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## Transfer sets for pharmaceutical preparations — Requirements and test methods

*Ensemble de transfert pour préparations pharmaceutiques — Exigences et méthodes d'essai*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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This document was prepared by Technical Committee ISO/TC 76, *Transfusion, infusion and injection, and blood processing equipment for medical and pharmaceutical use*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 205, *Non-active medical devices*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 22413:2010), which has been technically revised.

The main changes compared to the previous edition are as follows:

- the structure (moving all tests to the new [Annex A](#)) and partly the content were aligned with ISO 8536-4;
- [Table 1](#) on penetration force was amended by a new entry;
- [6.7](#) (formerly 5.7) on fragmentation was clarified;
- former Clause 12 on storage was deleted;
- [Clause 10](#) (formerly Clause 13) on labelling was updated;
- [Clause 11](#) on the disposal has been added due to the single-use character of the product;
- former Annexes A and B on testing of fragmentation of transfer sets were moved to a new [Annex A](#) on physical tests;
- most of the tests in [Annex A](#) were, as far as necessary, aligned with the appropriate tests in ISO 8536-4;
- a new [Clause A.9](#) on a test for stress cracking of small-bore connectors was added;
- [Clause 2](#) and the Bibliography were updated.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

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## Introduction

Transfer sets for pharmaceutical preparations transmit fluids from one container to another. The transfer sets mix fluids or dissolve dry substances are used in combination with infusion and injection containers.

The transfer sets consist either of two piercing devices or of a piercing device in combination with a small-bore connector, which can be connected with each other in different ways. Transfer sets can have a housing.

Examples of different designs:

- a) two piercing devices connected to each other (similar to piercing devices of infusion containers);
- b) a metal cannula, bevelled on both sides or a combination of a) and b);
- c) metal cannulae, mostly having a hub or a grip plate in the middle, fixed to the plastic part;
- d) plastic piercing devices directly connected to a grip plate, or held by a tube at a distance to allow a higher hydrostatic pressure;
- e) piercing devices with an additional ventilation channel that can end in the other tip or outside;
- f) piercing devices with an air filter;
- g) piercing device in combination with a small-bore connector;
- h) piercing device in combination with a small-bore connector and a particle filter;
- i) piercing devices with housings serving, among other things, as a guide and a fixation on the connected containers for a secure, injury-free and contactless application.

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# Transfer sets for pharmaceutical preparations — Requirements and test methods

## 1 Scope

This document specifies requirements and test methods for sterilized single-use transfer sets that are used for pharmaceutical preparations.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7864:2016, *Sterile hypodermic needles for single use — Requirements and test methods*

ISO 8362 (all parts), *Injection containers and accessories*

ISO 8536-2, *Infusion equipment for medical use — Part 2: Closures for infusion bottles*

ISO 8536-4, *Infusion equipment for medical use — Part 4: Infusion sets for single use, gravity feed*

ISO 11607-1, *Packaging for terminally sterilized medical devices — Part 1: Requirements for materials, sterile barrier systems and packaging systems*

ISO 15223-1, *Medical devices — Symbols to be used with medical device labels, labelling and information to be supplied — Part 1: General requirements*

ISO 15747, *Plastic containers for intravenous injections*

ISO 80369-1, *Small-bore connectors for liquids and gases in healthcare applications — Part 1: General requirements*

ISO 80369-20, *Small-bore connectors for liquids and gases in healthcare applications — Part 20: Common test methods*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

### 3.1

#### **transfer set**

medical device to transmit liquid pharmaceutical preparations from one container to another

Note 1 to entry: The transfer set mixes fluids or dissolves dry substances and is used in combination with infusion and injection containers.

## 4 Design and designation

### 4.1 Design for transfer sets without housing

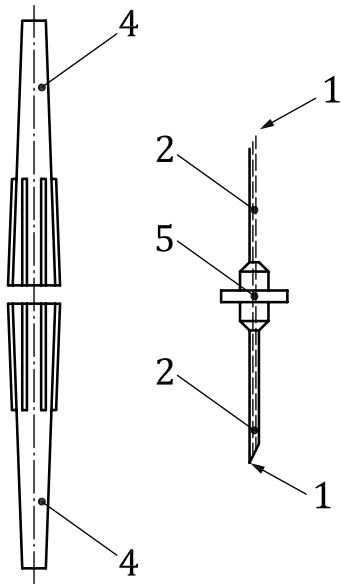
The designs of the individual components are given in [Figure 1](#) and [Figure 2](#). The Figures serve as examples of possible transfer sets. Other designs are acceptable.

