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MEDICAL DEVICE GUIDANCE DOCUMENT

ESSENTIAL PRINCIPLES OF SAFETY AND PERFORMANCE OF IVD MEDICAL DEVICES

Medical Device Authority
MINISTRY OF HEALTH MALAYSIA

Contents

Page

Preface iii
Introduction iv
1 Purpose 1
2 Scope 1
3 Terms and definitions 1
4 Safety and performance of medical devices – general principles 2
5 Essential principles of safety and performance of IVD medical devices 3
5.1 General principles 3
5.2 Chemical, physical and biological properties 4
5.3 Infection and microbial contamination 4
5.4 IVD medical devices incorporating materials of biological origin 5
5.5 Manufacturing and environmental properties 6
5.6 Performance characteristics 7
5.7 Protection against radiation 7
5.8 IVD medical devices that incorporate software and standalone IVD medical device software 8
5.9 IVD Medical devices connected to, or equipped with, an energy source 8
5.10 Protection against mechanical and thermal risks 8
5.11 Protection against the risks posed by IVD medical devices intended by the manufacturer for self-testing 9
5.12 Label and instructions for use 9
5.13 Performance evaluation including analytical performance and, where appropriate, clinical performance 9

Preface

This document is intended to provide general guidance. Although we have tried to ensure that the information contained here is accurate, we do not, however, warrant its accuracy or completeness. The Medical device Authority (MDA) accepts no liability for any errors or omissions in this document, or for any action / decision taken or not taken as a result of using this document. If you need specific legal or professional advice, you should consult your own legal or other relevant professional advisers.

In the event of any contradiction between the contents ofthis document and any written law, the latter should take precedence.

Examples cited in this document are purely for illustrative purposes only.

This Medical Device Guidance Document (MDGD) shall be read in conjunction with the current laws and regulations used in Malaysia, which includes but not limited to the following-

a) Medical Device Act 2012 (Act 737);

b) Medical Device Regulations 2012.

The Authority may request for information or specify conditions not described in this document that is deemed necessary to ensure the quality, safety and efficacy of the product.

The Authority reserves the right to amend any part of the guidance document whichever it deems fit.

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Introduction

Regulatory controls are intended to safeguard the health and safety of patients, users and others by ensuring that manufacturers of medical devices follow specified procedures during design, manufacture and marketing.

It is the responsibility of the manufacturer to demonstrate that its product is safe and perform as its intended use based on essential safety and performance criteria for an IVD medical device.

GUIDANCE DOCUMENT: ESSENTIAL PRINCIPLES OF SAFETY AND PERFORMANCE OF IVD MEDICAL DEVICES

1 Purpose

The purpose of this document is to describe generic safety and performance criteria of an IVD medical device collectively referred to as 'essential principles' that may be used to assess the safety of a particular IVD medical device. A manufacturer is able to demonstrate its medical device is safe by reviewing these essential principles, selecting those that are relevant to a particular device, and ensuring through its design and manufacturing controls that the device meets them.

2 Scope

This document applies to products that fall within the definition of an IVD medical device, as defined in MDA/GD-1: Definition of Medical Device.

3 Terms and definitions

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

3.1 Analytical performance

The demonstration of the analytical performance characteristics supporting the intended use of the IVD medical device.

3.2 Clinical performance of an IVD medical device

The demonstration of the clinical performance characteristics supporting the intended use of the IVD medical device.

3.3 Harm

The demonstration of the clinical performance characteristics supporting the intended use of the IVD medical device.

3.4 Hazard

Potential source of harm.

3.5 Intended use / purpose

The objective intent of the manufacturer regarding the use of a product, process or service as reflected in the specifications, instructions and

information provided by the manufacturer.

3.6 IVD medical device for self-testing

Any IVD medical device intended by the manufacturer for use by lay persons.

3.7 Lay person

Individual that does not have formal training in a relevant field or discipline.

3.8 IVD medical device

Refer to MDA/GD-1: Definition of Medical Device.

3.9 Performance evaluation for an IVD medical device

Investigation process of an IVD medical device for the purpose of establishing or verifying its performance.

3.10 Authority

Medical Device Authority, Ministry Of Health.

3.11 Risk

Combination of the probability of occurrence of harm and severity of that harm.

3.12 Specimen

The discrete portion of a body fluid or tissue or other sample associated with the body taken for examination, study, or analysis of one or more quantity or characteristic to determine the character of the whole.

4 Safety and performance of medical devices – general principles

A manufacturer of a medical device is expected to design and manufacture a product that is safe and performs as intended. This guidance document describes fundamental design and manufacturing requirements, referred to as ‘Essential Principles of Safety and Performance’, to ensure this outcome. This document is structured to provide general essential principles that apply to all IVD medical devices.

