
International Standard



7828

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Water quality — Methods of biological sampling — Guidance on handnet sampling of aquatic benthic macro-invertebrates

Qualité de l'eau — Méthodes d'échantillonnage biologique — Guide pour le prélèvement des macro-invertébrés benthiques à l'épuisette

First edition — 1985-02-15

UDC 543.3

Ref. No. ISO 7828-1985 (E)

Descriptors: water, quality, invertebrates, sampling, sampling equipment.

Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7828 was prepared by Technical Committee ISO/TC 147, *Water quality*.

Water quality — Methods of biological sampling — Guidance on handnet sampling of aquatic benthic macro-invertebrates

0 Introduction

A handnet is probably the most versatile sampler for benthic macro-invertebrates and can be used in a large variety of shallow waters. The methods of sampling with a handnet specified are appropriate when qualitative results are required. A handnet will not give absolute results (i.e. numbers of individuals of different species per unit area of river bed). However, it is usually possible to give some indication of the relative abundance of taxa within a sample but the results should be interpreted with caution.

1 Scope and field of application

This International Standard specifies equipment and procedures for the sampling of benthic macro-invertebrates by handnet in shallow waters (down to a depth of about 1,5 m) which are accessible either by wading or from a bank or boat.

The procedures are applicable to the sampling of all accessible aquatic habitats in rivers, streams, ponds, estuaries and lake shores. They provide qualitative data on the presence, absence, diversity and relative abundance of taxa depending on sampling effort and mesh size.

2 Definitions

2.1 benthic: Dwelling at the bottom of an aquatic environment.

2.2 biotope: An area in which the main environmental conditions are uniform.

2.3 macro-invertebrates: Invertebrates that are easily visible without magnification ($> 0,5$ mm).

2.4 taxa: Taxonomic units, for example families.

3 Principle

Sampling of benthic macro-invertebrates in shallow, standing or running water by manual collection using a lightweight handnet.

4 Sampling equipment

Handnet, consisting of a handle and a frame holding a net in which the organisms are collected.

Handles are usually made of metal, wood or reinforced plastics. Frames, usually constructed in metal, have been made in various shapes, for example round, triangular, rectangular. Of these alternatives the rectangular shape (see figure 1) is preferred since the flat edge can be placed in close contact with the bed during use and the vertical sides permit a better cross-sectional area of water to enter the net than does a triangular shape. The frame should be large enough to allow a reasonable sample to be taken but not be so large that the complete handnet offers too much resistance to the flow of water, which could make sampling difficult in fast flows. Suitable rectangular handnets currently in use have evolved in the light of experience and have frame dimensions in the following ranges (see figure 1):

| | |
|---------------|--------------------------------|
| width, w | 200 to 400 mm |
| height, h | 200 to 300 mm |
| shoulder, s | 100 to 200 mm (for example) |

In choosing an appropriate net two interrelated factors have to be considered:

- the dimensions and shape of the net;
- the mesh size of the net material.

Finer mesh sizes increase the risk of clogging with organisms and debris which reduces net efficiency by increasing the tendency of water and organisms to flow around rather than into the net. This effect can be minimized by increasing the depth, d , of the net (see figure 2) or frequent emptying. On the other hand, an unnecessarily deep net can be inconvenient in use. For guidance, the table gives examples of the most suitable depths of nets as a function of their size of openings.

The shape of the net is not particularly important from a sampling point of view but may be determined by practical considerations in manufacture, for example figure 2a) shows how two conical nets can be cut from material 1 m wide, whilst figure 2 b) is the pattern for one of the more usual bag-shaped nets. The net material is normally sewn to strong canvas which is attached to an inner frame thereby reducing abrasion. Methods of joining the inner and main frames, which facilitate replacement in the field, are clearly advantageous. Net material may be of a monofilament weave or knitted but the latter, being stronger, may be preferred for this reason. Synthetic fibre is