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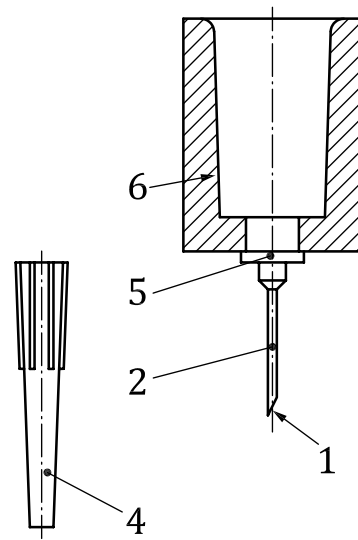
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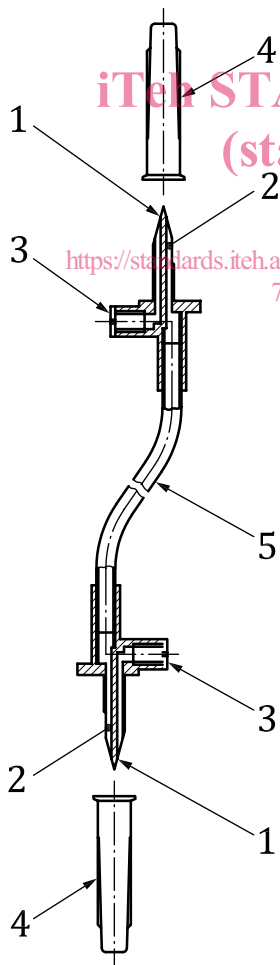




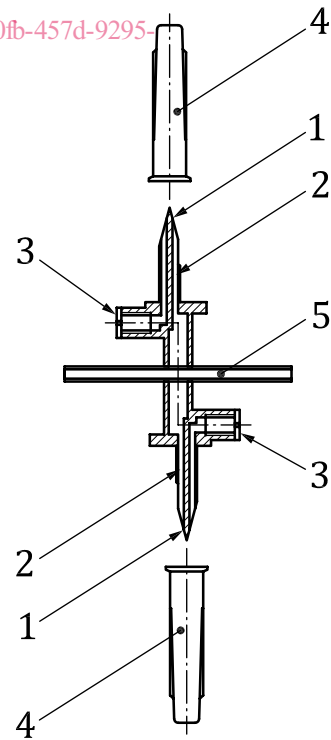
a) Transfer set with one channel



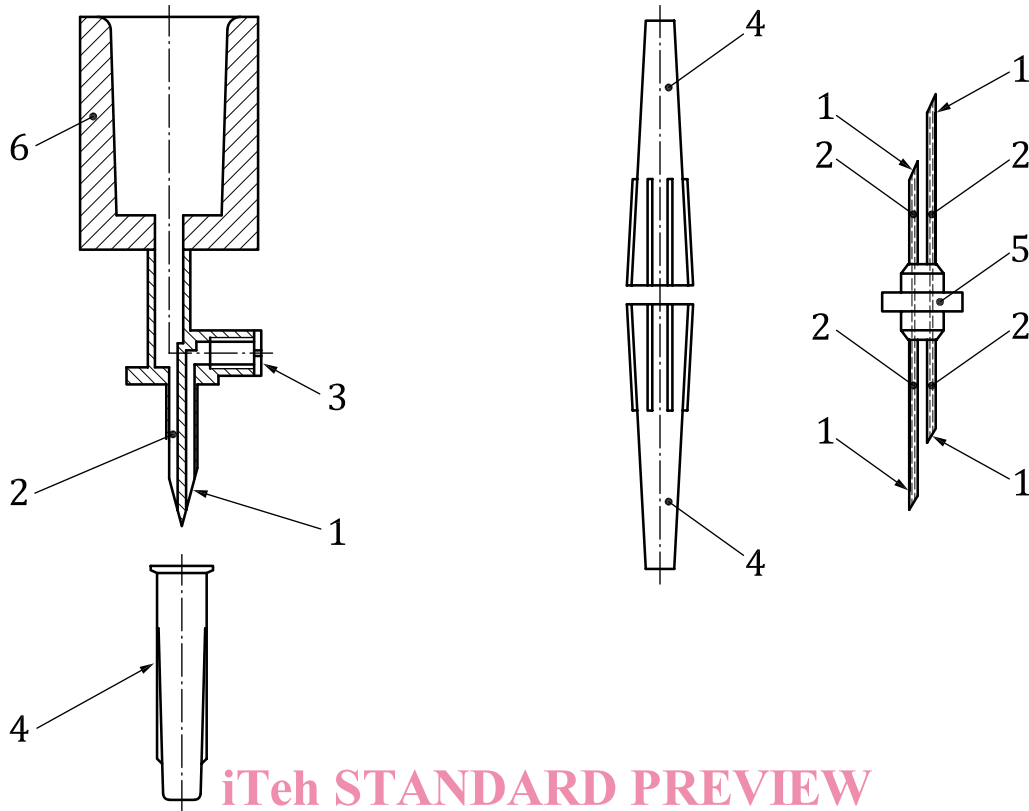
b) Transfer set with one channel in combination with a small-bore connector