The medical device manufacturer’s design and manufacturing activities are under the control of its quality management system. Conformity of the device to all the applicable Essential Principles will be demonstrated and assessed according to procedures designated by the Regulatory Authority and described in other guidance document.

5 Essential principles of safety and performance of IVD medical devices

5.1 General principles

5.1.1 Medical devices shall be designed and manufactured in such a way that, when used under the conditions and for the purposes intended and, where applicable, by virtue of the technical knowledge, experience, education or training of intended users, they will not compromise the clinical condition or the safety of patients, or the safety and health of users or, where applicable, other persons, provided that any risks which may be associated with their use constitute acceptable risks when weighed against the benefits to the patient and are compatible with a high level of protection of health and safety.

5.1.2 The solutions adopted by the manufacturer for the design and manufacture of the devices shall conform to safety principles, taking account of the generally acknowledged state of the art. When risk reduction is required, the manufacturer shall control the risk(s) so that the residual risk(s) associated with each hazard is judged acceptable. The manufacturer shall apply the following principles in the priority order listed:

a) identify known or foreseeable hazards and estimate the associated risks arising from the intended use and foreseeable misuse;

b) eliminate risks as far as reasonably practicable through inherently safe design and manufacture;

c) reduce as far as is reasonably practicable the remaining risks by taking adequate protection measures, including alarms;

d) inform users of any residual risks.

5.1.3 Devices shall achieve the performance intended by the manufacturer and be designed, manufactured and packaged in such a way that they are suitable for one or more of the functions within the scope of the definition of a medical device applicable in each jurisdiction.

5.1.4 The characteristics and performances referred to in Clauses 5.1.1, 5.1.2 and 5.1.3 shall not be adversely affected to such a degree that the health or safety of the patient or the user and, where applicable, of other persons are compromised during the lifetime of the device, as indicated by the manufacturer, when the device is subjected to the stresses which can occur during normal conditions of use and has been properly maintained in accordance with the manufacturer's instructions.

5.1.5 The devices shall be designed, manufactured and packed in such a way that their characteristics and performances during their intended use will not be adversely affected under transport and storage conditions (for example, fluctuations of temperature and humidity) taking account of the instructions and information provided by the manufacturer.

5.1.6 The benefits must be determined to outweigh any undesirable side effects for the performances intended.

5.2 Chemical, physical and biological properties

5.2.1 The IVD medical devices shall be designed and manufactured in such a way as to ensure the characteristics and performance referred to in Section 5.1. Particular attention shall be paid to the possibility of impairment of analytical performance due to incompatibility between the materials used and the specimens and/or analyte (measurand) to be detected (such as biological tissues, cells, body fluids and micro-organisms) intended to be used with the device, taking account of its intended purpose.

5.2.2 The IVD medical devices shall be designed, manufactured and packaged in such a way as to minimize the risk posed by contaminants and residues to the persons involved in the transport, storage and use of the devices and to patients, taking account of the intended purpose of the product.

5.2.3 The IVD medical devices shall be designed and manufactured in such a way as to reduce as far as reasonably practicable and appropriate the risks posed by substances that may leach or leak from the IVD medical device. Special attention shall be given to substances which are carcinogenic, mutagenic or toxic to reproduction.

5.2.4 IVD medical devices shall be designed and manufactured in such a way as to reduce as far as reasonably practicable and appropriate risks posed by the unintentional ingress or egress of substances into or from the IVD medical device taking into account the device and the nature of the environment in which it is intended to be used.

5.3 Infection and microbial contamination

5.3.1 The IVD medical devices and manufacturing processes shall be designed in such a way as to eliminate or to reduce as far as reasonably practicable and appropriate the risk of infection to user, professional or lay person, or, where applicable, other person . The design shall:

a) allow easy and safe handling;

and, where necessary;

b) reduce as far as reasonably practicable and appropriate any microbial leakage from the IVD medical device and/or microbial exposure during use; and

c) prevent microbial contamination of the IVD medical device or specimen where applicable, by the user, professional or lay person, or other person.

5.3.2 IVD medical devices labelled either as sterile or as having a special microbiological state shall be designed, manufactured and packaged to ensure they remain so when placed on the market and remain so under the transport and storage conditions specified by the manufacturer, until the protective packaging is damaged or opened.

5.3.3 IVD medical devices labelled either as sterile or as having a special microbiological state shall have been processed, manufactured and, if applicable, sterilized by appropriate, validated methods.

5.3.4 IVD medical devices intended to be sterilized shall be manufactured in appropriately controlled (e.g. environmental) conditions.

