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Risk management of particulate contamination for devices with intravascular access

Gestion des risques de contamination particulaire pour les dispositifs d'accès intravasculaire

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Foreword

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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*.

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Introduction

Medical devices, that are part of the fluid path for delivery directly into circulating blood or are connected to those devices (such as administration or extension sets), include a risk of delivering particulate matter to the patient's body.

These particulates can be created or transferred to the devices during the production or application of those devices and can cause a variety of severe and fatal harms to patients (such as phlebitis, pulmonary emboli, pulmonary granulomas, immune system dysfunction, pulmonary dysfunction, infarction and death).

All parenteral products contain such particulate matter, as it is technically impossible to produce and use these devices without creating or transferring these particles to the devices. This is considered in technical standards and international pharmacopoeias that identify limits of particulate contamination, but these limits can only be considered as a definition of the maximum particle load that is based on current technical state of the art for various particle size ranges.

Several studies and publications imply, that no rationale for any tolerable number for the particulate contamination exists. The occurrence rates of related severe and fatal complications in patients that receive parenteral infusions is closely related to factors such as:

— route of administration;

— particle size and shape;

— number of particles injected;

— particle composition;

— patient population;

— exposure by multiple devices.

Additionally, the current specifications in standards and international pharmacopoeias are omitting the fact, that medical devices and drug containers are typically used in combinations with each other (e.g. container, infusion set, IV-catheter) and/or in parallel (e.g. several infusions running in parallel or in sequence) and/or repeatedly (e.g. several containers/infusion sets being used consecutively). With any of these, the total particulate load that patients receive is an addition of all those sources.

As the complexity of the number of influencing factors and their interrelations do not allow the derivation of any safe level of particulate contamination, the current specifications in standards and pharmacopeia can lead to an inappropriate assumption of safety by manufacturers, regulators, authorities, and clinical practitioners when these levels are met.

This document is intended to provide alternative perspectives on how to control risks related to particulate contaminations and to guide manufacturers, regulators, and authorities into a more comprehensive assessment of the measures related to reducing particulate contaminations.

The leading concept behind this alternative perspective is to apply the general methodology of risk management to identify, assess and control the risks that are related to particulate matter rather than defining an unsubstantiated level of assumed safety.