

Waste Containers (Plastic Bags) for Infectious Waste Disposal in the Medical Laboratory

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The purpose of the current paper was to provide reasonably achievable guidance for the International Standard ISO 15189:2012 accredited medical laboratory to support the implementation of disposal facilities for medical waste by ensuring that usage of infectious waste bags is within acceptable specifications. Guidance documents from selected international organizations were identified: The International Organization for Standardization, the World Health Organization, and the International Committee of the Red Cross. This study identified relevant requirements from selected organizations (n = 3) associated with the support of implementation of storage and disposal facilities for infectious waste in the medical laboratory. The information could be used to develop conformity checklists for internal auditing, if required. The present paper has provided a practical contribution to established knowledge of International Standard ISO 15189:2012 accreditation compliance management in the disposal of potentially infectious wastes using waste bags by laboratory personnel.

Key words: Accreditation, management audit, quality improvement, quality management.

Contemporary situation

International Standard ISO 15189:2012 published by the International Organization for Standardization specifies that the medical laboratory is to have storage and disposal facilities for dangerous materials appropriate to the hazards of the materials (ISO 15189:2012, 5.2.3).¹ To support the implementation of such facilities in the medical laboratory, potential infectious waste management should be maintained in compliance with good practice and applicable requirements [ISO 15189:2012, 4.1.1.4 e)].¹

How should the medical laboratory select appropriate waste containers for infectious waste disposal to support ISO 15189:2012 accreditation?

Infectious waste disposal measures

The medical laboratory must implement suitable measures to ensure relevant waste containers are provided for infectious waste disposal. The term infectious waste, defined as 'waste containing or suspected to contain human pathogenic microbiological agents' (ISO 12891-1:2015, 2.3) differs from hazardous waste, defined as 'waste that is potentially flammable, combustible, ignitable, corrosive, toxic, reactive, infectious or injurious to people or the environment' (ISO 12891-1:2015, 3.14) and medical waste, defined as 'any solid waste that is generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biological materials, including but not limited to isolation wastes, infectious agents, human blood and blood products, pathological wastes, sharps, body

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parts, contaminated bedding, surgical wastes and potentially contaminated laboratory wastes and dialysis wastes' ISO 16304:2018, 3.5).^{2,3} The medical laboratory should use specified leak proof containers to support the waste management implementation.

Relevant good practice guidance

Clause 4 (Management requirements) of ISO 15189:2012 and Clause 5 (Technical requirements) of ISO 15189:2012 do not provide any conformance requirements in relation to waste container physical specification, it is good practice for the medical laboratory to establish relevant infectious waste disposal practices that are in alignment with the following guidance documents from the selected international organizations: the International Organization for Standardization,¹ the World Health Organization, and the International Committee of the Red Cross.

International Standard ISO 15190:2020 published by the International Organization for Standardization provides general waste disposal information to address disposal requirements.⁴ More specifically, information relating to general precautionary waste disposal measures for hazardous waste is provided (ISO 15190:2020, 17.3) and proper labelling of hazards must be maintained to ensure safety for all laboratory personnel (ISO 15190:2020, 18 i).⁴

Table 1. Biological risks, biological hazard and biohazard symbols. The symbol ISO 7000-0659 (2004-01) is the biological risks symbol that should be used to label the waste bags. The other two symbols should not be used.

Symbols	Description
	Functional reference number: 0659 Referent: Biological risks Registration date: 2004-01-15
	Functional reference number: W009 Referent: Warning; biological hazard Registration date: 2011-05-01
	Functional reference number: Nil Referent: Warning; biohazard Registration date: Nil

Further information can be sought from the World Health Organization. The World Health

Organization provides recommendations for waste containers, including single use sharps containers and bags. The bags should be identified with a color codification scheme to support the waste segregation system. For highly infectious waste, the bag should be in yellow, marked with the symbol ISO 7000-0659 (2004-01) from International Standard ISO 7000:2019 published by the International Organization for Standardization together with supplementary safety information 'HIGHLY INFECTIOUS'; for other infectious, pathological and anatomical waste, the bag should be in yellow and marked with the symbol ISO 7000-0659 (2004-01).^{5,6}

It is important to note that there are two similar symbols which should not be used for marking bags. The symbol ISO 7010-W009 (2011-05) from International Standard ISO 7010:2019 prepared by the International Organization for Standardization differs from the symbol ISO 7000-0659 (2004-01) and should not be used.⁷ Another way to ensure the symbol is the recommended one is to check that it is accepted by the universal coded character set (UCS) code, as specified in International Standard ISO/IEC 10646:2017 published by the International Organization for Standardization.⁸ The equivalent pictogram (UCS coded character point: 2623; Associated character name: Biohazard sign) could be used if required (ISO/IEC 10646:2017, 33.5).⁸ Another biohazard symbol that is fluorescent orange red is also available for marking.⁹ However, the symbol is not affiliated with the International Organization for Standardization and should not be used. In addition, the bags should be sturdy, leak proof and chlorine free.⁶ The bag thickness should conform to 70 µm [when measured in accordance with Clause 8 (Procedure) of ISO 7765-1:1988].^{6,10}

The International Committee of the Red Cross also recommends a similar color codification scheme based on the World Health Organization scheme to support the waste segregation system and the bag thickness of 70 µm (when measured in accordance with Clause 8 of ISO 7765-1:1988) is also recommended to support the waste segregation system.¹¹

It should be noted that applicable international, national or regional requirements may also be enforceable (ISO 15189:2012, 1).¹ The medical laboratory must do what is reasonably achievable to ensure

waste bags are identified and marked unambiguously for a clear allocation of the waste fractions for waste management.

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