centrifuge in comparison to a fixed-angle centrifuge, a more solid gel barrier will be achieved. Centrifugation should be performed in a cooled centrifuge (15 – 24 °C).



Handling VACUETTE® Tubes with Safety Cap 10

Opening VACUETTE® Blood Collection Tubes

1) Hold the tube firmly in one hand (use a solid base to support the arm)

2) Twist the safety cap with the other hand so the cap is loosened

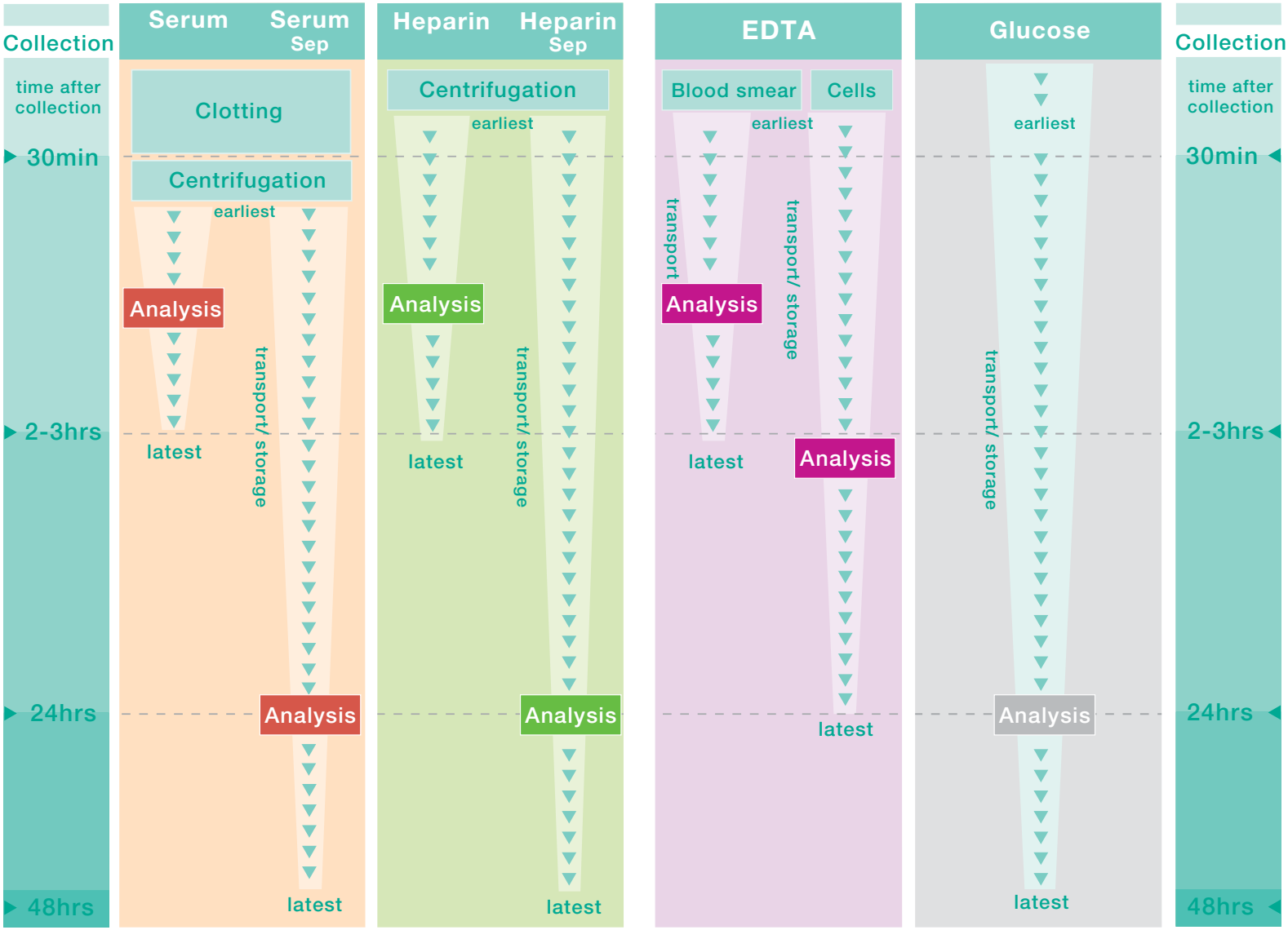
3) Carefully open the tube with a gentle twist-pull motion. VACUETTE® PREMIUM Tubes are opened with a short twist movement.

Note: Too long storage of opened tubes can lead to evaporation and therefore false analysis results!

