WHO International Standard
1st INTERNATIONAL STANDARD FOR BLOOD COAGULATION
FACTOR V, PLASMA, HUMAN
NIBSC code: 03/116
Instructions for use
(Version 3.0, Dated 30/11/2012)

1. INTENDED USE
The 1st International Standard for Factor V, Plasma, Human consists of ampopules, coded 03/116, containing appx 1 mL aliquots of pooled normal human plasma, freeze-dried. This preparation was established in 2005 as the 1st International Standard for Factor V, Plasma, Human by the Expert Committee on Biological Standardization (ECBS) of the World Health Organization.

2. CAUTION
This preparation is not for administration to humans or animals in the human food chain

The preparation contains material of human origin, and either the final product or the source materials, from which it is derived, have been tested and found negative for HBsAg, anti-HIV and HCV RNA.

As with all materials of biological origin, this preparation should be regarded as potentially hazardous to health. It should be used and discarded according to your own laboratory's safety procedures. Such safety procedures should include the wearing of protective gloves and avoiding the generation of aerosols. Care should be exercised in opening ampopules or vials, to avoid cuts.

3. UNITAGE
The standard was calibrated for Factor V clotting activity in an international collaborative study involving 22 laboratories from 11 countries. It was agreed that the assigned value should be calculated as the geometric mean of the 13 estimates obtained relative to locally collected fresh normal plasma pools (total number of donors = 512). The assigned value for Factor V clotting activity is 0.74 IU/ampoule.

Uncertainty: the assigned unitage does not carry an uncertainty associated with its calibration. The uncertainty may therefore be considered to be the variance of the ampoule content and was determined to be +/- 0.05 %.

4. CONTENTS
Country of origin of biological material: United Kingdom.

The WHO 1st IS for Factor V, Plasma, Human was prepared from a plasma pool derived from 26 normal healthy donors (United Kingdom Blood Service, North London Blood Transfusion Centre). Blood was collected using conventional venepuncture into CPD anticoagulant at a nominal ratio of 63 mL anticoagulant to 450 mL whole blood. The donations underwent leuko-filtration followed by two centrifugation steps after which the plasma was frozen rapidly and stored -70 ºC until the day of ampolle filling. Individual donations were tested and found negative for HBsAg, antibodies to HIV-1 and -2 and antibodies to HCV. The donations were also tested as mini-pools and found negative for the presence of HCV RNA using a PCR technique. On the morning of the fill the plasma units were thawed in a waterbath at 37 ºC and pooled. A buffering agent HEPES (N-[2-Hydroxyethyl]piperazine-N'-[2-ethanesulfonic acid] was added to the pooled plasma at a final concentration of 40 mmol/L.

The pooled plasma was distributed into glass ampopules at a mean fill weight of 1.0052 g (range 1.0038 - 1.0066 g) and coefficient of variation of 0.05%. Each ampolle underwent freeze-drying and secondary desiccation before being sealed in an atmosphere of dry nitrogen gas and placed into storage at -20 ºC (1).

5. STORAGE
Unopened ampopules should be stored in the dark at -20 ºC or below. Please note: because of the inherent stability of lyophilized material, NIBSC may ship these materials at ambient temperature.

6. DIRECTIONS FOR OPENING
DIN ampopules have an ‘easy-open’ coloured stress point, where the narrow ampolle stem joins the wider ampolle body. Tap the ampolle gently to collect the material at the bottom (labeled) end. Ensure that the disposable ampolle safety breaker provided is pushed down on the stem of the ampolle and against the shoulder of the ampolle body. Hold the body of the ampolle in one hand and the disposable ampolle breaker covering the ampolle stem between the thumb and first finger of the other hand. Apply a bending force to open the ampolle at the coloured stress point, primarily using the hand holding the plastic collar.

Care should be taken to avoid cuts and projectile glass fragments that might enter the eyes, for example, by the use of suitable gloves and an eye shield. Take care that no material is lost from the ampolle and no glass falls into the ampolle. Within the ampolle is dry nitrogen gas at slightly less than atmospheric pressure. A new disposable ampolle breaker is provided with each DIN ampolle.

7. USE OF MATERIAL
No attempt should be made to weigh out any portion of the freeze-dried material prior to reconstitution.

To reconstitute, allow ampopules to warm to room temperature. Open the ampolle following the directions given in section 6 taking care to ensure that all material is in the lower part, and reconstitute with 1.0 mL distilled water. Stand for 10 minutes at room temperature to allow complete dissolution of the material. It is recommended that the reconstituted standard is transferred to a stoppered plastic tube and stored on melting ice until used.