5.3.5 Packaging systems for non-sterile IVD medical devices shall maintain the integrity and cleanliness of the product.

5.4 IVD medical devices incorporating materials of biological origin

5.4.1 Where IVD medical devices include tissues, cells and substances originating from animals, processing, preservation, testing and handling of tissues, cells and substances of animal origin shall be carried out so as to provide optimal safety for user, professional or lay person, or other person.

In particular safety with regard to viruses and other transmissible agents shall be addressed by implementation of validated methods of elimination or inactivation in the course of the manufacturing process. This may not apply to certain IVD medical devices if the activity of the virus and other transmissible agent are integral to the intended purpose of the IVD medical device or when such elimination or inactivation process would compromise the performance of the IVD medical device.

The manufacturer shall retain information on the geographical origin of the animals.

5.4.2 Where IVD medical devices include human tissues, cells and substances, the selection of sources, donors and/or substances of human origin, the processing, preservation, testing and handling of tissues, cells and substances of such origin shall be carried out so as to provide optimal safety for user, professional or lay person, or other person.

In particular safety with regard to viruses and other transmissible agents shall be addressed by implementation of validated methods of elimination or inactivation in the course of the manufacturing process. This may not apply to certain IVD medical devices if the activity of the virus and other transmissible agent are integral to the intended purpose of the IVD medical device or when such elimination or inactivation process would compromise the performance of the IVD medical device.

5.4.3 Where IVD medical devices include cells and substances of microbial origin, processing, preservation, testing and handling of cells and substances

shall be carried out so as to provide optimal safety for user, professional or lay person, or other person.

In particular, safety with regard to viruses and other transmissible agents shall be addressed by implementation of validated methods of elimination or inactivation in the course of the manufacturing process. This may not apply to certain IVD medical devices if the activity of the virus and other transmissible agent are integral to the intended purpose of the IVD medical device or when such elimination or inactivation process would compromise the performance of the IVD medical device.

5.5 Manufacturing and environmental properties

5.5.1 If the IVD medical device is intended for use in combination with other devices or equipment, the whole combination, including the connection system shall not impair the specified performance of the devices. Any restrictions on use applying to such combinations shall be indicated on the label and/or in the instructions for use.

5.5.2 IVD medical devices shall be designed and manufactured in such a way as to remove or reduce as far as reasonably practicable and appropriate-

a) the risk of injury to user, professional or lay person, or other person in connection with their physical and ergonomic features;

b) the risk of use error due to the ergonomic features, human factors and the environment in which the IVD medical device is intended to be used;

c) risks connected with reasonably foreseeable external influences or environmental conditions, such as magnetic fields, external electrical and electromagnetic effects, electrostatic discharge, pressure, humidity, temperature or variations thereof;

d) the risks associated with the use of the IVD medical device when it comes into contact with materials, liquids, and gases to which it is exposed during normal conditions of use;

e) the risk associated with the possible negative interaction between software and the environment within which it operates and interacts;

f) the risks of accidental penetration of substances into the IVD medical device;

g) the risk of incorrect identification of specimens; and

h) the risks of reasonably foreseeable interference with other devices such as carry over between IVD medical devices.

5.5.3 IVD medical devices shall be designed and manufactured in such a way as to minimize the risks of fire or explosion during normal use and in single fault

condition. Particular attention shall be paid to IVD medical devices whose intended use includes exposure to or use in association with flammable substances or substances which could cause combustion.

5.5.4 IVD medical devices must be designed and manufactured in such a way as to facilitate the safe disposal of any waste substances.

5.6 Performance characteristics

5.6.1 IVD medical devices shall be designed and manufactured in such a way that the performance characteristics support the intended use, based on appropriate scientific and technical methods. In particular, where appropriate, the design shall address sensitivity, specificity, accuracy which is trueness and precision (repeatability and reproducibility), control of known relevant interference and limits of detection.

These performance characteristics need to be maintained during the lifetime of the IVD medical device as indicated by the manufacturer.

5.6.2 Where the performance of devices depends on the use of calibrators and/or control materials, the traceability of values assigned to such calibrators and/or control materials shall be assured through available reference measurement procedures and/or available reference materials of a higher order.

5.6.3 Wherever possible values expressed numerically shall be in commonly accepted, standardised units, and understood by the users of the device.

5.7 Protection against radiation

5.7.1 IVD medical devices shall be designed, manufactured and packaged in such a way that exposure of user, professional or lay person, or other person to the emitted radiation (intended, unintended, stray or scattered) is reduced as far as practicable and appropriate.

