International

ISO 11040-4

Prefilled syringes —

Part 4: Glass barrels for injectables and sterilized subassembled syringes ready for filling

Seringues préremplies —

Partie 4: Cylindres en verre pour produits injectables et seringues pré-assemblées stérilisées préremplissables

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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*.

This fourth edition cancels and replaces the third edition (ISO 11040-4:2015), which has been technically revised.

The main changes are as follows:

— Clause 3 has been updated;

— update on general requirements have been added on quality systems, testing and documentation;

— additional requirements to specific components of sterilized subassembled syringes ready for filling have been revised;

— requirements on syringes barrels have been revised by:

  — addition of specification for finger flange breakage resistance,

  — addition of specification for cone breakage resistance,

  — addition of requirements specifically for staked needle syringes,

  — addition of performance requirements for non-lubricated syringes.

— figures in Annex A have been updated;

— information of former Annex B has been implemented in 5.1; new Annex B shows information of typical components of a finished prefilled syringe;

— general update of annexes.

A list of all parts in the ISO 11040 series can be found on the ISO website.

In the past, ampoules and injection vials were mainly used for (parenteral) injectable products. However, for the injection of the products contained in those ampoules and vials, a hypodermic syringe combined with the appropriate injection needle is also needed. This means the injectable product must be transferred by the user into the hypodermic syringe before its final use. This procedure is not only time-consuming, but also presents a great number of possibilities for contamination.

To ensure safe use of an injectable product, prefilled syringes for single use are on the market for many years. Without a doubt, such prefilled syringes permit immediate injection of the product contained after relatively simple handling. These syringes can also be used in injectors with automated functions where further and particular requirements apply.

Based on the diameter of the prefilled syringes, appropriate components, such as plunger stoppers, tip caps, needle shields, and other syringe closure systems can also be standardized. In conjunction with the right sealing components, they offer a system for (parenteral) injectable use. The producers of filling machines can use this document to standardize the equipment of the machines.

In the beginning of prefilled syringe processing by the pharmaceutical industry, syringes made of tubing glass were delivered to the pharmaceutical companies in the form of so called non-sterile “bulkware” only. The process steps washing, drying, inner surface lubrication, sealing the syringe with a syringe closure system, sterilization, as well as filling and closing, were then performed in the pharmaceutical companies. Processing of “bulkware” is still performed this way. Sterilized subassembled syringes have partially replaced non-sterile “bulkware”.

In the case of sterilized subassembled syringes ready for filling, responsibility for the aforementioned process steps relevant to the injectable product lies with the manufacturer of the primary packaging material. Following the assembly of the needle shield on syringes with a staked needle or tip caps for the Luer slip version, the subassembled syringes are placed into so called nests. The nests, in turn, are placed into a plastic tub. The syringes in the nest are protected against contamination by means of an insert liner and the tub itself is sealed by a sealing lid (which is currently and, so far, primarily achieved using a gas permeable material). Thus, the tub properly sealed with the sealing lid represents the “sterile barrier system”. The sealed tub is then wrapped into a sealable bag and, thus, ready for sterilization, which is currently and, so far, primarily performed using ethylene oxide.

In this form, the sterilized subassembled syringes ready for filling are delivered to the pharmaceutical companies in a sterile condition, where they are processed on suitable machines.