c) — Transfer set with an air inlet/air outlet



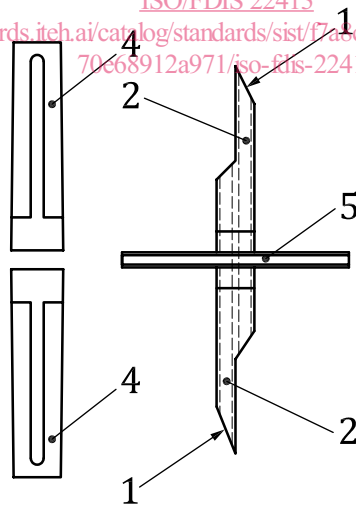
d) — Alternative transfer set with an air inlet/air outlet



e) — Transfer set with an air inlet/air outlet in combination with a small-bore connector

f) — Transfer set with two channels

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g) Alternative transfer set with two channels

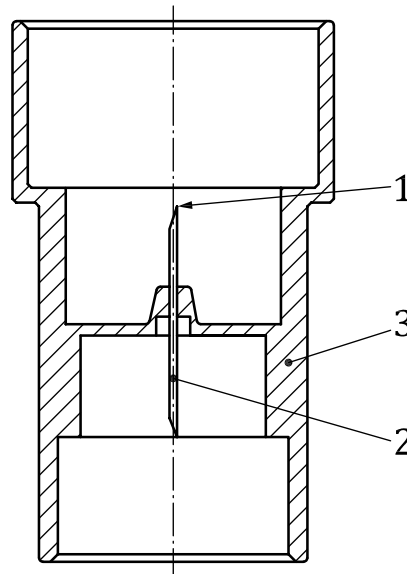
**Key**

- 1 piercing device
- 2 channel
- 3 channel with air filter for ventilation, optionally lockable
- 4 protective cap
- 5 connection of piercing devices by hub, grip plate or tube
- 6 small-bore connector

**Figure 1 — Transfer sets without housing**

## 4.2 Design for a transfer set with housing

The design of a transfer set with housing is given in [Figure 2](#). The drawing serves as an illustration of a possible transfer set with housing. Others designs are acceptable.



### Key

- 1 piercing device
- 2 channel
- 3 housing

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**Figure 2 — Transfer set with housing**  
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## 4.3 Designation

Designation shall follow label requirements according to [Clause 10](#).

## 5 Materials

The materials for the transfer sets and their individual components shall conform to the requirements in [Clause 6](#). If the components are exposed to the liquid to be transferred, the chemical and biological requirements in ISO 8536-4 shall be met.

Piercing devices shall be manufactured from appropriate materials, e.g. metal and/or plastic.

## 6 Physical requirements

### 6.1 Particulate contamination

Transfer sets shall be manufactured under conditions that minimize particulate contamination. All parts shall be smooth and clean at the fluid pathway surfaces. When tested as specified in [A.2](#), the number of particles shall not exceed the contamination index limit.

### 6.2 Tensile strength

**6.2.1** When tested as specified in [A.3](#) the transfer set shall withstand a static tensile force of not less than 15 N for 15 s.