
**Hydrometry — Catching-type liquid
precipitation measuring gauges**

*Hydrométrie — Appareils de mesure de précipitations liquides de type
collecteur*



This document is a preview generated by ELS



COPYRIGHT PROTECTED DOCUMENT

© ISO 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

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

Published in Switzerland

Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Instrument specifications	1
4.1 General.....	1
4.2 General gauge specifications.....	2
4.3 Environment.....	2
4.3.1 General.....	2
4.3.2 Temperature.....	2
4.3.3 Relative humidity.....	3
5 Recording	3
5.1 Recording format.....	3
5.2 Recording interval.....	3
6 Environmental protection and housing	3
7 Installation	4
8 Estimation of measurement uncertainty	4
8.1 General.....	4
8.2 Factors of measurement uncertainty.....	4
8.3 Type-A estimation.....	7
8.4 Type-B estimation.....	7
8.5 Combined uncertainty.....	7
Annex A (Informative) Catching-type liquid precipitation measuring gauges	8
Annex B (informative) Uncertainties of catching-type liquid precipitation measuring gauges	15
Bibliography	18

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 113, *Hydrometry*, Subcommittee SC 5, *Instruments, equipment and data management*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Rainfall totals and intensity rates are measured at frequencies ranging from seconds to months, and the data are required by the user on timescales ranging from immediate to several weeks. This document covers instrumentation that measures rainfall accumulation and rainfall intensity (RI) by collecting the volume of water that falls on a fixed area. The gauge user should decide on the gauge design, measurement unit, period of rainfall and network purpose.

Unlike many other meteorological instruments, there is no absolute physical standard against which a raingauge (hereafter called catching-type liquid precipitation measuring gauges) can be compared. Many different types, shapes and sizes of catching-type liquid precipitation measuring gauges are acceptable for the measurement of rainfall and rainfall depth, each reflecting a specific requirement. Most consist of a circular collecting device, delineating the fixed area of the sample, and a funnel leading into a storage reservoir or measuring system, or both. Some types of automatic gauges do not require a funnel. Since various sizes and shapes of orifice and gauge heights are used in different countries, the measurements are not strictly comparable.

This document provides general information on the functions of catching-type liquid precipitation gauges. The annexes in this document provide guidance on the types of catching-type liquid precipitation measuring gauges currently available (see [Annex A](#)) and the measurement uncertainty associated with them (see [Annex B](#)). Although advances in measurement electronic technologies and smart instruments have led to the development of optical and hybrid type liquid precipitation measuring gauges, they are not included in this document.

NOTE 1 This document specifies only the general functions of catching-type liquid precipitation measuring gauges. For in-depth and extensive information on precipitation measuring gauges, see References [1] and [2].

NOTE 2 For detailed information on measurement unit and period of rainfall, see Reference [1].

NOTE 3 For detailed information on the design of a reference raingauge pit as well as installation, see Reference [3].

Hydrometry — Catching-type liquid precipitation measuring gauges

1 Scope

This document specifies the typical requirements of instrumentation for measuring liquid precipitation, primarily for the purpose of hydrological and meteorological observation. This document is applicable to both non-recording and recording catching-type precipitation gauges for the measurement of liquid precipitation. This document covers design criteria for the gauges and elements to be considered in their construction. This document does not include specification, design and installation conditions.

NOTE Since the measurement of solid precipitation is outside the scope, the disadvantages of solid precipitation apply to all gauges listed in [Annex A](#). The measurement of solid precipitation and associated disadvantages are well documented in Reference [1].

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 772, *Hydrometry — Vocabulary and symbols*

BS 7843-3, *Acquisition and management of meteorological precipitation data from a gauge network — Part 3: Code of practice for the design and manufacture of storage and automatic collecting raingauges*

3 Terms and definitions

For the purpose of this document, the terms and definitions given in ISO 772 and BS 7843-3 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

4 Instrument specifications

4.1 General

Catching-type liquid precipitation measuring gauges are classified as non-recording and recording types. The non-recording type has ordinary and storage gauges. The recording type has weighing, tipping-bucket and floating types. Catching-type liquid precipitation measuring gauges have a resolution of 0,1 mm to 1 mm, and can measure rainfall intensities of 0,1 to 1 000 mm·h⁻¹ or higher. Measurement errors can occur according to installation conditions, the measurement environment, solid precipitation and rainfall intensity.

A catching-type liquid precipitation measuring gauge shall be a circular orifice and shall be formed perpendicular to the outer slope and the inner surface with sharp edges. The diameter of the edge of the collecting device should not differ by more than 0,2 % of the stated diameter in any direction. Furthermore, the collector should be designed to prevent rain from splashing in and out. This can be achieved if the vertical wall is sufficiently deep and the slope of the funnel is sufficiently steep (at least 45 %). The container should have a narrow entrance and be sufficiently protected from radiation to