8. STABILITY
Reference materials are held at NIBSC within assured temperature-controlled storage facilities and they should be stored on receipt as indicated on the label. It is the policy of WHO not to assign an expiry date to their international reference materials. Accelerated degradation studies have indicated that this material is suitably stable, when stored at -20 ºC or below, for the assigned values to remain valid until the material is withdrawn or replaced. These studies have also shown that the material is suitably stable for shipment at ambient temperature without any effect on the assigned values. Users who have data supporting any deterioration in the characteristics of any reference preparation are encouraged to contact NIBSC.

9. REFERENCES

10. ACKNOWLEDGEMENTS
The collaborative study participants are gratefully acknowledged.

11. FURTHER INFORMATION
Further information can be obtained as follows:
This material: enquiries@nibsc.org
WHO Biological Standards:
http://www.who.int/biologicals/en/
JCTLM Higher order reference materials:
http://www.bipm.org/en/committees/jc/jctlm/
Derivation of International Units:
http://www.nibsc.org/standardisation/international_standards.aspx
Ordering standards from NIBSC:
http://www.nibsc.org/products/ordering.aspx
12. CUSTOMER FEEDBACK
Customers are encouraged to provide feedback on the suitability or use of the material provided or other aspects of our service. Please send any comments to enquiries@nibsc.org.

13. CITATION
In all publications, including data sheets, in which this material is referenced, it is important that the preparation's title, its status, the NIBSC code number, and the name and address of NIBSC are cited and cited correctly.

14. MATERIAL SAFETY SHEET

<table>
<thead>
<tr>
<th>Physical and Chemical properties</th>
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<tbody>
<tr>
<td>Physical appearance: Freeze dried powder</td>
<td>Corrosive: No</td>
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<tr>
<td>Stable: Yes</td>
<td>Oxidising: No</td>
</tr>
<tr>
<td>Hygroscopic: Yes</td>
<td>Irritant: No</td>
</tr>
<tr>
<td>Flammable: No</td>
<td>Handling: See caution, Section 2</td>
</tr>
<tr>
<td>Other (specify): Contains material of human origin</td>
<td></td>
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</tbody>
</table>

Toxicological properties
Effects of inhalation: Not established, avoid inhalation.
Effects of ingestion: Not established, avoid ingestion.
Effects of skin absorption: Not established, avoid contact with skin.

Suggested First Aid

Inhalation: Seek medical advice.
Ingestion: Seek medical advice.
Contact with eyes: Wash with copious amounts of water. Seek medical advice.
Contact with skin: Wash thoroughly with water.

Action on Spillage and Method of Disposal
Spillage of ampoule contents should be taken up with absorbent material wetted with an appropriate disinfectant. Rinse area with an appropriate disinfectant followed by water. Absorbent materials used to treat spillage should be treated as biological waste.

15. LIABILITY AND LOSS
In the event that this document is translated into another language, the English language version shall prevail in the event of any inconsistencies between the documents.

Unless expressly stated otherwise by NIBSC, NIBSC’s Standard Terms and Conditions for the Supply of Materials (available at http://www.nibsc.org/About_Us/Terms_and_Conditions.aspx or upon request by the Recipient) ("Conditions") apply to the exclusion of all other terms and are hereby incorporated into this document by reference. The Recipient’s attention is drawn in particular to the provisions of clause 11 of the Conditions.

16. INFORMATION FOR CUSTOMS USE ONLY

<table>
<thead>
<tr>
<th>Country of origin for customs purposes*: United Kingdom</th>
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<tbody>
<tr>
<td>Toxicity Statement: Non-toxic</td>
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</table>

* Defined as the country where the goods have been produced and/or sufficiently processed to be classed as originating from the country of supply, for example a change of state such as freeze-drying.

Net weight: 0.084 g

Veterinary certificate or other statement: if applicable.

Attached: No

17. CERTIFICATE OF ANALYSIS
NIBSC does not provide a Certificate of Analysis for WHO Biological Reference Materials because they are internationally recognised primary reference materials fully described in the instructions for use. The reference materials are established according to the WHO Recommendations for the preparation, characterization and establishment of international and other biological reference standards http://www.who.int/bloodproducts/publications/TRS932Annex2_Inter_biol_efstandardsrev2004.pdf (revised 2004). They are officially endorsed by the WHO Expert Committee on Biological Standardization (ECBS) based on the report of the international collaborative study which established their suitability for the intended use.