5.7.2 When IVD medical devices are intended to emit potentially hazardous, visible and / or invisible radiation, they shall as far as practicable and appropriate be-

a) designed and manufactured in such a way as to ensure that the characteristics and the quantity of radiation emitted can be controlled and / or adjusted; and

b) fitted with visual displays and / or audible warnings of such emissions.

5.8 IVD medical devices that incorporate software and standalone IVD medical device software

5.8.1 For IVD medical devices which incorporate software or for standalone software that are IVD medical devices in themselves, the software must be validated according to the state of the art taking into account the principles of development lifecycle, risk management, verification and validation.

5.9 IVD Medical devices connected to, or equipped with, an energy source

5.9.1 IVD medical devices where the safety of the patient depends on an internal power supply in the IVD medical device, shall be equipped with a means of determining the state of the power supply.

5.9.2 IVD medical devices shall be designed and manufactured in such a way as to reduce as far as practicable and appropriate the risks of creating electromagnetic interference which could impair the operation of this or other devices or equipment in the usual environment.

5.9.3 IVD medical devices shall be designed and manufactured in such a way as to provide an adequate level of intrinsic immunity to electromagnetic disturbance to enable them to operate as intended.

5.9.4 IVD medical devices shall be designed and manufactured in such a way as to avoid, as far as reasonably practicable, the risk of accidental electric shocks to the user, professional or lay person, or other person both during normal use of the device and in the event of a single fault condition in the device, provided the IVD medical device is installed and maintained as indicated by the manufacturer.

5.10 Protection against mechanical and thermal risks

5.10.1 IVD medical devices shall be designed and manufactured in such a way as to protect the user, professional or lay person, or other person against mechanical risks connected with, for example, resistance to movement, instability and moving parts.

Where there are risks due to the presence of moving parts, risks due to break-up or detachment, or leakage of substances, then appropriate protection means must be incorporated.

5.10.2 IVD medical devices shall be designed and manufactured in such a way as to reduce to the lowest practicable level the risks arising from vibration generated by the devices, taking account of technical progress and of the means available for limiting vibrations, particularly at source, unless the vibrations are part of the specified performance.

5.10.3 IVD medical devices shall be designed and manufactured in such a way as to reduce to the lowest practicable level the risks arising from the noise emitted, taking account of technical progress and of the means available to reduce noise, particularly at source.

5.10.4 Terminals and connectors to the electricity, gas or hydraulic and pneumatic energy supplies which the user, professional or lay person, or other person has to handle shall be designed and constructed in such a way as to minimize all possible risks.

5.10.5 Accessible parts of the IVD medical devices (excluding the parts or areas intended to supply heat or reach given temperatures) and their surroundings shall not attain potentially dangerous temperatures under normal use.

5.11 Protection against the risks posed by IVD medical devices intended by the manufacturer for self-testing

5.11.1 IVD medical devices intended for self-testing shall be designed and manufactured in such a way that they perform appropriately for their intended purpose taking into account the skills and the means available to lay persons and the influence resulting from variation that can reasonably be anticipated in the lay person's technique and environment. The information and instructions provided by the manufacturer shall be easy for the lay person to understand and apply.

5.11.2 IVD medical devices intended for self-testing shall be designed and manufactured in such a way as to reduce as far as practicable the risk of error by the lay person in the handling of the device and, if applicable, the specimen, and also in the interpretation of results.

5.11.3 IVD medical devices intended for self-testing shall, where reasonably possible, include a procedure by which the lay person can verify that, at the time of use, the product will perform as intended by the manufacturer.

5.12 Label and instructions for use

5.12.1 Users shall be provided with the information needed to identify the manufacturer, to use the device safely and to ensure the intended performance, taking account of their training and knowledge. This information shall be easily understood.

5.13 Performance evaluation including analytical performance and, where appropriate, clinical performance

5.13.1 For an IVD medical device a performance evaluation shall be conducted in accordance with MDA guidance. The performance evaluation

shall review analytical performance data and, where appropriate, clinical performance data in the form of any-

- literature;

- performance study reports; and

- experience gained by routine diagnostic testing.

to establish that the IVD medical device achieves its intended performance during normal conditions of use and that the known, and foreseeable risks, and any undesirable effects, are minimised and acceptable when weighed against the benefits of the intended performance.

The depth and extent of a performance evaluation shall be appropriate to the nature, intended use and risks of the IVD medical device, and in accordance with MDA guidance.

Note: Further information is provided in MDA/GD/IVD-3: Principles of Conformity Assessment for IVD Medical Devices.

5.13.2 Clinical performance studies using specimens from human subjects shall be carried out in accordance with the spirit of the Declaration of Helsinki. This includes every step in the clinical performance study from first consideration of the need and justification of the study to publication of the results.

MEDICAL DEVICE AUTHORITY

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