

**Microbiological Protocol for the
Integrity Testing of Syringes**

1st Edition

February 2006

Microbiological Protocol for the Integrity Testing of Syringes

Introduction

Disposable syringes are regularly used as final containers for aseptic products prepared within hospital units. The protocol is intended to assess the integrity of the individual syringe/hub containers systems in use at various units.

The principle of the test is to fill the syringe system with sterile nutritive media, the outside of the syringe container is then challenged with an actively growing micro-organism in order to assess container integrity.

These points should be taken into account by units using disposable syringes/closure systems as containers:-

- Luer lock closures provide a more secure and integral closure than luer slip.
- The bending of the extended plunger after filling, for example during storage and transport, should be avoided. This is known to produce problems with pack integrity. Syringes, therefore, should not be filled to their full extent in order to help minimise the potential for bending of the plunger.
- The preparation process should include a check to ensure a firm fit of syringe and hub for each individual item.

Method

1. Preparation of broth filled syringes

- 1.1 A suitable number (e.g. a batch or at least 20 syringes) are prepared in the aseptic unit to contain sterile Tryptone Soya Broth (TSB) in place of the product. The syringes are prepared according to normal procedures and sealed with the appropriate hub.
- 1.2 The details of the syringe and hub manufacturer and batch number are recorded.
- 1.3 These broth filled syringes are pre-incubated at 20-25°C for 7 days, then 30-35°C for 7 days to ensure that the aseptic fill has been carried out correctly and the contents are sterile. Discard any syringes showing turbidity or microbial growth.

2. Preparation of challenge micro-organism

Brevundimonas diminuta is a suitable micro-organism since it is a small, motile rod shaped bacterium, and not known to be pathogenic, but caution should be exercised in use.

Prepare a pure culture of the micro-organism and inoculate into a 100ml of TSB broth and incubate for 18-24 hours at 30-35°C. This is used as the inoculum in the integrity test.

3. Integrity Test (Whole immersion)

- 3.1 Prepare a sterile container of suitable size to contain the syringes under test and which is also capable of being placed in an incubator. The container should be provided with a close fitting lid and be resistant to the spillage of its contents.
- 3.2 In a laminar flow cabinet spray and wipe the outer surface of the syringes under test with sterile 70% IMS and allow to dry. Place syringes in the container(s) and cover with s/s TSB ensuring that the syringes remain submerged.
- 3.3 Inoculate the container(s) housing the syringes immersed in broth with 1 ml of the 18-24 hour culture of *Brevundimonas diminuta*. Incubate the containers for 14 days at 30-35°C.
- 3.4 Following incubation remove syringes from the broth culture (CAUTION – use PPE when handling contaminated syringes and ensure that a risk assessment has been carried out) and examine each syringe for turbidity/growth showing *Brevundimonas diminuta* access into the syringe.
- 3.5 The integrity of the syringe/hub system is confirmed providing that the broth in all syringes remains free from growth.

4. Integrity Test (partial immersion)

This is a specific test to challenge areas where micro-organisms may gain access to the contents of the syringe, i.e. at the plunger barrel interface or at the hub luer fitting.

- 4.1 Prepare a suitable sized holder in order that the syringe(s) under test are held upright.
- 4.2 Place the syringe upright, with the plunger uppermost, in a holder and fill the barrel of the syringe above the plunger with the seeded broth culture of *Brevundimonas diminuta*; OR
Place the hub end of the syringe in a bottle of TSB broth sufficient to cover the hub and inoculate with *Brevundimonas diminuta*.
- 4.3 Incubate the containers for 14 days at 30-35°C
- 4.4 Following incubation remove syringes and check for turbidity indicating the penetration of *Brevundimonas diminuta* into the syringe contents.
- 4.5 The integrity of the syringes/hub system is confirmed providing that the broth in all syringes remains free from microbial growth.

Prepared by Trevor Munton for the Microbiological Protocols Group, a working group of the NHS Pharmaceutical Quality Assurance Committee.
October 2005

Members of the Microbiological Protocols Group
Trevor Munton
Phil Hunt
John Rhodes
Alison Webber