Closing VACUETTE® Blood Collection Tubes

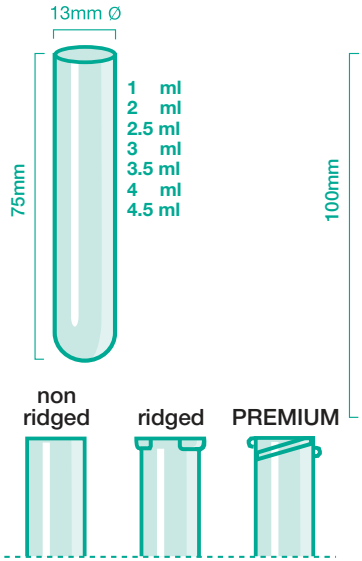
1) Place the safety cap on the tube
2) Press the cap onto the tube with the thumb (so it is firmly seated) . VACUETTE® PREMIUM Tubes are closed with a twist movement.

VACUETTE® Handling of Testing Material 11

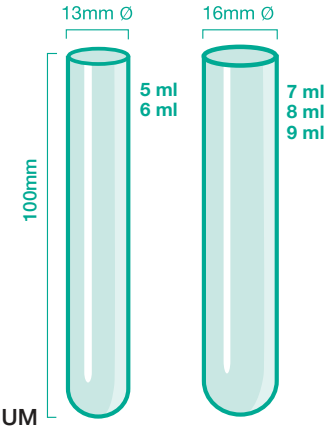


Tube Dimensions 12

75mm tubes
specimen volumes



100mm tubes
specimen volumes



VACUETTE® Safety Caps 13

▶ Standard cap

16mm | 13mm | 13mm non ridged

Snap cap

for re-capping 13mm tubes

- Prevents aerosol effect
- Absolute transport security
- Simple re-capping
- Prevents contact with patient blood

Application Areas for VACUETTE® Tubes 14

VACUETTE® tube type	Colour-coding of cap	Additive	Intendend purpose
Serum		Clot Activator	Determinations in serum for clinical chemistry, microbiological serology, immunology, TDM
Serum Sep		Clot Activator and Sep	Determinations in serum for clinical chemistry, microbiological serology, immunology, TDM
Serum Beads		Clot Activator and Beads	Determinations in serum for clinical chemistry, microbiological serology, immunology
Serum Crossmatch		Clot Activator	Determinations in serum for crossmatch testing
Plasma		Sodium Heparin Lithium Heparin Ammonium Heparin	Determinations in heparinised plasma for clinical chemistry
Plasma Sep		Lithium Heparin and Sep	Determinations in heparinised plasma for clinical chemistry
EDTA		K_2 EDTA K_3 EDTA	Determinations in EDTA whole blood for haematology
EDTA Crossmatch		K_3 EDTA	Determinations in EDTA whole blood for crossmatch testing
EDTA Sep		K_2 EDTA / Sep	Determinations in EDTA plasma for molecular biological identification of viruses, parasites und bacteria
Coagulation		Citrate Solution (3.2%) Citrate Solution (3.8%)	Determinations in citrated plasma for coagulation testing
CTAD		CTAD (3.2%)	Determinations in citrated plasma for coagulation testing where the artificial entry of platelet factors into the plasma is avoided
Glucose		Anticoagulant Glycolysis inhibitor	Determinations in stabilised anticoagulated whole blood or plasma for glucose and lactate testing
Trace Elements		Clot Activator Sodium Heparin	Determinations in serum / heparinised plasma for trace elements testing
Blood Grouping		ACD-A ACD-B CPDA	Determinations in ACD / CPDA whole blood for blood grouping

VACUETTE® offers a wide variety of supportive education and training material for the sample collection procedure. Amongst others, these include: 15

- VACUETTE® Tube Summary Chart — Art. No. 980015
- VACUETTE® Instructions for Use Leaflet — Art. No. 980055
- VACUETTE® Hygiene Compendium — Art. No. 980056
- VACUETTE® Blood Collection Techniques Booklet — Art. No. 980063
- VACUETTE® Safety Brochure — Art. No. 980124
- VACUETTE® Preanalytics Manual — Art. No. 980183
- VACUETTE® Analyte Chart — Art. No. 980196
- VACUETTE® GBO Company Product Presentation DVD — Art. No. 980434

For further information, please contact your nearest VACUETTE® distributor.

Take the VACUETTE® Original

VACUETTE®
one step ahead

BLOOD COLLECTION SYSTEM

An Overview of the Essential Points

Checklist:

Storage conditions in storeroom	4 – 25°C, protected from direct sunlight
Expiry Date	Not exceeding end of month stated on tube and packaging
Blood collection	According to Instructions for Use
Inversion of tubes immediately after blood collection	**Gently** 8 times (coagulation tubes 4 times)
Waiting period prior to centrifugation of serum tubes	Minimum 30 min.
Visual control of complete coagulation of serum tubes prior to centrifugation	In certain blood samples, the clotting speed in serum tubes may be clearly delayed (i.e. anticoagulant therapy, missing coagulation factor, ...) the waiting period prior to centrifugation may be correspondingly delayed
Centrifugation	According to Instructions for Use
Further transport/dispatch of centrifuged gel tubes (post, courier service,...)	Storage of tubes upright (for approx. 1 hour) prior to further transport/dispatch
Recentrifugation of Sep tubes	Avoid absolutely! Could lead to a change in the analysis results (i.e. potassium)