

Instruction for Use of

TUD Evacuated Blood Collection Tubes

Direction for Use of *TUD* Evacuated Blood Collection Tube

Product name: **TUD** Evacuated blood collection tube

- I. Application: It is used for collection, transferring, storage and treatment of venous blood specimen in lab or clinic.
- II. Composition: *TUD* evacuated blood collection tube is composed of a plastic/glass test tube, relevant additives, rubber stopper, safety closure and label.
- III. Product specifications: RQ/ZC culture medium, SPS; RQ/ZC no additive; RQ/ZC K2E, K3E, N2E; RQ/ZC NC, BC; RQ/ZC LIH, NAH; RQ/ZC separation gel; RQ/ZC sodium fluoride

IV. Application of *TUD* Evacuated Blood Collection Tube

The tube material used for evacuated blood collection tube are glass or plastic. Vacuum of pre-calculated volume is preset into the test tube after special treatment is applied to tube's inner wall. Then the tube is sealed with a butyl rubber stopper. To prevent outside splashing of blood specimen that may be caused while open the stopper during test, a plastic safety closure can be applied to cover the stopper. According to various requirements of relevant test items, different additives meeting requirements (character, concentration, strength, proportion, etc.) are preset in the tube and are identified with stopper or safety closure's color meeting international standard (Please refer to the following table). And the marking line of blood volume is also marked on the label adhering to the tube.

Identification and Application of *TUD* Evacuated Blood Collection Tube

Closure Color	Additive code	Clinical application	Sample preparation	Additive
Yellow, red, green	None	For bacterial culturing of blood specimen	Whole blood	Culture medium, SPS
Red	None	Conventional serum experiment (clinical biochemistry test, immunity test, radio immunity test, PCR, etc)	Serum	None
Purple	K2E, K3E, N2E	Whole blood test, blood group determination and cross matching of blood in hematology	Whole blood	EDTA-K ₂ (K ₃)(Na ₂)
Light blue	NC, BC	Blood coagulation test (PT, APTT, blood coagulation factor detection)	Plasma, whole blood	Sodium Citrate (Ratio to blood specimen: 1:9)
Black	NC	Blood cell sedimentation test	Whole blood	Sodium Citrate (Ratio to blood specimen: 1:4)
Green	LIH, NAH	Hematology test, plasma biochemistry test	Plasma	Sodium Heparin / Lithium Heparin
Yellow	None	Routine serum test (clinical biochemical test, immunity test, radio immunity test, etc)	Serum	Clot Activator & Gel
Grey	None	Blood sugar test, sugar tolerance test	Plasma	Sodium fluoride & potassium oxalate

V. Methods for use of evacuated blood collection tube

1. Serum separation tube

Inner wall of these tubes is treated with silicone to prevent adherence of blood to the inner wall and prevent physical hemolysis. To shorten the clotting time of blood specimen, clot activator is sprayed on the inner wall of tube. To make the serum separation faster and better and realize “one-tube operation” for a whole test process and serum storage, gel can be added into the tube. The evacuated vacuum tube added with clot activator shall be inverted slightly 5-8 times immediately after blood collection (Refer to **Precautions** for details).

2. Plasma separation tube

Inner wall of these tubes is specially treated to ensure the quality of plasma. The anticoagulant added to the tube, such as Sodium Citrate, EDTA-K₂(K₃), Sodium/Lithium Heparin, etc, are determined by the requirements of plasma test. The physicochemical properties of anticoagulants comply with requirements of the *International Standard*. To ensure the stability of plasma composition and the “one-tube operation” for a whole test process and serum storage, gel can be added to these tubes. The evacuated blood collection tube for plasma separation shall be inverted slightly 5-8 times immediately after blood collection to ensure adequate anti-coagulation.

3. Evacuated blood collection tube for whole blood test

Inner wall of these tubes is specially treated 2 times to ensure maximally the stability of biological and physicochemical properties of blood sample's composition within a relatively longer period. The physicochemical properties, purity, concentration, Ph value, clarity, osmotic pressure, etc, of additives meet the injection requirements of *International Standard*. The tube shall be inverted slightly 5-8 times after blood collection and during test to ensure anticoagulant effect of blood specimen and the homogeneous phase distribution of blood cells.

4. Evacuated tube blood collection tube for microelement determination

Microelements existent on inner wall and stopper of these tubes are lixiviated out by being soaked in diluted acid and double distilled water for more than 4 hours to avoid possible contamination to blood specimen. The maximum limit of residual microelements in the evacuated tube is lower than the test limit.

5. Evacuated blood collection tube for blood coagulation test

The concentration of Citric acid of this tube has two alternatives: 3.2% (0.109mol/L) and 3.8% (0.129mol/L). Persantine, adenosine and theophylline can be added into the tube to ensure that blood platelet can't be activate outside of human body. The anticoagulant is light yellow. Please attend that the blood collection tube containing ersantine, adenosine and theophylline can't be used for blood platelet aggregation test.

VI. Precautions

1. Since blood volume to be collected is determined by vacuum preset in the evacuated blood collection tubes (fixed production conditions: 20°C, 1 standard atmosphere), the accuracy of blood volume to be collected is affected by many factors such as altitude (atmosphere), air temperature, venous pressure, manufacture date of evacuated blood collection tube, blood collection technique, etc.
2. Correct ratio between blood specimen and additive is required for evacuated blood collection tube with additives, and a tolerance of $\pm 5\%$ of such ratio is allowable). During collection, the blood should be collected to the indication line marked on the tube label, and thus the collection time may be a little longer. If the conditions (e.g. high altitude) where you are have obvious influence on the accuracy of collection volume, please contact our Technical Department for better technical support.
3. Evacuated blood collection tube with Gel is recommended if serum or plasma shall be separated from blood specimen for determination of items such as LDH, GLU, K⁺, AST, etc, that are easy to be effected by blood cells. And centrifugation shall be applied to this tube as soon as possible after blood collection to separate the serum or plasma from blood cells by Gel. (If serum separation tube is used, centrifugation should be applied after blood coagulates completely.). In this way, chemical components of serum or plasma can remain basically stable for more than 72 hours (to be airtight stored with stopper).

4. If the collection volume is below 1.6ml, common evacuated tube may not meet your need. In such case, please contact our Technical Department for better solution. pleural and peritoneal effusion
5. It may be difficult to collect blood from infant. We can provide a complete solution and technical support to your actual requirement.
6. It's not suggested to use **TUD** blood collection tube with additives for collection of other body fluids such as urine, cerebrospinal fluid and pleural and peritoneal effusion.
7. For the centrifugation of evacuated glass blood collection tube containing blood specimen on non-automatic balancing horizontal centrifuge, the maximum centrifugal force shall not be higher than 2200g; for the centrifugation on angular centrifuge, the maximum centrifugal force shall not be higher than 1300g; for the centrifugation on automatic balancing horizontal centrifuge, the centrifugal force can be increased a little suitably.

Calculation formula of centrifugal force: $RFC=1.118 \times 10^{-5} rmp^2 \times r(cm)$

of which : rpm is rotation speed per minute

“r” is the distance between rotation center and the bottom of blood collection tube when the tube is in fully extended status.

To achieve satisfactory serum (plasma) separation effect, please find the following table shows optimum centrifugal speed for different centrifugal radius.

Table of Centrifugal Radius and Optimum Centrifugal Speed

Centrifugal radius (cm)	Centrifugal speed (Rotation/Minute)	Centrifugal radius (cm)	Centrifugal speed (Rotation/Minute)
7	3750	17	2400
8	3500	18	2350
9	3300	19	2280
10	3150	20	2200
11	3000	21	2160
12	2900	22	2100
13	2750	23	2060
14	2650	24	2030
15	2550	25	2000
16	2500	26	1950

8. For **TUD** evacuated blood collection tube with clot activator, the time of full clotting of blood specimen is affected by factors such as character of clot activator, temperature, the normality of blood coagulation factor, etc. The average time of full clotting of blood specimen collected from normal persons under the action of different clot activator is shown in the following table.

Average Placing Time for Blood Specimen before Serum Separation

Product	Average Placing time
Serum tube (with red stopper)	60min
Serum tube (with yellow or orange stopper)	30min
Serum tube (containing thrombin)	5min

9. Indications: **Single use only**. They shall be disposed after use accordance to relevant regulations of different countries/regions.
10. Storage: To be stored in a cool, dry and ventilative place with no corrosive gases. Suitable temperature: 4°C-25°C
11. Validity: Please see the packaging (Validity of evacuated blood collection glass tube: 24 months; Validity of evacuated blood collection PET tube: 18 months)
12. The content of the TUD blood tube shall be checked always before use to ensure the carton is sealed with no damages or any alteration to the label, additive and opened cap. Damages content could arise inaccurate result and contamination to the blood tube.
13. TUD does not responsibility to any liabilities for the unauthorized sources or use of tubes in VI.1

VII. Explanation of symbols

: Rainproof; : Fragile; : Upward; : Sunproof; : Single use only



VIII. Quality Commitment

High-quality product + Reliable technical support + Satisfactory service (Our Technical Department will respond promptly to your any questions arising out of use)

IX. Trademark

TUD is a registered trademark for TUD Sdn Bhd, which located at : 49-1, Jalan Temenggung 9/9, Bandar Mahkota Cheras, 43200 Cheras, Selangor Darul Ehsan, Malaysia.